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. Studies on Pest Complex of Pigeonpea and Their Management with Special Reference to Pod Borer, *Marucavitrata*(Geyer)

JAHANTAJ, K. A.

ABSTRACT

Survey on insect pests of pigeonpea was carried out in Shivamogga and Chitradurga districts of Karnataka during 2017-18.The highest population of *Helicoverpaarmigera* (Hubner), *Clavigrallagibbosa* (Spinola), *Aphis craccivora* (Koch), *Empoasca*sp. *Megalurothrips*sp. and *Myllocerus*sp. were found in Shivamogga followed by Chitradurga district. However, the peak incidence of *Marucavitrata*(Geyer), *Melanagromyzaobtusa* (Malloch), *Exelastisatomosa*(Walsingham),*Riptortuspedestris*(Fabricius),and*Otinotus*sp. were found in Chitradurga district followed by Shivamogga district. The biology of *M. vitrata*on pigeonpea under laboratory conditions revealed that, female moth laid minute eggs singly or in batches of 2 to 6 on the under surface of leaves, terminal shoots and flower buds. The mean incubation period, larval, pre-pupal, pupal, male and female adult period was 3.3±0.70, 13.45±0.95,2.35±0.41, 9.85±0.67, 8.1±1.19 and 9.7±1.16 days, respectivey. Evaluation of insecticide molecules against pod borer complex of pigeonpea indicated that chlorantraniliprole, emamectin benzoate, and flubendiamide were significantly effective against pod borer *H. armigera. E. atomosa* population was effectively reduced by chlorantraniliprole followed by spinosad, emamectin benzoate,flubendiamide and Chlorantraniliprole proved very effective in recording the lowest pod fly maggot population of pigeonpea whereas, NSKE 5 per cent was least effective in reducing larval population compared to other treatments.The highest and least percent pod damage was observed in NSKE 5 per cent (27.97) and chlorantraniliprole 18.5 SC, respectively. Chlorantraniliprole recorded highest B:C ratio of 2.63 compared to rest of the treatments. Untreated control recorded the lowest B:C ratio of 1.09. All treatments recorded higher B:C ratio and superior over untreated control.

August, 2018

(B. C. Hanumanthaswamy)
Major Advisor

2. Species Composition, Ecology and Management of Leafhoppers (CICADELLIDAE: HEMIPTERA) Infesting Potato

MEGHANA, N.

ABSTRACT

Investigations on **Species composition, ecology and management of leafhoppers (Cicadellidae: Hemiptera) infesting potato** was carried out in major potato growing regions of Karnataka during 2017-18. During the study, nineteen species of leafhoppers were recorded. Molecular technique using 650-base pair region of the mitochondrial cytochrome oxidase I (COI) gene was employed to identify different *Empoasca* spp. A total of nine sequences were submitted to NCBI-Gene Bank and accession numbers were obtained. The population of potato leafhoppers attained peak during harvesting stage in both seasons *i.e.,Kharif* and *Rabi* 2017-18. Incidence of potato leafhoppers hadsignificant negative correlation with wind speed, non-significant positive correlation with minimum temperature, relative humidity and sunshine hours. A non-significant negative correlation was observed with maximum temperature and total rainfall during *Kharif* 2017. Leafhoppers incidence in *Rabi* 2017-18, showed a non-significant positive correlation with maximum temperature, minimum temperature, total rainfall and wind speed and non-significant negative correlation with relative humidity and sunshine hours. Highest number of trichomes were found in Kufri Jyothi (218.00) followed by FL-5 (79.00) and lowest in S-6 (39.30) followed by FC-3 (72.50). Lower TSS, higher phenol and higher potassium content was noticed in Kufri Jyothi and FL-5 followed by FC-3 and S-6. Among the selected insecticides Imidacloprid 17.8 SL @ 0.3 ml/lit recorded significantly lower number of leafhoppers.The economic analysis of different insecticides indicated imidacloprid17.8 SL@ 0.3 ml/lit was most effective by recording highest C:B ratio of (1:3.90).

August, 2018

(Kalleshwaraswamy, C.M.)
Major Advisor

3. Species Complex of Aphids in Legumes with Special Reference to Bio-Ecology and Organic Management of Field Bean Aphid,*Aphis craccivora*(KOCH)

NAMITHA N. V.

ABSTRACT

Investigations on **Species complex of aphids in legumes with special reference to bio-ecology and organic management of field bean aphid, *Aphis craccivora*(Koch)** was carried out at College of Agriculture, Navile, UAHS, Shivamogga during 2017-18. During the study, two species of aphids*viz*., *Aphis craccivora* and *Aphis gossypii* Glover were found infesting different legumes in different regions of Shivamogga during 2017-18. The population of bean aphids attained peak during third week of October (15.3 aphids per five centimeter twig) during *Kharif*. During *Rabi* season, the aphid population was maximum during first week of January (224.7 aphids per five centimeter twig). Incidence of bean aphid, *Aphis craccivora*had non-significant negative correlation with total rainfall, non-significant positive correlation with maximum temperature, significant negative correlation with minimum temperature and non- significant positive correlation with relative humidity during *Kharif* 2017,while during *Rabi* 2017-18, aphid showed non-significant negative correlation with total rainfall, maximum temperature, minimum temperature and positive correlation with relative humidity. Biological studies of *Aphis craccivora*on *Lablab purpureus*revealed that the total life cycle of the bean aphid under laboratory condition ranged from 14.20 to 20.80 days with a mean of 17.50± 1.91 days. Total nymphal period ranged from 4.20 to 7.70 days with a mean of 5.43 ± 1.05 days and fecundity was 29 ± 4.34 nymphs per female in laboratory.Among the organic molecules, *Verticilliumlecanii*2×10^8 cfu/g (1.5ml/lt)was found more effective in the management of bean aphid. It was significantly superior (with 79.63 mean per cent reduction of aphids) over untreated control. Among all organic molecules, tested *V. lecanii*2×10^8 cfu/g (1.5ml/lt) recorded highest C: B ratio of 1: 3.11 by recording highest green pod yield (24.14 q / ha).

July, 2018

(R.N.Kencharaddi)
Major Advisor

4. Bio Ecology and Management of Lablab Leaf Webber, *Omiodes indicata* (Fabricius) (Lepidoptera: Crambidae) on Field Bean

NIRANJANAKUMAR, K. V.

ABSTRACT

An investigation on "**Bio ecology and management of lablab leaf webber, *Omiodes indicata* F. On field bean"** was carried out at the College of Agriculture, Navile, UAHS, Shivamogga during *Kharif* and *Rabi* of 2017-18. Lablab leaf webber, *O. indicata* Fab. (Lepidoptera:Crambidae) is an emerging pest on leguminous plants, commonly known as bean leaf webworm moth. Studies on biology of *O. indicata* on field bean under laboratory conditions revealed that five larval instars and four moults took place through the shedding of larval skin and casting of head capsule. The mean larval, pre-pupal, pupal, male and female adult period was 13.45±0.95, 2.35±0.411, 9.85±0.67, 8.20±1.39 and 9.7±1.16 days, respectively. The full grown larvae pupated in the rolled leaves. The total developmental period was 25.52±2.71 days. The incidence of *O. indicata* was recorded in two seasons i.e., *Kharif* and *Rabi*. During *Kharif* 2017 pest reaches peak population during 2nd week of September 2.35 larvae per plant and during *Rabi* 2017 fourth week of January 3.10 larvae per plant and it becomes low at the end of both the seasons. Minimum temperature shows positive significant correlation against pest population during *Kharif* 2017. Maximum temperature and morning relative humidity shows positive significant correlation against pest population, whereas total rainfall, bright sunshine hours shows significant negative correlation against pest population. Evaluation of selected insecticides indicated that flubendiamide 39.35 SC (0.1 ml/lt) proved best of all the insecticides to control the lablab leaf webber in field bean with highest green pod yield of 31.23 q/ha and B:C ratio of 1:1.355 and untreated control recorded the pod yield of 16.15 q/ha and B:C ratio of 1:1.9.

September, 2018

(Onkarappa, S.)
Major Advisor

5. **Diversity of Predatory Coccinellids in Different Ecosystems and Safety Evaluation of Selected Insecticides against *Cheilomenes sexmaculata* (Fab.)**

POOJA KARANE

ABSTRACT

Investigation on **Diversity of predatory coccinellids in different ecosystems and safety evaluation of selected insecticides against *Cheilomenes sexmaculata* (Fab.)** was carried out at University of Agricultural and Horticultural Sciences (UAHS), Shivamogga during 2017-18. A survey on diversity of coccinellids in different ecosystems of Shivamogga indicated the presence of 11 different coccinellid species belonging to 4 different sub families. *Cheilomenes sexmaculatus* (Fab.) was found to be predominant species. Majority of the species belonged to sub family Coccinellinae representing 78.15 per cent of the total species collected, followed by Chilocorinae (11.45%) and Scymninae (8.76%). The population of cowpea aphid and coccinellid prevailed throughout the cropping period of cowpea. The peak incidence of aphids was noticed in 2nd week of November (125.35 aphids/2.5cm pod length). The coccinellid population followed the trend of cowpea aphid. The population of aphids and coccinellids showed positive correlation with maximum temperature and negative correlation with remaining weather parameters such as minimum temperature, morning, evening relative humidity and rainfall. Under laboratory condition azadirachtin 1 EC @ 2 ml/lit was found to be relatively safer, whereas dimethoate 30 EC @ 1.7 ml/lit was found to be highly toxic insecticide against adults of *Cheilomenes sexmaculata.* Under field condition imidacloprid 17.8 SL @ 0.3 ml/lit was found to be effective in managing aphid population, whereas azadiracthin 1 EC 2 ml/lit was found to be safest in maintaining the coccinellid population. Among the insecticides, dinotefuron 20 SG 0.3 ml/lit was found to be relatively safer to coccinellids as well as effective in managing the aphid *Aphis craccivora* Koch.

July, 2018

(Sharanabasappa)
Major Advisor

6. Pest complex of rose with special reference to sucking pests and their management

PRIYANKA

ABSTRACT

Investigations on sucking pests of rose was carried out at Centre of Excellence for Floriculture, Shivamogga during 2017-18. During the study, two species of thrips *viz*., *Rhiphiphorothrips cruentatus* Hood and *Selenothrips rubrocinctus* (Giard), aphid (*Macrosiphum euphorbiae* Thomas) and mite (*Tetranychus urticae* Koch) were found to feed on rose. During the survey, maximum thrips population (13.93/flower) and maximum aphid population (49.65/ 5 cm twig) was recorded in Shivamogga district during first fortnight of April and second fortnight of August respectively and lowest population of aphids (4.01/5 cm twig) was found in Davanagere district. The peak population of mites (10.90 mites/leaf) was noticed during first fortnight of December in Shivamogga district. Correlation studies with weather parameters on thrips showed negative correlation with relative humidity and rainfall, whereas, it had positive correlation with temperature. Population of aphids had negative correlation with temperature. Mite population was having negative correlation with temperature, relative humidity and rainfall. Imidacloprid 30.5 SC @ 0.50 ml/l, thiamethoxam 25 WG @ 0.20 g/l and dinotefuran 20 SG @ 0.20 g/l were found to be effective in an experiment with insecticides for the management of aphids and thrips. Diafenthiuron 50 WP @ 1.20 g/l and chlorfenapyr 10 EC @ 1.60 ml/l were found to be effective against mites.

July, 2018

(S. U. Patil)
Major Advisor

7. Seasonal Incidence of Pests of Soybean with Special Reference to Biology and Management of Red Spider Mite, *Tetranychus macfarlanei* Baker and Pritchard

SATISH S BATAGI

ABSTRACT

Studies on "**Seasonal Incidence of pests of soybean with special reference to biology and management of red spider mite, *Tetranychus macfarlanei* Baker and Pritchard**" was carried out at Agricultural and Horticultural Research Station (AHRS), Bavikere, Tarikere Taluk, Chikmagaluru District during *Kharif* and *Rabi*of 2017-18. During the study, a total of three lepidopteran defoliators *viz*., soybean leaf webber (*O. indicata*), tobacco caterpillar (*S. litura*) and green semilooper (*T. orichalcea*) and two sucking pests *viz*., soybean aphid (*A. glycines*) and red spider mite, (*T. macfarlanei*) were found damaging the crop. Peak incidence of *O. indicata*was noticed during second week of August (3.61 larvae/mrl), tobacco caterpillar reached its peak population during third week of August (4.60 larvae/mrl)and highest population of*T. orichalcea* was recorded during third week of August (2.69 larvae/mrl). Aphid population was highest duringfourth week of November (26.69 aphids/3 leaves) and red spider mite reached its peak population during first week of December (5.18 mites/ 2.5 cm^2 leaf area). Studies on biology of red spider mite, *T. macfarlanei* revealed that males had less developmental period (10.62 ± 0.69 days) than females (11.92 ± 0.89 days). The adult longevity was also less in males (11.37 ± 0.69 days) compared to females (24.61 ± 0.57 days). Mated females laid more number of eggs (54.93 ± 8.08) than unmated females (31.87 ± 2.61). Overall males lived for 21.99 ± 1.86 days whereas, females took 36.53 ± 2.14 days to complete their life cycle. Propargite 57 EC @ 427.50 a.i./ha proved to be highly effective in reducing the mite population with highest yield of 21.74 q/ha and also had highest C: B ratio of 1: 3.91 followed by spiromecifen 22.9 SC @ 91.60 a.i./ha which registered yield of 18.66 q/ha and C: B ratio of 1: 3.28.

July, 2018

(S. Pradeep)
Major Advisor

8. Sucking Pest Complex of Chrysanthemum, *Dendranthemagrandiflora* BORKHAND their Management

SMITHA O.R.

ABSTRACT

Investigation on sucking pest complex of chrysanthemum, *Dendranthemagrandiflora*Borkh and their managementwas carried out at Karnataka State Department of Horticulture (KSDH), Shivamogga, Karnataka during 2017-2018. During the study, two thrips species *viz*., *Haplothripsgowdeyi* Franklinand *Microcephalothripsabdomanalis* Crawford, two aphid species*viz.*, *Macrosiphoniellasanbornii* Gillette and *Aphis gossypii* Glover and a whitefly species *Bemesiatabaci*Gennadiuswere found to infest chrysanthemum. During survey, maximum aphid population was recorded in Shivamogga district (9.57/3 leaves) during the first fortnight of January. The maximum mean number of whiteflies (5.25/3 leaves) was recorded during the first fortnight of September in Chitradurga district. The peak population of thrips was noticed during first fortnight of February in Chitradurga district (8.95 thrips/flower).Studies on the population dynamics of sucking pests revealed that the peak infestation of aphid was observed during second fortnight of January (42.59/3leaves),Both maximum and minimum temperature, relative humidity and rainfall were found to exert a significant negative influence on the aphid population. The peak thrips incidence (6.15 thrips/flower) was observed during first fortnight of February. The thrips incidence was positively correlated with both maximum temperature and minimum temperature but has negative correlation with maximum and minimum relative humidity and rainfall.The insecticidal treatments imidacloprid 17.8 SL, acetamiprid 20 SP and flonicamid 50 WDG were found to be effective in managing the sucking pests. However, all the insecticidal treatments under evaluation were significantly superior in recording lower population of sucking pests compared to untreated check.

July, 2018

(M. Manjunatha)
Major Advisor

9. Population dynamics, crop loss estimation and management of lepidopteran pests of sunflower

SWATHI G. HEGDE

ABSTRACT

Investigations on lepidopteran pests of sunflower were carried out at College of Agriculture, University of Agricultural and Horticultural Sciences, Navile, Shivamogga during 2017. Correlation studies with weather parameters on *Spodoptera litura* (Fabricius), *Thysanoplusia orichalcea* (Fabricius) and *Hyposidra* sp. showed negative correlation with maximum temperature and sunshine hours. The population of *Spilarctia obliqua* (Walker) had negative correlation with minimum temperature and sunshine hours whereas, it had positive correlation with remaining weather parameters. *Helicoverpa armigera* (Hubner) had positive correlation with maximum temperature, morning relative humidity, sunshine hours and negative correlation with rainfall, minimum temperature and evening relative humidity. Crop loss estimation studies revealed maximum yield loss in untreated control by recording 60.43 per cent followed by mechanical method (31.54%), chemical method (16.11%) and chemical + mechanical method (12.11%) compared to caging method. Chlorantraniliprole 18.5 SC and flubendiamide 480 SC were found to be highly effective in managing the lepidopteran pests of sunflower by recording highest yield of 24.66 q/ha and 24.16 q/ha with a C:B ratio of 1:3.09 and 1:3.01, respectively. These were followed by spinosad 45 SC and indoxacarb 14.5 SC in reducing the larval population.

July, 2018

(B. K. Shivanna)
Major Advisor

10. Studies on Insect Pest Complex of Cocoa with Special Reference to Biology and Management of Cocoa Mealy Bug, *Planococcus lilacinus* (Cockerell)

VENUGOPAL H.M.

ABSTRACT

Investigations on insect pest complex of Cocoa with special reference to biology and management of Cocoa mealy bug, *Planococcus lilacinus* (Cockerell) was carried out at College of Agriculture, Navile, UAHS, Shivamogga during 2016-17. During the study period, fifteen species of insect pests were found damaging the Cocoa crop. Among them, the major ones were Cocoa mealy bug, *Planococcus lilacinus* (Cockerell);Tea mosquito bug, *Helopeltis bradyi* (Waterhouse);Cocoa pod borer, *Conogethes punctiferalis* (Guenee); Aphids, *Aphis gossyipi* (Glover);Scarab beetle, *Maladera* sp.and three species of hairy caterpillars *viz*., *Creatonotus gangis* (Linnaeus), *Olene mendosa* (Hubner)and *Euproctis freterna* (Moore).Cocoa mealy bug, *P. lilacinus* was found throughout the year and attacked twigs, pods and leaves. Among the three parts, the mean mealy bug count was highest on pods (9.23), followed by twigs(4.72), while the least count of mealy bug was noticed on leaves (0.85). The population of mealy bugs showed two peaks, one peak from March to May and the other from October to November. Incidence of mealy bug was significant and positively correlated with maximum temperature, while rainfall was significant and negatively correlated. Studies on the biology of Cocoa mealy bug, *P. lilacinus*revealed that the fecundity of mealy bugs ranged from 130 to 288 eggs per female. Female mealy bugs had only three instars, while the males had four instars. Total nymphal duration ranged from 16 to 24 days. The total life cycle of the female mealy bug, *P. lilacinus* ranged from 27 to 41 days and that of males ranged from 20 to 32 days. Out of the insecticides evaluated, Thiamethoxam 25 WG @ 0.25 g/lt was found most effective in managing the mealy bug population and it recorded the highest yield (8.22 q/ha)with a cost-benefit ratio of 1: 1.85.

July, 2018

(Jayalaxmi Narayan Hegde)
Major Advisor

Agricultural Extension

University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Agricultural Extension

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1. A Study on Impact of Emerging Institutional Interventions in Fruits and VEGETABLES Marketing at Davangere District

GAYATHRI, G.N.

ABSTRACT

The study was conducted on impact of emerging institutional interventions in fruits and vegetables marketing at Davangere district of Karnataka during 2017-18. By simple random sampling, 40 farmers each from public, co-operative and private market interventions were selected, constituting sample size of 120. The data was collected using pretested interview schedule. The results showed that majority of the public (72.50 %), co-operative (70.00%) and private (70.00%) market interventions adopting farmers had medium level of knowledge on market intervention. It was observed that overall social impact due to different market interventions was found to be high in private (0.61) market intervention followed by co-operative (0.54) market intervention. The co-operative market intervention was found to be efficient market for Chilli (1.22) and Banana (1.22). The efficient market for Tomato(2.71) was private market intervention. For Papaya(1.04), public market intervention was found to be efficient market. Majority of public, co-operative and private market interventions respondents belonged to middle age category with medium level of education having medium level of farming experience. Majority of the farmers belonged to medium level of economic motivation, decision making ability, market orientation, cosmopoliteness and information seeking behavior are from public, co-operative and private market interventions. Major constraint faced by public (56.67%) and co-operative (45.00%) market intervention was labour availability but post harvest activities (65.83%) were the major constraint in private market intervention. The suggestions given was providing stable prices to produce (87.50%)in public market intervention, supply of inputs from HOPCOMS (97.50%) in case of co-operative market intervention and providing grading facility at collection centers(90.00%) in private market intervention.

July, 2018

(Sahana, S.)
Major Advisor

2. Decision Making and Participation of Farm Men and Women in Paddy Cultivation: A Study in Shivamogga District.

KAVYASHREE, C.

ABSTRACT

The present study was carried out in Shivamogga district of Karnataka state during the year 2017-18 to analyze the decision making pattern and participation of farm men and women in cultivation of paddy crop. A total of 120 respondents (60efarmemeneand 60 farm women) of both rainfed and irrigated paddy area were interviewed using a pre- tested interview schedule. The study revealed that majority of farm men are mediums(60.00 %) to high (23.33 %) level decision makers, and majority of farm women are medium (50.00 %) to low (28.33%) level decision makers. More than half of farm men are medium (53.33 %) to high (26.67 %) level participators and large number of the farm women had medium (46.67 %) to low (33.33 %) level of participation in paddy cultivation activities.

Variables like age, achievement motivation, extension participation and farming experience is positive and significant with decision making pattern of farm men. Variables such as age and farming experience of farm women are significant with decision making pattern. When it comes to extent of participation of farm men and women, the variables like attitude towards farming, mass media participation and extension participation of farm men are positively significant with extent of participation of farm men and three variables namely farming experience, attitude towards farming and age of the farm women are significant with extent of participation of farm women.

Major problems expressed are non-availability of agricultural labors (86.67 % and 81.67 %) and Low price/less profit margin (71.67 % and 66.67 %) by farm men and women respectively. The major suggestions given are enhancement of minimum supportive price for paddy (80.00 % and 61.67 %) and promotion of mechanization/ custom hiring system (75.00 % and 50.00 %) by farm men and women respectively.

August, 2018

(Basavaraj Beerannavar)
Major Advisor

3. A Study on Knowledge and Socio-Economic Impact of Diploma in Agricultural Extension Services for Input dealers (DAESI)

MAMATA, V. N.

ABSTRACT

The present study was conducted in Shivamogga and Davanagere districts of Karnataka state to ascertain the knowledge and socio-economic impact of Diploma in Agricultural Extension Services for Input Dealers (DAESI). A total of 120 respondents were considered as a sample for the study. The study revealed that majority of the respondents possessed medium(64.16%)level of overall knowledge regarding agricultural aspects. The respondents had high level of knowledge on crop production(94.00%) followed by crop protection(93.00%) and soil health(88.00%). Economic impact of DAESI programme showed significant results. Average number of farmers visited input dealer shop prior to diploma was 140/seasonwhich had been increased to 217/seasonafter availing diploma. Frequency of visit made by the farmers in input marketprior to diploma was 2 times/seasonwhich had been increased to 3 times/season after availing diploma.The magnitude of stocking of inputs like fertilizers (35.00%), micronutrients (12.00%) and plant protection chemicals (1.76%) had been decreased. In every season waiting time has been decreased from 10to7 daysin case of seeds, 5-3 days in case of fertilizers and 7 to 5 days in case of plant protection chemicals. Annual turnover from existing has increased to the magnitude of 12.50 per cent in case of seeds, in case of fertilizers (68.00%), in case of micronutrients (50.00%) and in case of plant protection chemicals (23.00%). Social skills such as leadership qualities (23.19%), managerial0skills (7.64%), technical skills (26.42%), rapport building (15.83%) and social/self-empowerment (25.00%) showed highly significant results. Cent per cent of the respondents expressed that constraint such asless coverage of information related to latest plant protection chemicals and varieties in the course curriculum. Inclusion of latest information related to plan protection chemicals and varieties in the course curriculum was suggested by cent per cent of the respondents.

August, 2018

(M. Sudheendra)
Major Advisor

4. A Study on Utilization Pattern of ICT Tools by the Farmers of Shivamogga and Chikamagaluru Districts

SAGAR S PUJAR

ABSTRACT

The study was conducted in the year 2017-18 in Shivamogga and Chikamagaluru district of Karnataka state with a sample size of 120 farmers. Simple random sampling procedure was used to select the sample.

The data was collected with the help of structured interview schedule. The socio-economic profile of the respondents revealed thatmajority of the respondents belong to middle age group (51.70%),high school education (41.67%), small land holding category (32.50%), 10-20 years of farming experience (40.83%) and high-income level (61.70%). Whereas, majority of the respondents had medium and low cosmopoliteness (35.00%), medium innovative proneness (55.83%), medium economic motivation (45.00%), medium mass media exposure (37.50%), medium information seeking behaviour (52.50%) and farmers had low political participation(58.34 %).

With respect to regularity of using ICT tools, whats app was used daily by majority of the respondents (81.67%). While, e-Krushika app was used once in 3 days by 48.34 per cent of respondents, followed by KMAS tool user used it once in a week (57.50%). Further the extent of agricultural information used, whats app (67.50%) and KMAS (53.34%) of the farmers were used partially and e-Krushika app (55.00%) and KCC (67.50%) of the respondents were these tools to get specific information.

The variables likeeducation, innovative proneness, economic motivation and mass media participation had significant association with utilization of ICT tools at 0.01 level. Whereas, age, land holding, farming experience, annual income, cosmopoliteness, extension participation, information seeking behaviour and political participation had non-significant association with utilization of ICT tools.

The major constraints faced by the ICT tools user farmers were “Unaware of origin of the information generated”, “Risk in adoption technology” and “Poor network connectivity”.

August, 2018

(Amaresh Kumar. K)
Major Advisor

5. Adoption of Production Technologies and Marketing Behaviour of Tomato Growers in Chikamagaluru District

SHRIKANT

ABSTRACT

The study was conducted during the year 2017-18 inChikamagaluru district of Karnataka state with a sample size of 120 farmers. Simple random sampling procedure was used to select the respondents.

The data was collected with the help of structured interview schedule. The socio-economic profile of the respondents revealed that, majority of the respondents belong to middle age group (51.67%), high school education (33.34%), small family size (50.00%) and land holding category (41.67%), medium annual income (50.84%). Whereas, majority of the respondents had medium extension contact (48.34%), extension participation (54.67%), mass media participation (66.67%), scientific orientation (55.84%), achievement motivation (55.84%), risk orientation (44.16%), innovativeness (48.34%) and low level of social participation (51.66%).

It was observed that half (50.00 %) of the respondents belonged to medium level of adoption category. Whereas, 25.84 per cent and24.16per centof respondents belonged to high and low level of adoption category respectively.

With respect to marketing behaviourmore than half (57.50 %) of respondents had medium level of marketing behaviour. Followed by, (21.66%) highand low(20.84%)

The variables likeeducation, landholding, annual income, extension contact, extension participation, social participation, scientific orientation, achievement motivation and innovativeness had significant association with adoption of tomato production technologies at 0.01 levels. Whereas, age, family size, mass media participation risk orientation had non-significant association with adoption of tomato production technologies.

The major constraints faced by the famers in adoption of production technologies and marketing of tomato were “Costly storage facilities”,“Labour problem”, “Diseases and pestproblem”, “High charges of commission agent”, “Fluctuation in market price” and “Lack of remunerative price”.

August, 2018

(A. T. Krishnamurthy)
Major Advisor

6. A Study on Problems and Prospects of Mechanized Paddy Cultivation through Custom Hiring Centres in Udupi District

SUBHASH KALAGI

ABSTRACT

The study was conducted to know the problems and prospects of paddy mechanization practices followed by farmers of Udupi district by involving 120 respondents using random sampling technique. Thestudyrevealed that Majority of the respondents faced the problems like non availability of machineries during peak season (100.00 %), less number of government CHSC (95.83 %) , high initial investment (87.50 %), fragmented land holdings (75.00 %), implements and machineries requires frequent repairs(70.83 %)and 61.66 per cent opined mechanized that paddy cultivation has highly prospective. Further, it was clear from the data that for every one rupee invested by government CHSC respondents got 1.43 rupee returns while private CHSC respondents got 1.32 rupee returns hence it is clear that government CHSC is economically more viable than the private CHSC.

The study revealed that nearly half of the respondents (44.00%)and 43.00 per cent belonged to medium level of overall knowledge category about farm mechanization practices both among the government and private CHSC respectively.Further, morethan half of the government CHSC respondents (63.33%) and 73.33 per cent of private CHSC respondents belonged to medium level of adoption category.

This study revealed that a larger number of government CHSC respondents were of middle aged (66.67 %), educated up to high school (38.33 %), having medium family size (61.67 %), medium farming experience (36.66 %) and medium level of other socio economic characteristics. A considerable number of private CHSC respondents were of middle aged (58.33 %), studied up to high school (23.33 %), having medium family size (65.00%), medium farming experience (33.33%) and medium level of other personal and socio economic characteristics.

August, 2018

(Dhananjaya B)
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. Herbage Yield and Nutrient Composition of Fodder Maize based Intercropping in Rainfed Situation of Southern Transitional Zone (STZ)

ASHWINI ASHOK YARJARVI

ABSTRACT

A field experiment was conducted at Agricultural and Horticultural Research Station Bhavikere, UAHS, Shivamogga during *kharif*2017 to study the herbage yield and nutrient composition of fodder maize based intercropping in rainfed situation of southern transition zone. The texture of the soil is sandy loam having acidic pH (5.25) with low organic carbon (0.40 %)and available nitrogen (220.80 kg ha^{-1}), phosphorous (33.90 kg ha^{-1}) and potassium (163.60 kg ha^{-1}) status. The test variety for maize was South African Tall. The experiment was laid out in a Randomized Complete Block Design with nine treatments replicated thrice. The treatment comprised of sole fodder maize, fodder maize based intercropping with different legumes (cowpea, horsegram, local fieldbean and guar) in 3:1 and 2:1 row ratios.Sole fodder maize recorded significantly higher growth parameter like plant height (285.60 cm), number of leaves (14.13) , leaf area (52.37 dm^2 $plant^{-1}$) and dry matter accumulation (236.34 g $plant^{-1}$). The intercropping treatment fodder maize + cowpea (3:1) recorded significantly higher green fodder yield (76.15 t ha^{-1}), dry fodder yield (25.34 t ha^{-1}) along with maximum nutrients uptake (290.76, 53.70 and 296.32 NPK kg ha^{-1}respectively). Further,quality parameters such as crude protein (9.81 and 14.51 %) ash content (10.09 %) ether extract (2.65 %) were found higher which is also recorded significantly lower crude fibre (20.13 and 19.58 %), neutral detergent fibre (75.97, 68.31 %) and acid detergent fibre (57.70, 41.36 %) was found in the above treatment. Higher net return (Rs.61,937 ha^{-1}) was also registered in fodder maize + cowpea (3:1) intercropping whereas, higher benefit cost ratio (3.08) was obtained with intercrop of fodder maize with cowpea (2:1).

July, 2018

(T. Basavaraj Naik)
Major Advisor

2. Characterization of Occurrence and Frequency of Drought and Evaluation of Drought Management Options for Maize under Rainfed Conditions

CHAITHRA, G.M.

ABSTRACT

The analysis of 51 years of monthly rainfall over different talukas of Chitradurga, Davanagere and Shivamogga districts and calculation of SPI was done for the characterization of occurrence and frequency of drought. In Chitradurga district, Molkalmuru taluka had recorded maximum number of drought years (44 years). Similarly, Channagiri and Harapanahallitalukas (44 years) of Davanagere ditrict and Sagara taluka (45 years)of Shivamogga district recorded a maximum number of drought years.

A field experiment was conducted at ZAHRS,Babbur farm, Hiriyur, during *Kharif* 2017, forthe evaluation of drought management options for maize under rainfed conditions. The texture of soil was black clay having alkaline pH with available nitrogen (258 kg ha^{-1}), phosphorous (35 kg ha^{-1}) and potassium (315 kg ha^{-1}). The experiment was laid out in a Randomized Complete Block Design with ten treatments replicated thrice. The ten treatments comprised of pusa hydrogel and commercial hydrogel applied at 2.5 and 5.0 kg $ha^{-1}$with or without pongamia green leaf mulch at 4.0 t ha^{-1} and their combinations along with control.Among different treatment combinations soil application of commercial hydrogel at 5.0 kg ha^{-1} + mulching with pongamia green leaf at 4.0 t ha^{-1} recorded significantly higher growth parameters like number of leaves (13.10), leaf area (6362.84 cm^2), total dry matter production (296.16 g), yield attributes like cob length (18.87 cm), cob girth (14.92 cm), kernel yield(93.20q ha^{-1}), stover yield (117.14 q ha^{-1})andphysiological parameters like total chlorophyll content (2.80 mg g^{-1}fresh weight) and chlorophyll stability index (83.65 %).

From the study it can be inferred that SPI can be used as an indicator of drought intensity and soil application of commercial hydrogel along with pongamia green leaf mulch can be a option for getting higher kernel yield in maize under rainfed conditions.

July, 2018

(Sridhara S)
Major Advisor

3. Crop Weather Relationships in Rice (*Oryzasaiva* L.) under different Methods of Establishment

CHANDRASHEKHAR

ABSTRACT

A field experiment was conducted at Zonal Agricultural and Horticultural Research Station, Brahmavara, UAHS, Shivamogga during*kharif* 2017 to study the crop weather relationships in rice under different methods of establishment. The experiment was laid out in split plot design with three replications. There were ten treatment combinations comprise of two rice establishment systems as main plots (conventional and System of Rice Intensification) and five dates of transplanting as sub plots (June 3rd week, July 1st week, July 3rd week, August 1st week and August 3rd week).

Among different systems of rice establishment, SRI recorded significantly higher plant height (102.99 cm),total dry weight (75.92 g hill^{-1}), grain yield (4588 kg ha^{-1}), straw yield (7016 kg ha^{-1}), HUE (4.59× 10^{-2} g ^{0}C day^{-1}), PTUE (8.93× 10^{-2} g ^{0}C hrs^{-1}), HTUE (12.29× 10^{-3} g ^{0}C day^{-1}) and RUE (3.27 g MJ^{-1}) compared to conventional method. Among the transplanting datesJune 3rd week transplanted crop recorded significantly higher plant height(107.71 cm), total dry weight (77.01g hill^{-1}), grain yield (5158kg ha^{-1}), straw yield (7151kg ha^{-1}), HUE(4.81× 10^{-2} g ^{0}C day^{-1}), PTUE (9.17× 10^{-2} g ^{0}C hrs^{-1}), HTUE (16.12× 10^{-3} g ^{0}C day^{-1}) and RUE (3.03 g MJ^{-1}) compared to other dates of transplanting.

Rainfall (r = 0.74**) and relative humidity (r = 0.68**) during soft dough stage to hard dough stage had positive relation with grain yield of rice. On the other hand maximum temperature from transplanting to tillering (r = -0.69**), panicle initation to 50 % flowering (r = -0.96**), 50 % flowering to soft dough stage (r = -0.93**), soft dough stage to hard dough stage (r = -0.73**) and minimum temperature from soft dough stage to hard dough stage(r = -0.58**) had negative relationship with grain yield of rice.

July, 2018

(M. Hanumanthappa)
Major Advisor

4. Effect of Foliar Application of Major Nutrients and Boron in Mechanized Rice Cultivation in Coastal Zone of Karnataka

GAJANANA KURI

ABSTRACT

A field experiment was conducted during *Kharif*2017 at Zonal Agricultural and Horticultural Research Station, Brahmavar,Udupi, Karnataka to study the Effect of foliar application of major nutrients and boron in mechanized rice cultivation incoastal zone of Karnataka. The experiment was laid out in RCBD with 7 treatments and replicated thrice. The treatment combinationsincludes Recommended dose of NPK (60:30:60 kg ha^{-1}) as control, RDF + Foliar Spray of 19-19-19 at 1% , RDF + Foliar Spray of 19-19-19 at 1% with boron at 0.5%, RDF + Foliar Spray of 13-0-45 at 1%, RDF + Foliar Spray of 13-0-45 at 1% with boron at 0.5%, RDF + Foliar spray of 0-0-50 at 1% and RDF + Foliar Spray of 0-0-50 at 1% with boron at 0.5%. The foliar sprays were taken at 30,60 and 90 days after transplanting.

The results revealed that application of RDF + Foliar Spray of 19-19-19 at 1% with boron at 0.5% produced significantly higher grain and straw yield (5542 and 7136 kg ha^{-1}, respectively) as compared to recommended dose of fertilizer (4691 and 5980 kg ha^{-1}, respectively). The same treatment combination recorded significantly higher plant height (103.63 cm), number of tillers per hill (21.1), number of green leaves per hill(81.81), total dry matter production (62.75 g $hill^{-1}$) and yield attributing characters like number of productive tillers per hill (19.6),panicle length(26.1 cm), panicle weight (4.23 g per panicle), number of filled grains per panicle (106.5), harvest index(0.44) and total nutrient uptake of NPK (143.37, 38.95 and 102.80 kg ha^{-1}, respectively) with higher benefit cost ratio (2.04) and net returns (Rs.74,015 ha^{-1}) followed by application of RDF + Foliar Spray of 19-19-19 at 1%.

August, 2018

(Sudhir Kamath, K. V)
Major Advisor

5. Effect of Herbicides and Herbicides Combination in Transplanted Rice with Special Reference to Vaucheria Species of Yellow-Green Algae under Coastal Karnataka

MANJUNATHA, U. B

ABSTRACT

A field experiment was conducted to evaluate the "Effect of herbicides and their combination in transplanted rice with special reference to *Vaucheria species* of yellow-green algae under coastal Karnataka" in farmer's field at Kota, Udupi taluk. Having twelve treatments, comprised of pre-emergent (PE) herbicides *viz.*, pretilachlor 50 EC, pyrozosulfuron ethyl 10 WP, pendimethalin 38.7 CS, butachlor 50 EC and post-emergent (PoE) herbicides *viz*, ethoxysulfuron 15 WDG, chlorimuron ethyl 10 % + metsulfuron methyl 10 % WP, bispyribac sodium 10 SC, 2,4-D sodium salt 80 WP and penoxsulam 24 % CS. The experiment was laid out in RCBD with three replications. The predominant weed flora observed other than *Vaucheria species* of yellow-green algae were *Monochoria vaginalis, Ludwigia parviflora*, *Marsilea quadrifolia* among dicots, *Panicum repens, Echinochloa colonum, Cyperus difformis and Cyperus procerus* among monocots. Experimental results revealed that, sequential application of PE pendimethalin 38.7 CS @ 750 g a.i. ha^{-1} at 3 DAT *fb* PoE penoxsulam 24 % CS @ 22.5 g a.i. ha^{-1} at 30 DAT recorded significantly lower fresh weight (66.21, 40.04 and 10.12 g/0.25 m^2), dry weight (2.06, 1.38 and 0.73 g/0.25 m^2) and higher weed control efficiency (72.53, 86.19 and 91.42 %) of yellow-green algae weed at 15, 30 and 45 DAT respectively and was on par with sequential application of PE pendimethalin 38.7 CS @ 750 g a.i. ha^{-1} at 3 DAT *fb* PoE bispyribac sodium 10 SC @ 25 g a.i. ha^{-1} at 30 DAT. Yield and yield attributing parameters were also significantly higher with same treatment *viz.*, panicle length (22.77 cm), filled grains (110.28 $panicle^{-1}$), grain yield (5306 kg/ha) and straw yield (6219 kg/ha). The same trend was noticed with net returns (Rs. 57,151 ha^{-1}) and profit per rupee invested (1:2.11).

December, 2018

(N. E. Naveen)
Major Advisor

6. Influence of Integrated Nutrient Management Practices on Growth and Yield of Aerobic Rice (*Oryza sativa* L.)

MEGHA B

ABSTRACT

A field experiment was conducted at Agricultural and Horticultural Research Station, Bhavikere, UAHS, Shivamoggaduring *Kharif* 2017, to study the influence of integrated nutrient management practices on growth and yield of aerobic rice. The texture of soil was sandy loam having acidic pH with organic carbon of 0.40g kg^{-1}, available nitrogen 220.80 kg ha^{-1}, phosphorous 33.90 kg ha^{-1} and potassium 163.60 kg ha^{-1}. The variety used was MAS 946-1 (Sharada). The experiment was laid out in a Randomized Complete Block Design with ten treatments replicated thrice. The treatments comprised of 100 per cent RDF and 75 per cent RDF with different levels of FYM and vermicompost.

Among different treatment combinations application of 100 % RDF + 100 % Vermicompost (N Equivalent) + PGPR recorded significantly higher growth parameters like number of tillers (34.2), leaf area (1396.9 cm^2), dry matter production (89.04 g), yield attributes like number of productive tillers per hill (16.32), panicle length (23.52 cm), panicle weight (2.68 g), number of filled grains (87.0), grain yield(3868.0kg ha^{-1}) straw yield (4225.72kg ha^{-1})andtotal nutrient uptake of nitrogen (93.13 kg ha^{-1}), phosphorus (25.05 kg ha^{-1}), and potassium (92.63 kg ha^{-1}). The yield increment was 27 per cent over the control.

Higher gross returns and net returns were registered with 100 % RDF + 100 % Vermicompost (N Equivalent) + PGPR(Rs. 81,228, Rs.45,175) whereas, higher benefit cost ratio (2.87) wasobtained with application of 75% RDF +25% vermicompost (N Equivalent) + PGPR.

July, 2018

(C. J. Sridhara)
Major Advisor

7. Performance of Groundnut Genotypes under Different Sowing Windows in Southern Transition Zone of Karnataka

K. RAAGAVALLI

ABSTRACT

A field experiment was conducted during *Kharif*-2017 on "Performance of groundnut genotypes under different sowing windows in Southern Transition Zone of Karnataka" at AHRS, Bavikere, UAHS, Shivamogga, on sandy loam soils, under rainfed conditions. The experiment was laid out using Randomized complete block design with factorial concept, consisting of two factors; groundnut genotypes (GKVK-5, GPBD-4, G2-52 and TMV-2) and sowing windows (II fortnight of June, I fortnight of July, II fortnight of July and I fortnight of August), each with four levels forming sixteen treatments in three replications.

The groundnut genotype, GKVK-5 showed significantly higher pod yield (16.73 q ha^{-1}) and kernel yield (12.17 q ha^{-1}) than other genotypes. The yield components such as, pod weight per plant (9.36 g), hundred-kernel weight (39.71 g) and shelling per cent (72.65); and growth parameters, contributed to the increase in pod yield of the genotype GKVK-5. However, the genotype G2-52 recorded significantly higher pod number per plant (13.34) while the oil content and oil yield were significantly higher in the genotype GKVK-5 (41.23 % and 5.04 q ha^{-1}, respectively). Significantly higher percentage disease incidence (0.579), larval infestation of *Amsactaalbistriga* (0.06) and *Spodopteralitura* (0.26) were noticed in TMV-2. Higher yield of pod, kernel and oil (15.20, 11.13 and 5.07 q ha^{-1}, respectively) were found in the crop sown during II fortnight of June.The pod yield (15.20 q ha^{-1}), kernel yield (11.13 q ha^{-1}) and oil yield (5.07 q ha^{-1}) were higherwhen the crop was sown during II fortnight of June, due to increase in the growth parameters, pod number per plant (11.74), pod weight per plant (8.53 g), hundred-kernel weight (40.38 g), shelling per cent (73.15) and oil content (45.58 %). With delay in sowing, the pod yield and kernel yield reduced, while the incidence of disease and pest infestation increased.The genotype GKVK-5 sown during II fortnight of June recorded higher pod yield (18.07 q ha^{-1}) and kernel yield (13.37 q ha^{-1}) compared to other treatment combinations.

August, 2018

(T. M. Soumya)
Major Advisor

8. Effect of Soil and Foliar Application of Humic Substances as a Biostimulants on Biomass, Nutrient Uptake and Quality of Soybean [*Glycine max* (L.) Merrill]

SAVITA S PASHUPATIMATH

ABSTRACT

A field experiment to study the "Effect of soil and foliar application of humic substances as a biostimulants on biomass, nutrient uptake and quality of soybean [*Glycine max* (L.) Merrill]" was carried out at College of Agriculture, Shivamogga, under rainfed conditions during *kharif*, 2017.The experiment was laid out under Randomized Complete Block Design with ten treatments replicated thrice. The treatment combinations include POP + soil application of humic substances @ 2.5 and 5.0 kg ha^{-1} at sowing, POP + foliar application of humic substances @ 0.2 per cent from commercial source and extracted from vermicompost at 40 days after sowing (DAS), interaction of the above soil and foliar applications, tested against FYM+ recommended NPK and vermicompost on FYM 'N' equivalent basis + recommended NPK. Application of vermicompost on FYM 'N' equivalent basis (2.76 t ha^{-1}) + recommended NPK recorded significantly higher biomass (5090 kg ha^{-1}), grain (1957 kg ha^{-1}), protein (847.5 kg ha^{-1}) and oil (409.4 kg ha^{-1}) yields of soybean along with maximum nutrients uptake (208.4, 22.3 and 111.6 kg NPK ha^{-1}, respectively). Among humic substances treatment, POP + soil application of humic substances @ 5 kg ha^{-1} at sowing + foliar application of humic substances @ 0.2 per cent extracted from vermicompost or commercial product application at 40 DAS recorded higher yield $plant^{-1}$ (13.97 and 13.84 g, respectively), biomass (4603 and 4448 kg ha^{-1}, respectively), grain (1741 and 1676 kg ha^{-1}, respectively), protein (766.4 and 733.3 kg ha^{-1}, respectively) and oil (357.1 and 335.0 kg ha^{-1}, respectively) yield with higher nutrients uptake (193.7, 19.6, 100.3 and 182.7, 18.3, 96.4 kg NPK ha^{-1},respectively). Grain yield improvement was to an extent of 29.76 and 24.89 per cent due to application of vermicomposton FYM 'N' equivalent basis+ recommended NPK and soil application of humic substances @ 5 kg ha^{-1}at sowing + foliar application of humic substances (0.2%) extracted from vermicompost at 40 DAS, respectively compare to FYM+ recommended NPK only.

August, 2018

(G. K. Girijesh)
Major Advisor

9. Effect of graded levels of nitrogen and potassium on growth, yield and quality of potato (*Solanumtuberosum* L.)

SHRUTHI G

ABSTRACT

A field experiment was conducted during *Kharif* 2017 at College of Horticulture, Mudigere, to study the "Effect of graded levels of nitrogen and potassium on growth, yield and quality of potato (*Solanumtuberosum* L.)." The texture of soil was red sandy loam having acidic pH (6.15) and organic carbon (0.47 g kg^{-1}). The soil status was medium for available nitrogen (325.00 kg ha^{-1}), high for available P_2O_5 (62.01 kg ha^{-1}) and low for K_2O(102.27 $kgha^{-1}$). The test variety was KufriJyothi. The experiment was laid out in Randomized Complete Block Design (RCBD) with factorial concept having nine treatments replicated four times. The treatment combinations include three levels of nitrogen (100, 150 and 200 kg N ha^{-1}) and three levels of potassium (100, 150 and 200 kg K_2O ha^{-1}). The investigation revealed that application of 200 kg N ha^{-1} along with 200 kgK_2O ha^{-1}recorded maximum tuber (19.57 t ha^{-1}) and marketable (17.30 t ha^{-1}) yield. The same treatment also recorded significantly higher plant height (70.90 cm), number of shoots (4.10 $plant^{-1}$), number of leaves (114.10 $plant^{-1}$), leaf area (2042 cm^2 $plant^{-1}$) at 80 DAP along with tuber weight (234.72 g $plant^{-1}$), number of tubers (7.27 $plant^{-1}$).Total soluble solids (6.70 °Brix), reducing sugar (0.92 %), and nutrient uptake (187.13, 36.40 and 187.50kg N, P_2O_5 and K_2O ha^{-1}, respectively) were also found higher in the above treatment. Net returns (` 2,51,426 ha^{-1}) and BC ratio (3.66) wererecorded higher with theApplication of 200 kg N ha^{-1} and 200 kg K_2O ha^{-1}compared to other treatments.

August, 2018

(Shivaprasad, M.)
Major Advisor

10. Evaluation of Suitable Groundnut (*Arachis hypogaea* L.) Based Millets Intercropping System in Central Dry Zone of Karnataka under Rainfed Condition

SHWETHANJALI, K. V.

ABSTRACT

A field experiment was conducted at Zonal Agricultural and Horticultural Research Station, Babbur farm, Hiriyur, under AICRP (groundnut) during *Kharif* 2017, to study the evaluation of suitable groundnut based millets intercropping system in Central Dry Zone of Karnataka underarainfed condition. The texture was medium black soil having alkaline pH (8.10) with available nitrogen (258 kg ha^{-1}), phosphorous (35 kg ha^{-1}) and potassium (315 kg ha^{-1}). The experiment was laid out in a Randomized Complete Block Design with ten treatments replicated thrice. The test varieties includes G-2-52, ML-365, Sukshema and HMT100-1 for groundnut, finger millet, little millet and foxtail millet, respectively. The treatments consisted of sole and intercropsof groundnut with millets (finger millet, little millet and foxtail millet) in 5:2 and 6:1 row ratios.Sole groundnut noticed significantly higher pod yield (1862 kg ha^{-1}) and haulm yield (2618 kg ha^{-1}) over intercropping treatments.Among the intercropping treatments, pod and haulm yield of groundnut washigher in 6:1 row ratio of groundnut + foxtail millet (1744 kg ha^{-1} and 2194 kg ha^{-1}, respectively). Higher yield was mainly attributed to higher plant height (34.14 cm), number of branches (10.52), number of leaflets (79.33), leafarea (1265 cm^2 $plant^{-1}$), leaf area index (4.22), leaf area duration(135.5 days), total dry matter accumulation (28.81 g $plant^{-1}$), number of pods $plant^{-1}$ (26.46), pods weight $plant^{-1}$(13.09 g) and test weight (35.29 g). Significantly higher groundnut equivalent yield (1877 kg ha^{-1}) and ATER (1.10)were also registered with same treatment. Whereas, higher LER (1.16) was noticed with 5:2 row ratio of groundnut + foxtail millet intercropping treatment. At harvest, significantly higher nutrient uptake (70.98, 20.65 and 57.67 kg NP and K ha^{-1}, respectively) was observed with groundnut + foxtail millet in 6:1 rowaratio. Higher net returns (Rs. 50,469 ha^{-1}) and B:C (2.23)wereaalso realizedwith the same treatment.

August, 2018

(Kumar Naik, A. H.)
Major Advisor

Genetics and Plant Breeding

University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Genetics and Plant Breeding

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1. Induced Mutagenesis in Groundnut (*Arachishypogaea* L.) cv. TMV-2 following EMS Treatment

AVINASH KUMAR

ABSTRACT

The present investigation was aimed to assess the extent of genetic variability, nature of association of yield and yield attributing traits in mutated population of cv.TMV-2 which was carried out at the ZAHRS, Shivamogga during *Kharif*-2017 and AHRS, Bhavikere, summer-2018. Mutagenic effectiveness and efficiency decreased with increase in dose of EMS. Dose 0.3 and 0.4 percent of EMS were found to be best for creating mutation in groundnut cv. TMV-2. Mean performance of the mutated plant progenies revealed a wide range of variability for the yield and yield related traits. The range was the highest for kernel per plant, plant dry weight and shelling percent. High PCV and GCV were observed for pod yield per plant and kernel yield per plant. Wide range of variability suggested greater phenotypic and genotypic variability among the plants and responsiveness of the attributes for making further improvement by selection. High heritability coupled with moderate to high genetic advance as percent of mean was observed for traits like pod yield per plant, test weight and harvest index which shows higher response for selection of high yielding plants. The highest positive and significant association was found between pod yield per plant, test weight and harvest index indicating that these characters are the primary yield determinants in groundnut. Thus selection for these traits might be rewarding. Superior mutants (line no. 37, 50, 97, 98, 99, 108, 112, 130, 163 and 239) which exhibited higher pod yield per plant (g), kernel yield per plant (g), test weight (g) and shelling percent than the parent groundnut cv. TMV-2, have to be advanced to next generation.

August, 2018

(H. D. Mohan Kumar)
Major Advisor

2. Gamma Rays Induced Genetic Variability in Groundnut (*Arachis hypogaea* L.) cv.TMV-2

BHEEMAREDDY

ABSTRACT

The present investigation was aimed to assess the extent of genetic variability, nature of association ofyield and yield attributing traits in mutated population of cv.TMV-2 which was carried out at the ZAHRS, Shivamogga during *Kharif*-2017 and AHRS, Bhavikere during summer-2018.The mutagenic effectiveness and efficiency decreased with increase in dose of gamma rays. 200 Gy and 250Gy doses of gamma ray found best for creating mutation in groundnut cv. TMV-2.The mean performance of the mutated plant progenies revealed a wide range of variability for all theyield and yield related traits. The range was the highest for kernel per plant, pod yield per plant and test weight. High PCV and GCV were observed for pod yield per plant and kernel yield per plant. Wide range of variability suggested greater phenotypic and genotypic variability among the plants and responsiveness of the attributes for making further improvement by selection.High heritability coupled with moderate to high genetic advance as percent of mean was observed for traits like, test weight, shelling per cent, plant height and pod yield per plant which shows higher response for selection of high yielding plants. The highest positive and significant association was found between pod yield per plant and kernel yield per plant, number of pods per plant and harvest index indicating that these characters are the primary yield determinants in groundnut. Thus selection for these traits might be rewarding. Superior mutants (line no. 47, 70, 72, 75, 76, 77, 80, 103, 160 and 256) recovered from mutation which exhibited higher pod yield per plant (g), kernel yield per plant (g), test weight (g) and shelling percent than the parent groundnut cv. TMV-2, and advanced to next generation.

August, 2018

(H. D. Mohan Kumar)
Major Advisor

3. Assessment of Genetic Variation Induced through Mutation in Okra [*Abelmoschus esculentus* (L.) Moench]

BHUVANESHWARI

ABSTRACT

The present investigation was aimed to assess the extent of genetic variability, character association, path analysis and identification of mutant lines tolerant to sucking pests in M_2 population of cv, Arka Anamika which was carried out at the ZAHRS, Shivamogga during *Kharif*-2017. Highest variability was observed for fruit yield per plant followed by plant height, days to first flowering and seeds per fruit. High PCV and GCV were observed for fruit yield and number of fruits per plant. High heritability coupled with moderate to high genetic advance as percent of mean was observed for traits like, fruit yield per plant, number of fruits per plant and hundred seed weight suggested that the preponderance of additive genes. The highest positive and significant correlation coefficient of fruit yield per plant has been noted with number of fruits per plant per plant, plant height and fruit weight indicating that these characters are the primary yield determinant in okra. Path coefficient analysis revealed that number of fruits per plant had highest positive direct effect followed by fruit weight and plant height. Thus selection for these traits might be rewarding. Among the studied population 4 plants *viz*., M-4, M-72, M-163 and M-342 showed resistant to both leaf hoppers and aphids. Superior mutants like M-258, M-66, M-4, M-71, M-2, M-253, M-36, M-423, M-41 and M-357 showing higher yield can be tested across location.

August, 2018

(Gangaprasad S)
Major Advisor

4. Assessment of Morphophysiological Traits related to Submergence Tolerance in Rice Genotypes for Rainfed Lowlands

CHANDANA, B. R.

ABSTRACT

The present investigation was carried out at Zonal Agricultural and Horticultural Research Station, Navile, Shivamogga.The experiment consisted of 177 rice genotypes including three checks FR13A, Hemavathi and Jyothi for screening them for submergence tolerance using augmented design during summer 2017.Among them, 43 genotypes including checks showing more than 50 per cent survival per cent were selected, evaluated for morphophysiological traits, genetic diversity, variability, character association and path analysis for thirteen traits using Randomized Complete Block Design during *Kharif* 2017. Analysis of variance showed significant differences among the genotypes for all the traits studied. The phenotypic correlation for physiological parameters with grain yield and harvest index showed that the survival per cent, chlorophyll and harvest index had significant positive correlation with grain yield per plant.Whereas, stem elongation per cent showed negative correlation with grain yield per plant. High GCV and PCV coupled with high heritability and GAM was recorded in productive tillers per plant, number of tillers per plant, spikelet fertility and grain yield per plant. Correlation studies showed that plant height, number of tillers per plant, number of productive tillers per plant, number of spikelets per panicle, spikelet fertility, straw yield, harvest index and 1000-grain weight showed significant positive correlation with grain yield per plant. The highest direct positive effect was exhibited by harvest index followed by straw yield. Mahalanobis D^2 statistics grouped the 43 genotypes into eight clusters. The maximum inter cluster distance was found between cluster I and VII and the lowest distance was found between cluster I and III. Seven SSR markers revealed the presence of high molecular diversity among the genotypes grouping them into XI clusters. The present study showed that the genotypes Doddaaluru, Kagga, Nareminda, Bilidaddi and Kempudadimaratiga are submergence tolerant genotypes and are suitable for both submergence and non-submergence conditions.

July, 2018

(Dushyantha Kumar, B.M.)
Major Advisor

5. Genetic Variability and Molecular Diversity in Groundnut (Arachis hypogaea L.,) for Aspergillus Flavus Seed Colonization and Aflatoxin Contamination

HASANALI NADAF

ABSTRACT

In recent times, edible groundnuts have attracted major attention in the international market. Aflatoxin contamination and pesticide residues are the major obstacles in its export. Hence, development of cultivars with resistance to seed colonization by *Aspergillus flavus* and aflatoxin contamination is a major objective in groundnut breeding. In the present investigation, significant differences were noticed among 66 groundnut genotypes for *in vitro* seed colonization by *A. flavus* (IVSCAF), aflatoxin contamination, yield and its component traits (under both normal moisture and moisture stress condition). Yield traits *viz*., number of primary branches per plant, pod yield (kg/ha) and kernel yield (kg/ha) have exhibited high heritability coupled with high genetic advance over mean indicating better scope for selection for these traits. The genotypes SB-T10, ICGV-15138 and ICGV-15124 have shown high level of resistance to *Aspergillus* seed colonization. Popular cultivars TMV-2 and GPBD-4 were susceptible to seed colonization. The present study revealed an increase in aflatoxin contamination under moisture stress as compared to normal moisture condition. Genotypes *viz*., ICGV-15119, Dh-234, Dh-246, Dh-216, Dh-101, Dh-86, K-9, SB-T13, SB-T14, VB-T31, SB-T2 and J-11 have recorded no aflatoxin contamination under both normal moisture and moisture stress conditions indicating their tolerance to aflatoxin contamination. The molecular diversity analysis with 30 SSR primers revealed that, germplasm lineICGV 15143and cultivar Dh-101 were found to be most divergent genotypes. Single marker analysis has revealed that, marker S-21, S-80 and GM-1954 have significant association with tolerance to aflatoxin contamination. Four markers *viz.*, GM-1954, GM-1883, pPGPseq2F05 and S-03 were linked to IVSCAF. The marker GM-1954 was found to be associated with tolerance to both aflatoxin contamination and *in-vitro* seed colonization by *Aspergillus flavus*.

January, 2019

(Harish Babu B N)
Major Advisor

6. Assessment of Stability and Yield Performance of Advanced Breeding Lines of Rice (*Oryza sativa* L.)

MUTTURAJ MAHADEV DHAVALESHVAR

ABSTRACT

The present study was undertaken to evaluate twenty-seven advanced breeding lines in a Randomized Complete Block Design with two replications during *Kharif* 2017 at three locations *viz.*, ZAHRS, Shivamogga, AHRS, Kathalagere and AHRS, Ponnampet for variability, stability, correlation and path analysis for yield and yield attributing characters. ANOVA revealed significant differences for all the studied characters among the advanced breeding lines. Moderate GCV and PCV were recorded for traits *viz.*, plant height, number of spikelets per panicle, number of grains per panicle, test weight, straw yield and grain yield. High heritability coupled with high genetic advance as per cent of mean were recorded for plant height, L/B ratio, test weight and grain yield. Harvest index and straw yield had positive significant association with grain yield at phenotypic level. Among thirteen characters, eight characters had a positive and direct effect on grain yield at phenotypic level *viz.*, days to fifty per cent flowering, days to maturity, panicle length, number of productive tillers, number of grains per panicle, test weight, straw yield, and harvest index. In which harvest index had highest positive direct effect on grain yield. Advanced breeding lines KPR2IS 2-8-1 and MMBPT 1-11-4 were identified as the most promising advanced breeding line for grain yield as indicated by their higher mean performance across three locations. The advanced breeding lines MMKPR2 5-2-3 and KPR2IS 9-3-3 for ZAHRS, Shivamogga, JGK2 9-9-6-2-5, MMBPT 1-11-1 and KPR2IS 1-7-3 for AHRS, Kathalagere and MMKPR2 5-2-1 and JGK2 9-9-6-2-5 for AHRS, Ponnampet respectively, were identified as stable lines for specific locations for yield.

August, 2018

(C. Malleshappa)
Major Advisor

7. Assessment of Genetic Variability and Diversity in Finger Millet (*Eleusine coracana* (L.) Gaertn) Genotypes

PRASHANTHA, B. N.

ABSTRACT

The aim of present investigation was to assess the extent of genetic variability, divergence, nature of association and micronutrient content in sixty genotypes of finger millet which was carried out at the Zonal Agricultural and Horticultural Research Station, Shivamogga during *kharif* 2017. The analysis of variance revealed the existence of highly significant differences among the genotypes for all the traits studied. A wide range of variability and high heritability coupled with high genetic advance was recorded for most of the yield, yield contributing and quality traits. Grain yield plant^{-1} possessed significant positive correlation with days to 50 per cent flowering, days to maturity and earhead weight plant^{-1}. Path analysis revealed that, the characters like days to maturity, earhead weight plant^{-1} and straw yield plant^{-1} had direct positive effect on grain yield plant^{-1}. The maximum inter cluster distances for grain yield and quality traits were recorded between cluster IV and cluster VIII and cluster IV and cluster I respectively. Genotypes from these clusters can be selected for hybridization programme to get desirable recombinants to improve further grain yield with quality. Plant height and calcium content had maximum contribution towards genetic diversity, indicates the presence of wide diversity among the genotypes under study for the traits. Two genotypes, Malali (25.30 g/plant) and IC-473155 (25.20 g/plant) recorded significantly higher yield than varietal check, GPU-28 (21.35 g/plant). Genotype, IC-474959 was superior for calcium (398.62 mg/100g), magnesium (167.77 mg/100g) and copper content (0.95 mg/100g). The higher iron and zinc content was exhibited by the genotypes, IC-473388 (14.19, 5.45mg/100g), IC-473143 (13.85, 5.65mg/100g) and Jeenumundaga Ragi (7.05, 5.65 mg/100g). These identified potential genotypes with high calcium, magnesium, iron, copper and zinc content can be further utilized as donor parents to transfer these traits to genotypes which are high yielding and well adapted.

July, 2018

(T. H. Gowda)
Major Advisor

8. Assessment of Genetic Diversity for Yield and its Component Traits and Screening for Blast Reaction in Rice (*Oryza sativa* L.) Genotypes under Low Land Condition

RANGASWAMY D. M.

ABSTRACT

Rice (*Oryza sativa* L.) is one of the most important staple food crop for half of the world's population and grown worldwide. India being primary centre of origin it possesses huge diversity of rice genotypes of both wild and cultivated. The present study was undertaken to evaluate 145 rice genotypes for variability and diversity for yield and its component traits and all the genotypes were screened to blast disease according to IRRI scale. ANOVA revealed significant difference among the genotypes studied for all the characters. High PCV, GCV coupled with high heritability and high GAM was observed for total number of tillers per plant, number of productive tillers per plant, number of filled grains per panicle, grain yield per plant, straw yield per plant and harvest index. Number of filled grains per panicle and harvest index exhibited significant association with grain yield. Harvest index followed by straw yield per plant had the highest positive direct effect on grain yield whereas highest positive indirect effect of grain yield with trait number of filled grains per panicle *via* harvest index were recorded. Using Mahalanobis' D^2 statistics, genotypes were grouped into thirteen clusters the cluster II consists of maximum number of genotypes (30). Based on cluster distance, highest intra cluster distance were recorded in the cluster VII and highest inter cluster distance between cluster XII and XIII. Cluster mean analysis reveals that cluster XII received the first rank. Among all the characters, number of filled grains per panicle followed by plant height possessed high contribution towards the genetic divergence. Rice genotypes screened for to blast disease showed that the genotypes IET-17320, IET-21463, IR8609-79-33 and advanced breeding line $MMKPR_2$ 5-2-3 resistance. Among them advanced breeding line $MMKPR_2$ 5-2-3 had recorded the highest grain yield per plant.

August, 2018

(Dushyntha Kumar B. M.)
Major Advisor

9. Characterization of Local Rice (*Oryza sativa* L.) Genotypes for Various Morphological, Yield and Yield Attributing Traits

SACHIN KUMAR, H. M.

ABSTRACT

The present investigation was carried out to characterize 55 rice genotypes at ZAHRS, Shivamogga, during summer and *Kharif* 2017 using Randomized complete block Design.Thirty three qualitative and eleven quantitative characters were evaluated as per the guidelines of PPV&FRA, 2001.Out of 33 qualitative characters studied five characters were monomorphic, ten were dimorphic and 18 were polymorphic. Out of 11 quantitative characters studied five were dimorphic and six were polymorphic.The analysis of variance revealed highly significant difference among genotypes for all the characters studied.The high PCV and GCV values coupled with high heritability and high genetic advance as per cent mean were noticed for traits *viz.*, number of grains per panicleandgrain yield per plant. Correlation analysis revealed that traits *viz.*,days to 50 per cent flowering, days to maturity, stem thickness, numbers of tillers per plant, number of productive tillers per plant, number of grains per panicle and spikelet fertility showed significant positive correlation with grain yield per plant.Path coefficient analysis revealed that days to 50 percent flowering, stem thickness,numbers of tillers per plant, number of productive tillers per plant, panicle length, number of grains per panicle, spikelet fertility and test weight showed direct positive effect on grain yield.MahalanobisD^2 analysis clustered the genotypes intoeight clusters, the maximum intercluster distance was found between cluster VI and cluster VII. Assessment of molecular diversity using twelve SSR markers across fifty five rice genotypes revealed that six markers were monomorphic and six were polymorphic and genotypes were grouped into eleven clusters. The investigation showed the presence of some unique characters*viz.*, anthocyanin coloration, awns, black and brown caryopsis in fewgenotypes and also genetic and molecular diversity among the genotypes which could be utilized in the crop improvement program.

August, 2018

(Dushyntha Kumar B. M.)
Major Advisor

10. Pattern of Variability in F2 Segregating Generation of Brinjal (*Solanum melongena* L.)

VINUTHA PATIL S

ABSTRACT

The present investigation in brinjal (*Solanummelongena*L.) was undertaken during *kharif*, 2017 at college of agriculture, Navile, UAHS, Shivamogga, to study variability parameters, character association, path analysis and identification of transgressive segregants in respect of fruit yield and its component traits in F_2 population of Billichandubadane ×Mullubadane and Biliuddabadane × Mullubadane cross. GCV and PCV valueswere relatively higher for number of primary branches, number of fruits per cluster, number of fruits per plant for Billichandubadane×Mullubadane and number of flower per plant, number of fruits per cluster, number of primary branches, number of fruits per plant and fruit yield per plant for Biliuddabadane ×Mullubadane. High heritability coupled with moderate genetic advance as per cent mean for days to first flowering for Billichandubadane × Mullubadane anddays to first floweringfor Biliuddabadane×Mullubadane indicating additive gene action in their genetic control.

Fruit yield per plant was exhibited positive significant correlation with plant height, days to first flowering, number of flowers per plant, number of fruits per plant, fruit length forBillichandubadane ×Mullubadane and days to first flowering, number of primary branches, plant height, number of fruits per plant, fruit length for Biliuddabadane × Mullubadane.

Path analysis in F_2 generation indicated the positive direct effect for number of fruits per plant,for Bilichandubadane×Mullubadane and fruit width for Biliuddabadane × Mullubadane. Superior desirable transgressive segregants (P-31, P-54, P-69, P-116 and P-155) were identified in the crossBillichandubadane ×Mullubadane and (P-17, P-29, P-33, P-94 AND P-69) forBiliuddabadane ×Mullubadane advancing to the next generation.

July, 2018

(Gangaprasad S)
Major Advisor

11. Assessment of Genetic Variability and Diversity in Horse Gram (*Macrotyloma uniflorum* L.) Genotypes

VISHWANATHA, S. D.

ABSTRACT

Horsegram is an important and exploited tropic and sub-tropic legume crop grown mostly in dry land agriculture. The study involving 39 genotypes of horse gram (*Macrotyloma uniflorum* L.) was conducted at the Agriculture and Horticulture Research Station, Bhavikereduring late *Kharif*season of 2017 to assess the nature and magnitude of genetic variability, character association and path analysis for grain yield and its component trait and diversity analysis. The results indicated significant differences among the 39 genotypes for all characters studied, indicating the presence of new variability among genotypes. High variability and heritability coupled with high genetic advance were observed for number of branches per plant, plant height, number of pods per plant and days to 50% flowering depict the presence of additive gene action and possible scope for the improvement of these characters. The correlation coefficient analysis revealed that grain yield showed significant positive correlation with number of pods per plant, plant height, number of seeds per pod, number of branches per plant, and days to 50% flowering. In path analysis characters like number of pods per plant, seeds per pod and plant height showed highest positive direct effect on seed yield. Mahalanobis D^2 statistics grouped all the 39 cultivars of horsegram into eleven clusters. The maximum inter cluster distance (305.20) was noticed between cluster II and cluster X. The maximum intra cluster distance ranged from 0 (clusters III, IV, VII, VIII, IX, X and XI) to 38.06 (cluster VI), indicating that the genotypes in these clusters were relatively more diverse than the genotypes within other clusters. Days to 50% flowering contributed maximum (41.43%) to the genetic divergence.

October, 2018

(T. H. Gowda)
Major Advisor

Plant Pathology

University of Agricultural and Horticultural Sciences, Shivamogga

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

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1. Studies on Root-Knot Nematode [*Meloidogyne incognita* (KOFOID and WHITE, 1919) CHITWOOD, 1949] in FCV Tobacco Growing Soils of Karnataka

ASHWINI, B. N

ABSTRACT

Root-knot nematode, *Meloidogyne incognita* is a serious menace in all tobacco growing regions leading to yield reduction of 59.4 per cent and 52.9 per cent in nursery and filed conditions respectively. Survey conducted in Shivamogga, Hassan, Mysuru and Davanagere districts during 2017-18 revealed that the incidence of root-knot nematode was noticed in all surveyed locations, with maximum incidence in Harave village of Hunsur taluk, Mysuru district and least incidence in Kattige village of Davanagere district. Among twenty two germplasm/genotypes tested against *M. incognita*, the entries FCR-50 and FCJ-35 recorded least root-knot index of 1.0 indicating that they are resistant to root-knot nematode. Two entries recoded moderately resistance reaction, seven entries were moderately susceptible, six entries were susceptible and other four entries were highly susceptible. Three bio-agents were evaluated for their efficacy in inhibition of egg hatching and juvenile mortality of *M. incognita* under *in vitro*, *Bacillus subtilis* was found to be most effective in inhibiting egg hatching and *Trichoderma harzianum* showed maximum juvenile mortality. Among the plant extracts tested under *in vitro*, Marigold leaf extract recorded minimum egg hatching and maximum juvenile mortality at all the concentrations tested and the efficacy of leaf extract increased with increase in exposure period. Management of root-knot nematodes under both nursery and field conditions by different bio-agents, vermicompost and nematicides revealed that soil application of carbofuran + vermicompost and *T. harzianum* + vermicompost were the most effective in increasing number of transplantable seedlings, green leaf yield and cured leaf yield and in decreasing RKI, number of galls, number of females and soil nematode population.

July, 2018

(H. Ravindra)
Major Advisor

2. Studies on Morphology and Eco-Friendly Management of Leaf Spot of Cinnamon Caused by *Colletotrichum gloeosporioides* (Penz.) Penz. and Sacc.

KAVYA DINESHKUMAR MASHALDI

ABSTRACT

Cinnamon (*Cinnamomum verum* Presl., Syn. *Cinnamomum zeylanicum* Blume) is one of the important tree spice in the world, belongs to the family Lauraceae. This crop is affected by several diseases among them leaf spot is one of the important disease caused by *Colletotrichum gloeosporioides* (Penz.) Penz. and Sacc. During the survey highest disease severity was recorded in Chikmagalur district (25.97 %) and least disease severity was recorded in Shivamogga district (10.96 %). Cultural and morphological studies revealed that, radial growth of *C. gloeosporioides* was maximum on Richard's agar and potato dextrose agar with colony diameter of 90.00 mm with good sporulation. Mean dry mycelial weight was maximum on Richard's broth (164.00 mg) and potato dextrose broth (160.00 mg). Morphological characters of *C. gloeosporioides viz.*, colour of the mycelium varied from whitish to greyish white. The growth varied from flat to raised fluffy with regular margin. *In vitro* evaluation of bio-agents revealed that, *T. harzianum* recorded highest inhibition of radial growth of 78.42 per cent. Out of nine plant extracts tested marigold leaf extract (73.34 %) and neem leaf extract (72.34 %) at 15 per cent recorded maximum inhibition of mycelial growth of the pathogen. Among the different chemicals tested, maximum inhibition of mycelial growth was recorded in copper oxychloride (68.86 %). In pot experiment, application of 1 per cent Bordeaux mixture has recorded lowest per cent disease index of 6.60 per cent. Whereas, the results of field evaluation of different copper based fungicides, bio-agents and botanicals indicated that spray of 1 per cent Bordeaux mixture (59.21 %) was found significantly superior in reducing the disease severity.

July, 2018

(H. Narayanaswamy)
Major Advisor

3. Bio-efficacy and Molecular Characterization of Native Trichoderma Isolates of Shivamogga

MAHESHWARY, N. P.

ABSTRACT

Trichoderma is one of the most promising biocontrol agent utilized for the management of various plant pathogenic fungi and is found in almost all type of soils. Roving survey conducted to collect rhizosphere soil in Shivamogga taluk from different agricultural and horticultural crops *viz.,* pigeonpea, tomato, arecanut, banana and forest trees such as teak and pongamia resulted in isolation of 29 *Trichoderma* isolates. Among them *T. asperellum* was found in predominant form. Cultural, morphological and molecular chacterization of *Trichoderma* isolates revealed that, they can effectively utilize potato dextrose agar medium for their growth. Whereas, *Trichoderma* selective medium induced selective growth of organism with very poor growth. Most of *Trichoderma* isolates exhibited light green to dark green colony colour while reverse colony colour of most isolates varied from white to light green. The conidial shape of isolates varied from oval to round and their colour varied from olive green to green colour. Molecular characterization revealed the presence of three species *viz., T. asperellum*, *T. virens*, *T. aureoviride* in Shivamogga taluk. Bioefficacy of *Trichoderma* spp. tested under *in vitro* conditions against *Fusarium oxysporum* f. sp. *udum* and *Sclerotium rolfsii*, revealed that, *Trichoderma* can effectively suppress the growth of both plant pathogens. Compatability studies of *Trichoderma* with fungicides showed that, *Trichoderma* was compatible with copper hydroxide, copper oxychloride, mancozeb and metalaxyl and least compatible with captan whereas, tebuconazole, propiconazole and carbendazim were incompatible. Among combi fungicides, metalaxyl-M + mancozeb was found to be highly compatible whereas azoxystrobin + difenoconazole, carbendazim + mancozeb and tebuconazole + trifloxystrobin were incompatible.

July, 2018

(B. Gangadhara Naik)
Major Advisor

4. Investigation on False Smut of Rice Incited by *Ustilaginoidea virens* (Cooke) in Hilly and Coastal Zones of Karnataka

MANJUNATH BANASODE

ABSTRACT

Rice is the most extensively cultivated food crop of Asia and it is affected by several diseases, among them false smut caused by *Ustilaginoidea virens* (Cooke) is one of the most emerging disease causing significant loss in both yield and quality of the grains. The roving survey for disease severity was conducted in hilly and coastal zones of Karnataka, revealed that highest mean disease severity was observed in Kodagu (69.87 %) district followed by Udupi (34.36 %) district and least mean disease severity (9.48 %) was observed in Shivamogga district. Among 102 rice genotypes/varieties screened, 11 were found highly resistant, none of them found resistant, only one variety of IR-64 showed moderately resistant reaction, 53 were found moderately susceptible, 34 were found susceptible and only 3 were found highly susceptible to disease reaction. Cultural and morphological studies revealed that radial growth of *U. virens* was maximum on potato sucrose agar (76.25 mm). *In vitro* evaluation of fungicides indicated that Propiconazole, Tebuconazole, Azoxystrobin + Difenconazole and Tebuconazole + Trifloxystrobin showed cent per cent inhibition at all the tested concentrations *viz*., 100, 200 and 500 ppm. The field evaluation of fungicides, revealed that Tebuconazole + Trifloxystrobin at 1 ml/l recorded the least false smut severity (2.80 %) followed by Azoxystrobin + Difenconazole at 1ml/ l (6.17 %) with the highest yield of 55.42 q/ha and 53.72 q/ha respectively.

July, 2018

(G. N. Hosagoudar)
Major Advisor

5. Studies on Brown Leaf Spot of FCV Tobacco Incited by *Alternaria alternata* (FRIES) Keissler.

NAILA SHOHRAT

ABSTRACT

Brown spot of tobacco (*Alternaria alternata*) is important and severe disease of tobacco crop in many parts of the world and causing huge crop losses. It is a limiting factor in tobacco production. Among ten different solid media used the radial growth of *A. alternata* was maximum on Potato dextrose agar with colony diameter of 89.00 mm and least growth was seen in Glucose peptone agar (59.00 mm). Physiological studies revealed that maximum dry mycelial weight of the fungus at temperature of 25°C (329.13 mg) and lowest at 5°C (67.16 mg). While the maximum dry mycelial weight was observed at pH 6.5 (586.53 mg) followed byand the minimum dry mycelial weight was recorded at pH 3.0 (110.80 mg). Among the systemic fungicides tested against *A. alternata* under *in vitro* condition, hexaconazole and propiconazole showed cent per cent inhibition of mycelial growth at all the tested concentrations of 125, 250 and 400 ppm. Whereas, least inhibition of mycelial growth was observed in thiophanatemethyl(72.80 %) at all tested concentrations. Among the combi products evaluated, highest inhibition was obtained by tebuconazole+trifloxystrobin (100%).Among the twenty twogenotypes none of the genotypes showed immune reaction. Three of the genotypes were resistant. Five genotypes were moderately resistant. Nine genotypes were moderately susceptible. Three genotypes showed susceptible. Whereas, two genotypes showed highly susceptible reaction.Among the threebio-agents tested against *A. alternata* under*in vitro* condition, *T. harzianum* recorded highest inhibition of radial growth (84.30 mm). The field evaluation of different fungicides indicated that at 0.1 per cent of hexaconazole found significantly superior in reducing the disease incidence and increased the leaf yield. Hexaconazole recorded highest leaf yield (9786.69 kg/ha) followed by propiconazole (9279.63 kg/ha) whereas, untreated control recorded 3675.15 kg/ha.

July, 2018

(C. Karegowda)
Major Advisor

6. Studies on Chilli Veinal Mottle Virus in Major Chilli (*Capsicum annuum* L.) Growing Areas of Karnataka

NANDAPPA CHORGASTI

ABSTRACT

Chilli (*Capsicum annuum* L.) is one of the most importantvegetable and spice crop belonging to the family Solanaceae and widely grown in India. Chilli has been widely cultivated across the world and prone to many biotic and abiotic stresses.Among the viral diseases, *Chilli Veinal Mottle Virus* (ChiVMV) is one of themost destructive virus limiting the chilli cultivation in many parts of the world.The survey results revealed that, incidence of ChiVMVwas ranged from 12.77 to 48.43 per cent. Highest per cent disease incidence (PDI) was recorded in Hosallivillage (48.43%) of Hirekerur taluk and the lowest incidence (12.77 %)was observed at Mathodu village of Shivamogga taluk.Reverse transcription polymerase chain reaction (RT-PCR) technique for detection of *Chilli Veinal Mottle Virus* was used. PCR product of approximately 0.8 kb corresponding to ChiVMV partial CP was amplified using ChiVMV specific coat protein gene primers.Among 42 host plants tested, only ten host plants exhibited the symptoms of ChiVMV. The host plants *viz.,Daturametel, Capsicum annuum, Physalisfloridana, Solanumnigrum, Lycopersiconesculentum, Sesamumindicum, Amaranthussp, Nicotianatabacum*cv. White Burley*Nicotianatabacum*cv. Samsun and *Capsicum frutescens*found to be the host for ChiVMV.Screening of 50 chilli genotypes for their reaction against ChiVMV has been done and categorized into different groups based on the per cent disease incidence and OD values observed in ELISA reader.Accordingly, five genotypes showed highly resistant (HR), ten genotypes showed resistant (R),six genotypes showedmoderatelyresistant (MR) and remaining showedsusceptible.

July, 2018

(R. GaneshaNaik)
Major Advisor

7. Studies on Fungal Fruit Spots and Fruit Rots of Pomegranate

PRUTHVIRAJ

ABSTRACT

Pomegranate is one of the favourite table fruits of tropical and subtropical regions. Among several fungal diseases affecting pomegranate, anthracnose caused by *Colletotrichum gloeosporiodes*, spot caused by *Curvularia geniculata* and blight caused by *Alternaria alternata* and *Pestalotiopsis microspora* are important. The studies were conducted on survey for the severity in central dry zone of Karnataka. Morphological, Cultural and *in vitro* evaluation of fungicides were carried against all these pathogens. Among the different district surveyed highest and lowest per cent disease index were recorded in Tumkur and Hassan district respectively. In growth phase studies *C. gloeosporiodes*, *C. geniculata* and *P. microspora* reached peak on 10th day, whereas, *A. alternata* reached peak on 8th day after inoculation. The conidia of *C. gloeosporiodes* were hyaline, single celled, with two oil globules measuring 12.02 to 12.70 µm×3.5 to 4 µm. Whereas, conidia of *A. alternata* were brown to dark brown colour with 2-8 septations, produced in chains measuring 20 to 80 µm × 6.4 to 8.5 µm. *C. geniculata* conidia were dark brown, typically geniculate shaped curved with 3 to 4 septate spores measuring 19.71 to 22.35 µm×5.81 to 6.42 µm and the conidia of *P. microspora* were spindle , five celled with three central coloured cells and two hyaline cells and the length of conidia varies from 25.3 to 29.6 µm × 3.2 to 4.3 µm. Among the different solid media evaluated potato dextrose agar, oat meal agar and Sabourad's dextrose agar found to be best for growth and sporulation. *In vitro* studies revelead that propiconazole, hexaconazole, pyraclostrobin, difenconazole, tebuconazole + tryfloxystrobin, pyraclostrobin + epoxiconazole and propiconazole + difenconazole were effective in inhibiting the growth of fungus.

August, 2018

(Suresh D. Ekabote)
Major Advisor

8. Investigation on Collar Rot of Cluster Bean (*Cyamopsis tetragonoloba* L.) Incited by *Sclerotium rolfsii* Sacc.

SANNAJAMBANNA, B.

ABSTRACT

Collar rot of cluster bean caused by *Sclerotium rolfsii* has become a serious problem in recent years in cluster bean growing regions of India and the yield loss caused by the pathogen ranges from 50-70 per cent. Hence, investigation were carried out on collar rot of cluster bean caused by *S. rolfsii* with respect to survey for disease incidence, cultural and morphological characters of pathogen, efficacy of fungicides, bio-agents and botanicals under *in vitro* conditions and management of disease under field conditions. Roving survey was carried out in three districts, among them the highest per cent disease incidence of 11.66 was observed in Shivamogga followed by Davanagere (10.05 %) and lowest disease incidence (5.94 %) was documented in Chitradurga district. The cultural and morphological characters of *S. rolfsii* was studied on six different solid and liquid media. The results indicated that, maximum radial growth was observed on corn meal agar (90.00 mm) with white coloured colonies and maximum dry mycelial weight was noticed in potato dextrose broth (461.40 mg) and potato dextrose agar produced 126 dark brown coloured with round shaped sclerotia. Efficacy of fungicides, bioagents and botanicals were tested under *in vitro* condition against *S. rolfsii*, the results revealed that, propiconazole and hexaconazole, *Trichoderma harzianum* and garlic clove extract were superior in inhibiting growth of the pathogen. Field trial results revealed that, propiconazole 25 EC @ 0.1 % treated plots showed the lowest per cent disease incidence of 8.33 with highest per cent reduction over control followed by hexaconazole 5 EC @ 0.1 % (13.33 %) and maximum green pod yield was obtained from propiconazole @ 0.1 % (4599 kg / ha) with 99 no. of pods per plant.

September, 2018

(H. Narayanaswamy)
Major Advisor

Soil Science and Agricultural Chemistry

University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Plant Pathology

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1. Effect of Levels of Fertigation on Growth and Yield of Tomato under Polyhouse Condition

ANANDA SAJJAN

ABSTRACT

The polyhouse experiment was carried out at College of Horticulture, Hiriyur during *Kharif*season2017, to study the effect of levels of fertigation on growth and yield of tomato.The results of experiment indicated that soil application of 100:100:100 kg NPK per acre increased the growth, yield and quality of tomato significantly over otherfertigation treatments. Among thefertigation treatments,as fertigation dose increased, yield also increased. The treatment that receivedsoil application of 100:100:100 kg NPK per acre recorded significantly higher plant height (242.67 cm), number of branches (11.60 plant^{-1}), number of leaves (626.16 plant^{-1}), leaf area (67.07 dm^2 plant^{-1}), yield parameters *viz.*, number of fruits per plant (30.18 plant^{-1}), fruit weight (65.13 g), fruit yield (1.62 t ac^{-1}), quality parameters *viz.*, shelf life (9.38 days), total soluble solids (3.4 $^{\circ}$Brix), Lycopene content (56.60 mg 100g^{-1}) and ascorbic acid (123.37 mg 100g^{-1}) was significantly higher in treatment received 100:100:100 kg NPK per acre. Among the fertigation treatments, treatment that received soil application of 40:40:40 kg NPK per acre + 4 kg 19:19:19 per acre through fertigation recorded significantly higher growth, yield and quality parameters.Significantly maximum nitrogen (79.90 kg ac^{-1}), phosphorus (24.48 kg ac^{-1}) and potassium(163.26 kg ac^{-1}) uptake by tomato (fruit + plant) registered in treatment received soil application of 100:100:100 kg NPK per acre. Similarly, soil application 100:100:100 kg NPK per acre recorded higher available nitrogen (138.34 kg ac^{-1}), available phosphorus (39.82 kg ac^{-1}) and available potassium (155.74 kg ac^{-1}) after harvest of the crop.The economic benefits of 100:100:100 kg NPK per acre through soil application resulted in maximum benefit cost ratio (2.12) and value cost ratio (49.15).

August, 2018

(L. B.Ashok)
Major Advisor

2. Soil Characterization of Hebbalagere Micro Watershed of Channagiri Taluk in Davanagere District of Karnataka

HARSHITHA S

ABSTRACT

An investigation was carried out to characterize the soils of Hebbalagere microwatershed of Channagiri taluk in Davanagere district of Karnataka during the year 2017-18 at Department of Soil Science and Agricultural Chemistry, College of Agriculture, UAHS, Shivamogga.

Gridwise surface soil samples were collected at 320m X 320m interval and soil fertility status maps were prepared. The surface soil texture of the Hebbalagere micro watershed area was predominantly with sandy clay and clay. The soils were slightly acidic to strongly alkaline with non-saline in nature and soil organic carbon was low to high. The micro-watershed showed low to medium in available N status, medium to high in available P_2O_5, available K_2O and available sulphur status. The exchangeable calcium, magnesium and DTPA extractable iron, copper, manganese were sufficient in the entire micro-watershed area while the DTPA extractable zinc was both deficient and sufficient. Available boron content ranged from low to high in the study area.

Eleven soil profiles were studied based on soil heterogeneity of studied area. Soil structure of pedonsvaried from sub-angular blocky to angular blocky.The available N, P_2O_5, K_2O, sulphur and boron,exchangeable Ca and Mg and DTPA extractable Fe, Cu, Mn and Zn decreased with depth in the majority of the pedons while in some pedonsit followed the indefinite trend.The pedons1, 2, 3, 4, 5, 6, 8 and 11 were classified under order Alfisols,thesoilsofpedon7 and 9weregroupedunder order Inceptisols and Pedon 10 was classified as orderVertisols. Sorghum, sunflower and mulberry werehighly to moderately suitable; maize and arecanutwere marginally suitable; ragi, red gram, chilli, soybean, banana, mango and guava were moderately to marginallysuitable; field bean was moderatelysuitable; cotton and coconut weremarginally to not suitable in the Hebbalageremicro watershed.

July, 2018

(Ganapathi)
Major Advisor

3. Assessment of Carbon Sequestration Potential in Different Land use Systems of Virajpet Taluk, Kodagu District.

PRADEEPA, K. L.

ABSTRACT

A study was conducted at UAHS, Shivamogga to know the carbon sequestration potential of soils under different land use systems in Virajpet taluk, Kodagu district, Karnataka. The representative soil samples were collected from major land use systems *viz.*, sacred groves, coffee based agroforestry-indigenous, coffee based agroforestry-exotic and paddy land use system from 0-15 cm, 15-30 cm, 30-60 and 60-90 cm soil depths.

The present investigation indicated that, texture varied from loamy sand to clay loam. The pH was acidic in all the soils under investigation and electrical conductivity was normal with respect to salt accumulation.The CEC of soil ranged from 14.43 to 29.95 cmol (p+) kg^{-1}. The highest mean value of BD was observed under paddy land use system (1.30 Mg m^{-3}). The highest mean value of available nitrogen (343.64 kg ha^{-1}) was observed in coffee based agroforestry-indigenous and highest mean value of available phosphorous (57.32 kg ha^{-1}) and sulphur (45.09 mg kg^{-1}) wasobserved in sacred groves.

Among different land use systems, the higher mean value of PDOC(13.56 g kg^{-1}), PPOC (1026.26 mg kg^{-1}), CWEC(548.75 mg kg^{-1}), SMBC(626.78 mg kg^{-1}), TOC (31.93 g kg^{-1}), TC (52 g kg^{-1})and TIC (0.58 g kg^{-1}) content was observed in sacred groves and decreases with increasing soil depth. The E_4/E_6value was lower than 6 in all the studied land use systems. The soils under sacred groves has recorded the highest mean value of Humic acid and Fulvic acid (4.50 and 5.51).The highest mean value of carbon sequestration potential was observed in sacred groves (325.25 t ha^{-1}) followed by coffee based agroforestry-indigenous (239.40 t ha^{-1}) and lowest mean value of carbon sequestration potential was observed in paddy land use system (162.96 t ha^{-1}).

August, 2018

(Ravikumar, D)
Major Advisor

4. Forms and Distribution of Zinc in Soils under Paddy Cover in Bhadra Command of Karnataka

RANJITHA, P.

ABSTRACT

A study was carried out in the department of soil science and agricultural chemistry, college of agriculture, Shivamogga to know the "Forms and distribution of zinc in soils under paddy cover in Bhadra command of Karnataka" during 2016-18. 145 surface soil samples (0-15 cm) were collected from soils of Bhadra command and analysed for chemical properties, available zinc status and distribution of zinc fractions in soils and their relationship with other soil properties were also worked out.

The results indicated that, soil pH ranged from 5.02 to 8.63 (39.31% soil samples recorded acidic pH). Organic carbon ranged from 3.54 to 13.20 g kg^{-1} (57.24% samples recorded high). Per cent $CaCO_3$ ranged from 0.35 to 5.89.

The DTPA extractable zinc in these soils ranged from 0.10 to 2.41 mg kg^{-1}. Considering 0.60 mg kg^{-1} as the critical limit of DTPA zinc in soils, 70.34 and 29.66% were found to be sufficient and deficient in DTPA extractable zinc, respectively. The distribution of soil zinc fractions to total zinc followed order as water-soluble < carbonate bound < organic bound < Sorbed > easily reducible manganese bound < Fe and Al oxide bound < residual zinc**.** Among the zinc fractions, the residual fraction was found to be a dominant fraction and the water soluble fraction was found to be the least fraction. Total zinc was found to be in the range of 391 to 477 mg kg^{-1}.

Correlation studies showed that, available zinc positively related with organic carbon (r = 0.116), clay content (r = 0.343*) and CEC (r = 0.204). Further, positive correlations among the zinc fractions and total zinc except for Fe and Al oxide bound Zn indicated that zinc fractions are in dynamic equilibrium with each other.

July, 2018

(H. M. Chidanandappa)
Major Advisor

5. Effect of P Levels and P Solubilizers on P Status in Soil and Productivity of Paddy

SHOBHA TALAWAR

ABSTRACT

A field experiment was conductedat AHRS, Bavikere, UAHS, Shivamogga on sandy loam soil during *Kharif*2017 know the effect of P levels and P solubilizers on P status in soil and productivity of paddy. The levels of phosphorus at 0, 50, 75 and 100% P_2O_5 Kg per ha with and without P solubilizer seedling treatment were tried in Randomized Complete Block Design (RCBD) with twelve treatmentsand threereplication.

Results of the field experiment indicated that application of recommended NPK withPSF seedling treatment significantly increased the growth and yield and of paddy. Highest grain yield of paddy was noticed with recommended NPK with PSF seedling treatment (56.90 q ha^{-1}). The nutrient content and uptake of NPK by paddy was highest in the treatment that received recommended NPK with PSF seedling treatment.

Higher valves of saloid – P and Ca – P and availableP status in soil were recorded with recommended NPK with PSF seedling treatment at different crop growth stages. Higher values of Al-P, Fe – P, red – P, occl – P, organic – P and total – P fractions were recorded in treatments involving only P levels without P solubilizers seedling treatment compared to the application of P levels with P solubilizers seedling treatment. Application of recommended NPK recorded higher values of Al-P, Fe – P, red – P, occl – P, organic – P and total – P fractions.All the fractions except organic P significantly and positively correlated with yield attributes, straw yield, grain yield and P uptake by paddy.

August, 2018

(B. C. Dhananjaya)
Major Advisor

6. Characterization of Soils and Water in Lakya Sub Watershed of Dasarahalli-I Micro Watershed in Chikmagalur Taluk

SUSHMITHA, C.V.

ABSTRACT

An investigation was carried out to characterize soils and water in Lakya sub watershed of Dasarahalli-I microwatershed in Chikmagalur taluk during the year 2017-18 in the Department of Soil Science and Agricultural Chemistry, College of Agriculture, UAHS, Shivamogga.

Grid wise surface soil samples were collected at 320 m X 320 m interval and soil fertility status maps were prepared. The surface soil texture of the Dasarahalli-I micro watershed area was predominantly with sandy clay loam and clay. The soils were strongly acidic to slightly alkaline (5.02-7.80) with non-saline in nature and soil organic carbon was low to medium (3.30-7.50 g kg^{-1}). The micro-watershed showed low to medium (188.16-376.32 kg ha^{-1}) in available nitrogen status, medium in available P_2O_5, K_2O and medium to high in available sulphur status. The exchangeable calcium, magnesium and micro nutrients were sufficient in the entire micro-watershed area while the zinc was deficient in 0.38 per cent of the area and sufficient in 6.61 per cent of the study area. Available boron content was deficient in study area.

Eight soil profiles were studied based on soil heterogeneity of studied area. Soil structure of pedons was sub-angular blocky. In general available N, P_2O_5, K_2O, sulphur and boron, exchangeable Ca and Mg and micro nutrients decreased with increasing depth. Sorghum and sunflower were highly to marginally suitable; groundnut, ragi, bengal gram, tur, guava, coconut, mango and arecanut were moderately to marginally suitable in Dasarahalli-I micro watershed.

Total of 14 ground water samples were collected from running tube wells in the study area in before and after rainy season. All the analyzed chemical parameters were found to be highest in case of samples collected in before rainy season as compared to after rainy season and quality parameters like pH, EC, SAR, RSC *etc* ., were within the permissible limits.

July, 2018

(K. T. Gurumurthy)
Major Advisor

7. Effect of Calcium Enriched FYM through Eggshell on Soil Properties and Yield of Brinjal

SUSHMITHA, N. SWAMY

ABSTRACT

An enrichment0and0field0experiment0was conducted at ZAHRS, Navile, Shivamogga during the year 2017 to know the "Effect of Calcium enriched FYM through eggshell on soil properties and yield of Brinjal". The FYM was enriched with Eggshell powder (ESP) @10kg/t and Lime @5kg/t as calcium sources with and without microbial consortia for 45 days. The Ca enriched FYM was applied to field with brinjal0as0test0crop. The experiment was laid out in a Randomized Complete Block Design with thirteen treatments replicated thrice. The FYM enriched with eggshell powder@10kg/ton + Microbial Consortia (MC) for 40 days recorded highernitrogen0(0.85%),0phosphorus0(0.36%),0potassium0(0.58%)and1Calcium0(0.69%) content0compared to FYM with0package0of0practices.

The highest mean plant height, number of branches per plant and stem diameter were recorded due to application of Ca0enriched0FYM through eggshell powder@10kg/t + MC enriched for 45 days compared to0control (FYM only).The soil application of Ca enriched FYM through (45 days) eggshell powder @10kg/t + MC was recorded maximum number of fruits (44.6) per plant, fruit girth (5.26 cm) and fruit weight (58.9g)0followed0by0Ca enriched FYM through (45 days) eggshell powder @10kg/t without MC and lime enrichment. Whereas application of FYM with0package0of0practiceswas recorded lower number of fruits (32.00) per plant and fruit girth and fruit weight.The soil application of Ca enriched FYM through (45 days) eggshell powder @10kg/t + MC recorded highest fruit yield per plant (0.91 kg plant^{-1}) and fruit yield per hectare (25.32 kg ha^{-1}),to the extent of 20.62 per cent increase in yieldcompared to FYM enriched with lime and with FYM with0package0of0practices.

Significantly higher exchangeable calcium content in soil was recorded after harvest due to application of0Ca0enriched0FYM through0(45 days)0eggshell powder @10kg/t + MC whereas the lower exchangeable calcium status in soil was recorded in the treatment supplied with FYM only in all the growth stages and harvest stage.

July, 2018

(G. N. Thippeshappa)
Major Advisor

8. Effect of Levels and Split Application of Potassium on Productivity of Paddy and Status of Potassium in Alluvial Soil of Coastal Region of Karnataka

YASHAWANTHKUMAR, S. M.

ABSTRACT

A field experiment was conducted during *Kharif*, 2017 at Zonal Agricultural and Horticultural Research Station, Brahmavar, UAHS, Shivamogga to know the effect of levels and split application of potassium on productivity of paddy and status of potassium in alluvial soil of coastal region of Karnataka. The experiment was laid out in randomised complete block design with ten treatments and replicated four times. Among different levels and spilt application of potassium, the treatment received potassium @ 75 kg K_2O $ha^{-}1$ with three equal split doses recorded higher plant height (115.05 cm), number of tillers per m^2 area (482.25), panicle length (23.05 cm), test weight (25.34 g), filled grains per panicle (108.98), grain and straw yield (7733 and 8815 kg ha^{-1}, respectively) and lowest growth and yield parameters was observed in treatment without application of potassium.

The higher uptake of potassium (168.79 kg ha^{-1}) was recorded in treatment, which received potassium level (75 kg K_2O ha^{-1}) in three equal splits compared to all other treatments.

An increase in the level of potassium application (45 to 75 kg ha^{-1}) either as basal or in splits, increased the water soluble and non-exchangeable potassium in soil after harvest of crop and lattice potassium decreased with increase in level of potassium application.

August, 2018

(Jayaprakash, S. M.)
Major Advisor

Horticulture

Crop Improvement and Biotechnology

University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Crop Improvement and Biotechnology

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1. Heterosis and Combining Ability Studies for Yield and Quality Traits in Ridge Gourd [*Luffa acutangula* (L) ROXB.]

CHANDAN, B. M.

ABSTRACT

The study on heterosis and combining ability for yield and quality traits in Ridgegourd was undertaken during 2017-18 at the Department of Crop Improvement and Biotechnology, College of Horticulture,Mudigere. Twenty hybrids derived by crossing of five parents in diallelfashion were evaluated along with parents and check (US-276) in a randomized complete block design with three replications. Variances due to genotypes varied significantly for all characters and mean performance of majority hybrids were better than parents for almost all qualitative and quantitative parameters. The magnitude of heterosis over mid parent, better parent and check was high in desirable direction for all characters studied. The estimates of heterosis over checkranged from-1.28 % (Krishna–51 × Shittahalli Local and Krishna–51 × TNAU CO-1) to12.16% (ArkaSujath × Krishna–51 and TNAU CO-1 × Krishna–51) for days to 50% flowering and -30.92 % (Krishna–51 × TNAU CO-1) to 9.29 %(ArkaSujath × Krishna–51)for fruit yield (t/ha). Combining ability analysis revealedhigher dominance variance than additive variance for majority of characters indicating preponderance of non-additive gene action. The parentsPusaNasdar and Shittahalli Local were identified as good general combiners. Similarly, crosses PusaNasdar× ArkaSujath and ArkaSujath× Krishna-51 were identified as good specific combiners. Hybrids ArkaSujath × Krishna-51 (12.23 t/ha) and ArkaSujath × PusaNasdar(12.16 t/ha) were considered as the most productive hybrids and Shittahalli Local×Krishna-51 (56.01 %) andKrishna-51 ×Shittahalli Local(53.26 %) as the most heterotic hybrids.

December, 2018

(D. Lakshmana)
Major Advisor

2. Heterosis and Combining Ability Studies for Yield and Quality Traits in Brinjal (*Solanum melongena* L.)

SANTOSHKUMAR PATIL

ABSTRACT

The study on heterosis and combining ability in brinjal was undertaken during 2017-2018 at the Department of Crop Improvement and Biotechnology, College of Horticulture Mudigere. Twenty hybrids derived by crossing five parents in diallele mating system were evaluated along withparents and standard check in a randomized completely block design with three replications. The variances due to genotypes varied significantly for all the characters studied. The mean performance of the majority hybrids were better than parents for almost all qualitative and quantitative parameters. The magnitude of heterosis over mid parent, better parent and standard check ArkaAnand was very high in desirable direction for characters studied. The estimates of heterosis in per cent over the standard check ranged from 11.35 % (Melavanki × Coorg) to -26.39 % (Melavanki × Malapur)for days to 50% flowering and 46.45 %(Kudchi×Malapur)to 7.37 %(Kudchi × Melavanki)for total fruit yield tonnes per hectare. The studies on combining ability revealed that dominance variance was higher than additive variance for majority of characters indicating preponderance of non-additive gene action, thus these characters could be improved through recurrent selection orheterosis breeding. The parentMattigulla and Melavanki were identified as good general combiners for various characters studied. Similarly, the crossMelavanki× Malapur and Coorg × Mattigulla were identified as good specific combiners. HybridKudchi × Melavanki(24.18 t/ha) and Mattigulla × Coorg (23.55 t/ha) were considered as the most productive hybrids and Kudchi×Melavanki (82.70 %) andMelavanki×Kudchi (43.26 %) were considered as the most heterotic hybrids.

September, 2018

(D. Lakshmana)
Major Advisor

3. Assessment of Genetic Diversity in Bitter Gourd (*Momordicacharantia* L.) for Yield and its Attributing Characters

SOWMYA, H. M.

ABSTRACT

An experiment was carried out at College of Horticulture, Mudigere during 2017-18 to assess the extent of genetic diversity for yield and its attributing characters in Bitter gourd. The experiment was laid out in a randomized complete block design with three replications including twenty four bitter gourd genotypes. Analysis of variance revealed that highly significant differences was observed among the genotypes for yield and its attributing characters indicating existence of genetic variability among the genotypes. The estimates of phenotypic coefficient of variation were higher that the genotypic coefficient of variation with narrow differences indicated most of the characters were less influenced by the environment which provides scope for improvement through simple selection. High heritability coupled with high genetic advance as per cent mean was observed for all the characters indicating predominance of additive gene action and amenability for phenotypic selection in early generations. Fruit yield per plant had significant positive correlation with fruit length and fruit weight. High positive direct effect was observed between fruit yield per plant with vine length, node at which male flower appears, number of fruits per vine, fruit weight and fruit length which are important characters to be accounted for gaining improvement in yield. Twenty four genotypes were grouped into five clusters based on Mahalanobis's D^2 statistic. Twenty genotypes were included in cluster I and cluster II, cluster III, cluster IV and V were solitary in nature. Fruit weight (31.16%), flesh thickness (19.93%), node at which first female flower appear (11.59%) contributed maximum to the total divergence. Hubli local, Chickmanglore local, Chitradurga local-1 and Bidar local-1 recorded higher yield and these can be utilized for further breeding programme.

July, 2018

(Shashikala S. Kolakar)
Major Advisor

4. Genetic Diversity in Okra (*Abelmoschusesculentus* L.) for Yield and Seed Quality Traits

SUNIL GATADE

ABSTRACT

An experiment was carried out at University of Agricultural and Horticultural Sciences (UAHS), Navile, Shivamogga during the year 2017-18 to study the genetic diversity for yield and seed quality traits in okra. The experiment was laid out in a randomized completely block design with three replications including thirty five okra genotypes. Analysis of variance revealed that highly significant differences were observed among the genotypes for yield and seed quality traits indicating existence of genetic variability in the genotypes. The estimate of phenotypic coefficient of variation was higher that the genotypic coefficient of variation with narrow differences indicated most of the characters were less influenced by the environment which provides scope for improvement through simple selection. High heritability coupled with high genetic advance as per cent mean was observed for total chlorophyll content and number of branches per plantindicating predominance of additive gene action and amenability for phenotypic selection in early generations. Fruit yield per plant had significant positive correlation with plant height, number of branches, number of fruits per plant and fruit length. High positive direct effect was observed between fruit yield per plant with fruit weight, number of fruits per plant and fruit length which are important characters to be accounted for gaining improvement in yield. Based on Mahalanobis D^2 analysis, 35genotypes were grouped into three clusters andcluster I (26) consisted highest number of genotypes. Among the traits studied plant height (21.18 %), days to 50 per cent flowering (17.14 %), fruit weight (16.13 %) and number of branches (10.08 %) contributed maximum to the total genetic diversity. The present study identified three promising genotypes *viz.*,UHSB-L9, UHSB-L26, OkraB-1, OkraB-2 and OkraB-6, for yield and OkraB-1, OkraB-3, OkraB-6, OkraB-7 for seed quality which can be utilized for further crop improvement programme.

September, 2018

(Usha, T. N.)
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. Ecology of shot-hole borer, *Xylosandrus compactus* (Eichhoff) in relation with attractant and nutrient status of robusta coffee

AVINASH

ABSTRACT

The research on ecology of shot-hole borer, *Xylosandrus compactus* (Eichhoff) in relation with attractant and nutrient status of robusta coffee was conducted in Mudigere, Karnataka during 2017-18. Ethyl alcohol at 95 per cent was superior for monitoring the flight activity of *X. compactus.* Irrespective of concentrations used, the ethanol-baited traps were seen attracting only scolytid beetles. Three major nutrients *viz*. nitrogen, phosphorous and potassium were found significantly at the higher rate in the twigs sampled from fertigated plantation than in the twigs sampled from non-fertigated plantation. More nitrogen, phosphorous and potassium was quantified from infested twigs than uninfested twigs. The per cent infestation within the fertigated and non-fertigated plantation was found to be 72.14 and 61.42 respectively. The infested twigs per infested plant in the fertigated and non-fertigated plantation were 4.11 and 2.35 respectively without any significant difference. The number of bored holes in infested twigs of the fertigated plantation (2.58 bored holes/twig) was comparatively more with non-fertigated plantation (1.72 bored holes/twig). The variation was not much for nutrient content in twigs based on thickness. The number of bored holes in the thicker twigs (1.67 bored holes/twig) was superior over medium-size (1.55 bored holes/twig) and thinner twigs (1.12 bored holes/twig). The number of infested plants forthe selected quadrants was more in the fertigated (30.75 plants/100 plants) plantation than non-fertigated plantation (26.2 plants/100 plants). The number of infested twigs per infested plant was significantly higher in the fertigated plantation (4.42 twigs/infested plant) over non-fertigated plantation (2.31 twigs/infested plant) amongst the selected quadrants. Irrespective of the plantation, the highest infestation among selected quadrants was noticed in February. The infestation spread was random, scattered and didn't confirm any specific pattern in both the plantation.

August, 2018

(Revanna Revannavar)
Major Advisor

2. Studies on Tritrophic Interaction in Okra, *Helicoverpa armigera* (Hubner) and Chrysopids

J. J. APOORVA

ABSTRACT

The investigational preference studies among the sixteen okra genotypes indicate that the mean number of egg laying by *Chrysoperla zastrowi sillemi* (Esben - Petersen) in absence and presence of *Helicoverpa armigera* (Hubner) was significantly highest on EC 169406 and EC 169424. Whereas, *H. armigera* laid significantly higher number of eggs on EC 169406 and EC 169424 and least on EC 169415 and Utkal Gaurav. Among the different growth stages of okra genotypes, *C. zastrowi sillemi* laid more number of eggs in the presence of *H. armigera* in comparision with the absence of *H. armigera.* Both in the presence and absence of *H. armigera*, *C. zastrowi sillemi* laid more number of eggs at flowering stage followed by fruiting stages of okra genotypes. Further, *H. armigera* followed the same trend in egg laying in flowering and fruiting stages of okra. The feeding potential of chrysopid species on *H. armigera* eggs on different okra genotypes were significantly higher on EC 169415, Utkal Gaurav followed by EC 169419 and significantly least feeding potential on EC 169406. Among the species of chrysopids, feeding potential of *C. zastrowi sillemi* was more followed by *Mallada boninensis* (Okomoto) and *Mallada astur* (Banks). Irrespective of the okra genotypes, trichome density was positively correlated with the oviposition of *C. zastrowi sillemi* and *H. armigera*. Whereas, negatively correlated with the feeding potential of chrysopids. Gas chromatography of okra leaf extract indicated the presence of tetradecane, pentadecane, tricosene and eicosene volatile compounds responsible for attracting chrysopids. Among the different treatments involving *C. zastrowi sillemi* as a major component in management of fruit borers in okra, seed treatment with imidacloprid 70 WS @ 10 g/ kg + application of NSKE (5%) + release of *C. zastrowi sillemi* (60,000 grubs/ ha) was superior in recording lower incidence of fruit borers in the okra variety, Arka Anamika and this treatment is as effective as RPP and recorded less fruit damage by borers, significantly higher pod yield, higher gross return, net return and B:C ratio (1:1.95) next to RPP.

July, 2018

(L. Hanumantharaya)
Major Advisor

3. Diversity of Spider Mites in Vegetable Crops with Special Reference to Two Spotted Spider Mite, *Tetranychus urticae* Koch (ACARI: TETRANYCHIDAE) on Tomato

MEGHANA, J.

ABSTRACT

An investigation was carried out on diversity of spider mites with special reference to *Tetranychus urticae* Koch, its seasonal incidence and management using acaricides. The experiment was carried out in open field condition during 2017-18 at Department of Entomology, College of Horticulture, Hiriyur, Chitradurga District, Karnataka, India. Three species of Tetranychid mites *viz.*, *Tetranychus urticae*, *T. macfarlanei* and *T. ludeni* were identified from ten different host plants. Among these, *T. urticae* was reported on tomato, *T. macfarlanei* was reported on tomato, brinjal, bhendi, cucumber, watermelon, bitter gourd, bottle gourd, soyabean, frech bean and kakachi whereas *T. ludeni* was recorded on brinjal. During *kharif*2017, the population of spider mite on tomato was first noticed during the second fortnight of August 2017 and continued up to last week of October 2017. The peak abundance was noticed during the second fortnight of September 2017 with 4.52 mites per leaf. During *rabi* 2017, the population of *T. urticae* was first noticed during the second fortnight of December of 2017 with the peak abundance of 38.76 mites per leaf was noticed during first fortnight of March 2018. Among the selected acaricides, fenpyroximate 5 SC was effective at 3, 7 and 10 days after first and second spray against total population of spider mite on tomato under field condition. The least effective acaricide was dicofol 18.5 EC. The order of efficacy of these acaricides against mite population was fenpyroximate 5 SC (1.0 ml/l) > diafenthiuron 50 WP (1.0 g/l) > chlorfenapyr 10 EC (1.0 ml/l) > spiromesifen 22.9 SC (0.8 ml/l) > propargite 57 EC (2 ml/l) > fenazaquin 10 EC (2.5 ml/l) > dicofol 18.5 EC (2.5 ml/l). Finally, the highest yield (69.40 t/ha) and B:C ratio (1: 2.80) was obtained in the treatment fenpyroximate 5 SC.

August, 2018

(Rajashekharappa, K)
Major Advisor

4. Studies on Seasonal Development and Multiplication of Stingless Bee, *Tetragonula iridipennis* (Smith) Colonies

MYTHRI, P.G.

ABSTRACT

Studies on seasonal development and multiplication of stingless bee, *Tetragonula iridipennis* (Smith) colonies were carried out during 2017-18 at College of Forestry, Ponnampet. The observations on seasonal development of the colony showed that the initial mean brood volume of 70.06 cm^3 during the month of April 2017 increased to the maximum of 162.28 cm^3 by the month of March 2018. The volume of food pots increased from the initial level of 30.39 cm^3 to the highest of 156.70 cm^3 and the colony weight from the lowest of 234.96 g to 373.68 g during the months of April 2017 and March 2018, respectively. The foraging activity of the bees and number of bees involving in various activity remained same across the seasons and also a same trend of lesser number of bees involving in different activity in the morning hours; gradually increasing towards noon and then onward declining and reaching to the lowest by evening was observed in all the seasons. Perusal of the beekeepers practices in dividing the stingless bees showed three different methods, with varying rate of success ranging from 50 to 80 per cent. Among the different methods of colony division, high success was obtained in the divided nucleus colonies with the presence of gynes and / or queen cells in parallel method of division; and without them the success rate was zero per cent. The artificially prepared queen cell cups made up of bee wax and brood cell material when placed into the colony, they were not accepted by the bees. Even the enlarged cell prepared by joining two adjacent cells with single larvae in them was also not accepted by the colony. In *invitro* rearing, larval stages showed good success than the egg stages in emerging as adults.

August, 2018

(R.N. Kencharaddi)
Major Advisor

5. Studies on Pest Complex and Management of Fruit Fly, *Bactrocera cucurbitae* (Coquillett) in Cucumber

SRINIVAS, M. P.

ABSTRACT

The present investigation on the pest complex and management of fruit fly, *Bactrocera cucurbitae* (Coquillett) in cucumber was conducted at Amble village, Chikkamagaluru, Karnataka during *kharif* 2017 and summer 2018. In the present study, 21 species of insect pests belonging to Lepidoptera (2 species), Coleoptera (5 species), Diptera (7 species), Hemiptera (6 species), Thysanoptera (1 species) and one non-insect pest belonging to class Acarina (1 species) were noticed. The cucumber was found to be attacked by eight species of sucking pests, eight species of defoliators and six species of fruit flies. A total of 11 species of predators belonging to Coleoptera (5 species), Neuroptera (1 species) and Hemiptera (2 species) and one non-insect class, Araneae (3 species) were encountered in the cucumber cropping system. Eight insecticides were evaluated against melon fruit fly, among which, significantly lowest number of ovipositional punctures (0.72 and 0.98 /fruit), number of maggots (8.0 and 8.93 /fruit) and per cent fruit infestation (14.92 and 17.90 %) as well as highest marketable fruit yield (15.63 and 16.49 t /ha.) and more cost-benefit ratio (1: 2.30 and 1: 2.43) was recorded in the treatment spinosad 45 SC (0.15 ml/l) during both *kharif* and summer season, respectively and it was on par with the treatment dichlorvos 76 EC (1.0 ml/l). Highest number of ovipositional punctures (2.72 and 3.01 /fruit), number of maggots (19.13 and 19.80 /fruit) and per cent fruit infestation (46.91 and 56.79 %) as well as lowest marketable fruit yield (10.75 and 9.01 t /ha.) was obtained in jaggery alone treatment (10 g/l) followed by control in both *kharif* and summer season, respectively. During *kharif* season the lowest cost-benefit ratio (1: 1.62) was obtained in jaggery alone treatment while in summer season cyantraniliprole 10.26 OD recorded the lowest cost-benefit ratio (1: 1.34).

July, 2018

(Suchithra Kumari, M. H.)
Major Advisor

6. Seasonal Incidence and Management of Black Pepper Root Mealy Bug, *Formicoccus polysperes* Williams (Pseudococcidae: Hemiptera)

SWATHI, N.

ABSTRACT

Investigations were carried out on the survey, seasonal incidence and management of black pepper root mealybug during 2017-18.A preliminary survey was conducted in Chikkamagluru, Hassan and Kodagu districts of Karnataka to document the root mealy bug species infesting black pepper.Two species of mealy bugs, namely, *Formicococcus polysperes* Williams and *Pseudococcus* sp. were found to be infesting the underground parts of black pepper in Kodagu and Chikkamagaluru districts. The normal symptom observed by the root mealy bug infestation was yellow discolouration of the leaves. The root mealy bug colonizes on roots upto a depth of 25cm vertically with a maximum number of colonies 23.20/15cm root length. The alternative hosts recorded were *viz*., ginger, elephant foot yam and weeds like *Phyllanthus niruri* Lour,*Ageratum conyzoides* L., *Physalis minima* L., *Synedrella nodiflora* L. and a pepper standard, *Erythrin*a sp. Seasonal incidence of root mealy bugs showed the presence of mealy bugs throughout the year with highest population was in post rainy month October (18.5) and lowest population in the month of March (1.20). A significant positive correlation was observed between mealy bug population with rainfall and relative humidity, while negative correlartion was observed with temperature.Infested plants are associated with four ant species*viz*., *Paratrechina longicornis* Latreille, *Plagiolepis* sp.1,*Plagiolepis*sp.2 and*Aphaenogaster* sp. by which mealy bug infestation could be easily recognized. The *Formicoccus polysperes* is known to cause damage to black pepper in the hill zone of Karnataka. In an attempt to control this pest, six insecticides *viz*., chlorpyriphos, carbosulfan, imidachloprid, phorate, carbofuron, chlorantriniliprole and neem cake were evaluated under field conditions. Chlorpyriphos 20EC @ 5ml/l, imidacloprid 17.8SL @ 1.5ml/l and chlorantriniliprole 0.4G @ 20g/vine showed the highest efficacy recording 100, 98 and 97 percent reduction, respectively.

July, 2018

(R. Girish)
Major Advisor

7. Studies on Seasonal Incidence and Management of Cardamom Thrips (*Sciothrips cardamomi* Ramakrishna) Under Hill Zone of Karnataka

VENUKUMAR, S.

ABSTRACT

Studies on seasonal incidence and management of cardamom thrips (*Sciothrips cardamomi* Ramk.) was carried out at Mudigere, Karnataka during 2017-2018. The highest population of cardamom thrips was on leaf sheath of M2 and M3 cardamom varieties during February to May, whereas during September the population was the highest on panicle. There was significant positive correlation between the thrips population on leaf sheath and temperature in M2 and M3 cardamom varieties. Among the fourteen cardamom genotypes, the lowest thrips population per leaf sheath and panicle was recorded in PL No. 14, SKP 104, CR 6, IC 349651 and MCC 346 genotypes followed by SKP 164, IC 547167, Local Malabar, ICRI 3and CL 726 genotypes. The highest thrips population was recorded in the genotype Green Gold followed by IC 349545, CL 691 and IC 547185.

The number of thrips per leaf sheath and panicle was the least in treatments *viz.* 1 ml fipronil 5 SC, 0.2 g acetamiprid 20 SP and 0.25 g thiamethoxam 25 WG per litre of water. The thrips popuation per leaf sheath and panicle was higher in biorational treatments (azadiractin 1 EC and spinosad 45 SC), however the popualtion was lower than untreated control. The per cent capsule damage by thripswas significantly lower in the treatments *viz.* fipronil 5 SC, thiamethoxam 25 WG and acetamiprid 20 SP and the significantly higher marketable cardamom capsule yield was724.2, 722.3 and 704.4kg/ha in treatments *viz.* fipronil 5 SC, acetamiprid 20 SP and thiamethoxam 25 WG, respectivley. The treatments *viz.* acetamiprid 20 SP, fipronil 5 SC and thiamethoxam 25 WG were superior with respect to benefit cost ratio (7.07, 6.93 and 6.76, respectively).

August, 2018

(L. Hanumantharaya)
Major Advisor

8. Role of flower visitors in pollination and fruit set of guava (Psidium guajava L.)

KRUTHI, M.K.

ABSTRACT

An investigation on role of flower visitors in pollination and fruit set of guava (*Psidium guajava* L.) was conducted during August 2013 to December 2014 at R.H.R.E.C., U.H.S.campus, G.K.V.K., Bengaluru.Among the two blooming seasons of guava during the study period, second fortnight of November 2013 and second fortnight of August 2014 were the peak flowering fortnights with 75.0 and 78.3 flowers per plant, respectively. Anthesis and anther dehiscence were maximum during 06.00hrs.to 07.00hrs. Maximum stigma receptivity was found two hours after anthesis, whereas, pollen viability was highest at the time of anthesis. Among eight hymenopteran flower visitors recorded on guava, *Apis dorsata, A. cerana* and *A. florea* were dominant species in the order. The most dominant species, *A. dorsata* in a single trip during early morning visited, 2.80 flowers to forage, spending the highest time of 96.73 sec. per flower. Whereas, it visited highest, 7.20 flowers to forage, spending the least time of 15.58sec. per flower during afternoon. Most of *A. dorsata* (82.50%) landed on anthers and the remaining (17.50%) landed on petals of the flower. They foraged both for nectar and pollen during early morning, but as the day progressed, most of them shifted to collect only pollen.Open pollinated flowers recorded highest fruit set (92.30%), fruit retention after fruit set (94.79%), fruit retention at harvest (87.49%), number of days taken from flowering to harvest (120.08 days), fruit weight (153.235g), fruit volume (149.75cc), number of seeds per fruit (490), seed weight per fruit(4.899g), pulp weight per fruit (148.336g) and fruit weight per plant (14.983kg).Whereas, flowers covered with nylon net and muslin cloth to avoid flower visitors showed least of these traits proving the importance of honey bee pollination for higher yield in guava.

September, 2018

(V. V. Belavadi)
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. Morphological, Floral Characterization and Diversity of Wild Orchids of Western Ghats

AKSHATA, A. S

ABSTRACT

An investigation on "Morphological, floral characterization and diversity of wild orchids of Western Ghats" was carried out at orchidarium, Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, during 2017-18. The experiment was laid out in Randomized Complete Block Design (RCBD) with 22 treatments and 3 replications. The shoot height in monopodial and sympodial orchids was recorded maximum in *Rhyncostylis retusa* (L.) Blume (43.43 cm) and *Spathoglottis plicata* Blume (121.43 cm) respectively. *Spathoglottis plicata* Blume recorded maximum leaf length (100.67 cm) and leaf breadth (5.97 cm). The number of flowers recorded were maximum in *Rhyncostylis retusa* (L.) Blume. (99.40). *Coelogyne fimbriata* Lindl. recorded maximum dorsal sepal length (2.74 cm), dorsal sepal breadth (1.38 cm), lateral sepal length (3.00 cm) and lateral sepal breadth in *Aerides maculosum* Lindl.(1.33 cm). *Spathoglottis plicata* Blume. showed maximum petal length (2.67 cm) and petal breadth (1.47 cm).The maximum longevity of the flowers was found 87.13 days in *Cottonia pendicularis*. (Lindl.) Rchb. f. *Rhyncostylis retusa* (L.) Blume recorded the maximum number of pods per inflorescence (9.20). A dendrogram based on the morphological and floral parameters of 18 wild orchid species formed two main clusters. The results revealed that *Bulbophyllum fimbriatum* (Lindl.) Rchb. F. had the highest distance between *Spathoglottis plicata* Blume(9.97). The survey of wild orchids of Western Ghats was under taken to study diversity of wild orchids. Thirty eight species belonging to 20 genera were recorded in five diverse locations in and around Mudigere taluk. The highest Shannon's and Simpson's diversity index was observed for Devaramane region (3.25 and 0.96).

September, 2018

(Nataraj, S. K)
Major Advisor

2. Effect of Foliar Application of Biostimulants on Growth, Yield and Flower Quality of Chrysanthemum cv. Kolar Local

BHARGAVI, S. P.

ABSTRACT

An experiment was conducted to know the influence of biostimulants on growth, yield, quality and economics of chrysanthemum under fan and pad greenhouse at Department of Horticulture, College of Agriculture,Shivamogga during 2017-18.The experiment was laid out in RCBD with thirteen treatments replicated thrice.The treatments comprised ofT_1-Humic acid 0.5%, T_2-Humic acid 0.6%, T_3-Biovita 0.5%,T_4-Biovita 0.6%, T_5-Recharge 0.5%, T_6-Recharge 0.6%, T_7- Spic cytozyme 0.2%, T_8-Spic cytozyme 0.4%, T_9-Vipul 0.2%, T_{10}-Vipul 0.4%, T_{11}-Boron 0.1%, T_{12}-Boron 0.2% and T_{13}-Control.

Among the different biostimulants treatments application of Spic cytozyme @ 0.4% at 30, 60, 90,120 and 150 days after transplanting resulted in significantly higher plant height (89.04 cm) and internodal length(2.44 cm), while biovita at 0.6% recorded maximum number of leaves (143.43), stem girth (8.18 mm), number of primary branches (11.47), number of secondary branches(24.98), leaf area (5245.33 cm^2/plant), leaf area index(5.80), leaf area duration (122.60), stem dry weight (15.06 g/plant), leaf dry weight (24.84 g/plant), flower dry weight (6.16 g/plant), total dry matter accumulation (45.37 g/plant), crop growth rate(0.000897 g/m^2/day), relative growth rate(0.009760 g/g/day) and net assimilation rate (0.0129800 g/dm^2/day), with respect to flowering biovita at 0.6 per cent recorded minimum number of days for first flowering (100.00), 50 per cent flowering (112.33) and maximum duration of flowering (65.82), maximum number of flowers per plant (95.57),flower yield per plant (511.93 g), flower yield per square meter (5.63kg), flower yield per hectare (56.30 t/ha), sucker yield per plant (9.99), individual flower weight(7.87 g), flower diameter (6.92 cm), stem length (46.89 cm), vase life (22.99 days) and shelf life (11.07 days). The economic analysis indicated that biovita at 0.6% recorded the highest net returns(2,99,801.67) and BC ratio(3.92).

July, 2018

(B. Hemla Naik)
Major Advisor

3. Effect of Benzyl Adenine and Gibberellic Acid on Growth, Flowering, Flower and Corm Yield in Gladiolus (*Gladiolus hybridus* L.) cv. Summer Sunshine

PRIYANKA, S. HOLKAR

ABSTRACT

An investigation on "Effect of benzyl adenine and gibberellicacid on growth, flowering, flower and corm yield in gladiolus (*Gladiolus hybridus* L.) cv. Summer Sunshine" was carried out at Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, during 2017-18. The experiment was laid out in Randomized Complete Block Design (RCBD) with 16 treatments and replicated thrice. The treatments comprises of BA (100, 200 and 300 ppm), GA_3 (150, 200 and 250 ppm) and their combinations along with the control. The results revealed that GA_3 at 250 ppm recorded minimum days to sprouting (7.20), maximum per cent sprouting (96.80 %), plant height (98.43 cm), duration of flowering (24.40 days), spike length (94.07 cm), rachis length (60.70 cm), florets per spike (18.80) and vase life (15.00 days). BA at 100 ppm recorded maximum number of leaves (9.50) per plant, leaf area (1824.37 cm^2) and leaf area index (3.04). GA_3 at 150 ppm recorded minimum days taken for spike initiation (66.27), first floret opening (73.73 days), 50 per cent flowering (77.87 days), maximumspike girth (12.37 mm), spike weight (98.03 g), floret length (10.73 cm) and floret diameter (10.33 cm). BA at 300 ppm exhibited the maximum number of side shoots (5.00) per corm, total chlorophyll content (2.60 mg/g), number of spikes yield per plant (3.30),per plot (99.00), per hectare (4,95,000.00), number of corms yield per plant (3.41), per plot (102.00), per hectare (13,416.67 Kg/ha), cormels yield per plant (47.14), per plot (644.67) and per hectare (1250.00 Kg/ha), maximum corms weight per plot (2.68 Kg), cormels weight per plant (28.08 g) and per plot (251.33 g). GA_3 at 250 ppm recordedmaximum diameter of corm (7.99 cm) and diameter of cormels (7.19 mm). BA at 300 ppm recorded maximum cost benefit ratio (1: 4.56).

July, 2018

(Hemanth Kumar, P.)
Major Advisor

4. Genetic Variability Studies in F2 Segregating Population of China ASTER [*Callistephus chinensis* (L.) Nees.]

RAMYA, H. M.

ABSTRACT

A study on "Genetic variability studies in F_2 segregating population of China aster [*Callistephus chinensis* (L.) Nees.]" was carried out during 2017-2018 in the experimental block of Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere.

The F_2 population of the cross Arka Archana x AAC-1 recorded high PCV and GCV for number of branches per plant, plant spread East-West, number of flowers per plant, disc diameter, individual flower weight and flower yield per plant. While, the F_2 population of the cross Arka Kamini x PG Violet exhibited high GCV and PCV for number of branches per plant, plant spread North-South and East-West, individual flower weight, number of flowers per plant and disc diameter. High heritability coupled with high genetic advance as per cent of mean was recorded for plant height, number of branches per plant, plant spread North-South and East-West, disc diameter, flower stalk length, flower yield per plant, stem girth, flower diameter, number of flowers per plant and individual flower weight in both the crosses. Correlation studies revealed that flower yield per plant recorded positive and significant phenotypic correlation with number of flower per plant, individual flower weight, flower diameter, disc diameter, number of branches per plant, plant spread North-South and East-West and duration of flowering in both the F_2 segregating population of China aster. Path analysis of F_2 segregating population of China aster revealed that plant height, number of branches per plant, plant spread East-West and North-South, stem girth, days to first flowering, duration of flowering, number of flower per plant, individual flower weight, flower diameter and disc diameter had positive direct effects on flower yield per plant.

July, 2018

(Nataraj, S.K.)
Major Advisor

5. Morphological Characterization of Chrysanthemum (*Dendranthema grandiflora* Tzvelev) Genotypes under Hill Zone of Karnataka.

ROOPA, S.

ABSTRACT

An investigation on "Morphological characterization of chrysanthemum (*Dendranthema grandiflora* Tzvelev) genotypes under hill zone of Karnataka" was carried out in the experimental block of Department of Floriculture and Landscape Architecture. College of Horticulture, Mudigere, during 2017 - 2018.

Among the twenty chrysanthemum genotypes evaluated, the genotype ACC 1 recorded maximum plant height (56.26 cm). The genotype Chandini recorded maximum plant spread E-W and N- S (21.32 cm and 14.09 cm, respectively), number of leaves per plant (511.41), primary and secondary branches per plant (12.39 and 24.24, respectively), leaf area (9913.82 cm^2) and leaf area index (11.02) and genotype Star Pink recorded maximum stem girth (5.50 mm). The genotype Kolar Local recorded minimum days for appearance of first flower and 50 per cent of flowering (90.59 and 99.66, respectively.) and maximum flowering duration (149.33 days). The genotype Kolar Local recorded significantly maximum flower yield per plant (250.78 g) and per hectare (25.72 t). Flower yield per plant was significantly correlated in positive associations with leaf area, flower weight, number of primary and secondary branches per plant, flower diameter, number of leaves per plant, duration of flowering, number of flowers per plant, stem girth and plant height at both genotypic and phenotypic level. The flower yield per plant exhibited high positive direct effect with number of primary branches per plant, inter-nodal length, and flower weight at genotypic and phenotypic level. The genotype Kolar Local realized maximum net returns and benefit cost (3.06) ratio. Among these screened chrysanthemum genotypes, Kolar Local was found superior over the rest with respect to growth, flowering, yield and quality parameters. Hence, genotype Kolar Local can be recommended for commercial cultivation under Hill Zone of Karnataka.

July, 2018

(Chandrashekar, S.Y.)
Major Advisor

6. Effect of Foliar Nutrition and Harvesting time on Flower and Xanthophyll Yield of Marigold var. Arka Agni

VIBHA, V. RAO

ABSTRACT

An investigation was carried out to study the effect of foliar nutrients *viz*., Mono ammonium phosphate, Single super phosphate, Zinc sulphate, Phosphate solubilizing bacteria, Potassium schoenite, Micronutrient mixture and 13:40:13 at two concentrations (0.3 % and 0.5 %) all together there were 15 treatment combinations along with control, on growth, flower and xanthophyll yield of marigold var. Arka Agni under field condition. The experiment was laid out in randomized complete block design with three replications in the experimental block of Department of Horticulture, College of Agriculture, Shivamogga, Karnataka during 2017-18. The results of the experiment indicated that among different foliar treatments, spraying of MAP at 0.5 per cent recorded maximum number of leaves (307.33), primary branches (15.54), secondary branches (42.81), tertiary branches (69.26), leaf area (8154 cm^2), leaf area index (3.02), total dry matter (148.20 g), relative growth rate (5.64 g/g/day), crop growth rate (9.64 g/m^2/day), net assimilation rate (1.69 g/dm^2/day), number of flowers per plant (67.67), number of petals per flower (529.33), fresh flower weight (10.93 g), dry flower weight (1.85 g), shelf life (4.00 days), flower yield per plant (630.74 g), flower yield per hectare (22.71 t), seed yield per plot (835.27 g), seed yield per hectare (514.52 kg) and the xanthophyll yield parameters like petal meal yield per kilogram of fresh flower (72.48 g), petal meal yield per hectare (16.44 q), xanthophyll yield per kilogram of petal meal (23.86 g) and xanthophyll yield per hectare (39.57 kg). The economic analysis of the experiment distinctly shows that spraying of MAP at 0.5 per cent displayed the maximum B:C ratio for flower (3.62) and seed (6.75) production. While, the highest xanthophyll content (23.83 g/kg petal meal) was recorded in the flowers harvested at 7 AM which were treated with 0.5 per cent MAP.

August, 2018

(B. HemlaNaik)
Major Advisor

7. Studies on Diversity and Characterization of Fern Flora of Western Ghats in Mudigere Region of Karnataka

VIDYASHREE

ABSTRACT

An investigation on "Studies on diversity and characterization of fern flora of Western Ghats in Mudigere region of Karnataka" was carried out at the Department of Floriculture and Landscape Architecture, College of Horticulture Mudigere, during 2017-18. Survey of fern flora of Western Ghats was under taken to access the diversity of ferns. Thirty five species belonging to 33 families and 26 genera were recorded. The *Adiantum philippense* L. was most abundant species (42.72). The highest Shannon's and Simpson's diversity index was observed for Malayamarutha region (3.41and 0.963). Out of the 35 species recorded twenty one species selected for further morphological characterizationbased on their abundance, habitat, survival ability and economic importance. The experiment was conducted in a Completely Randomized Block Design (CRD) replicated thrice under polyhouse. The species *Nephrolepis undulate* J. Sm. recorded maximum plant height (77.30 cm), frond length (70.00 cm), number of fronds (85.13) and vase life (17.50 days). *Cyathea nilgirensis* Holttum recorded maximum frond breadth (45.53 cm), plant spread in EW and NS direction (55.77 cm and 54.40 cm, respectively) and *Diplazium esculentum* (Retz.) Sw. had maximum leaf area (10721.00 cm^2). Genetic variation was studied among nineteen fern species using ten inter simple sequence repeat markers (ISSR). ISSR fragments generated 29 to 87 bands per primer. A total of 281 polymorphic bands produced 34.48 to 66.66 per cent polymorphism per primer. The similarity coefficient between the species were within the range from 1.70 to 25 per cent. The dendrogram generated by ISSR markers revealed two major clusters, indicating that fern species have distributed based on frond shape, frond type, type of rhizome, habitat, stipe colour, texture, sori position. Based on molecular data *Parahemionitis cordata* (Fraser-Jenk.), *Pteris biaurita* L. and *Blechnum orientale* L branched singly having difference in their morphology.

July, 2018

(Chandrashekar, S.Y)
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. Study on Rooting of Stem Cutting in Barbados Cherry (*Malpighia glabra* L.) under Hill Zone of Karnataka

ALAM KHAN SAMIM

ABSTRACT

An experiment was conducted to study on rooting of stem cutting in Barbados cherry (*Malpighia glabra* L.) under hill zone of Karnataka in the department of fruit science, College of Horticulture, Mudigere, University of Agricultural and Horticultural Sciences, Shivamogga, during the year 2017-18. The experiment was laid out in Complete Randomized Design with twelve treatments replicated thrice. The stem cutting of Barbados cherry reveals that, least number of days (21.33) for root initiation, maximum percentage of rooting (80.0), number of root (26.67), average length of root (17.85 cm), length of longest root (23.00 cm), higher number of primary and secondary root (8.83 and 20.83 respectively), maximum fresh and dry weight of root (2.91 g and 1.15 g respectively) and root volume (4.50 cc) was recorded in cutting treated with IBA 5000 ppm followed by IBA 4500 ppm over other treatments. Significantly higher shoot parameters *viz*., less number of days taken for first sprouting (11.70), number of sprouted cuttings (18.33), sprouting percentage (91.67), number of shoots (5.13), length of shoot (10.40 cm), number of leaves per cutting (21.93), diameter of shoot (2.30 mm) and maximum fresh and dry weight of shoot (3.01 g and 1.30 g respectively) was recorded in cutting treated with IBA 5000 ppm followed by IBA 4500 ppm over other treatments.

Significantly highest chlorophyll-a (1.26), chlorophyll –b (0.55), total chlorophyll content (1.82 mg/g of fresh weight) of leaves and C: N ratio (8.74) was observed in cuttings treated with IBA 5000 ppm. The highest benefit: cost ratio (3.20) was observed in cuttings treated with IBA 5000 ppm. Among all treatments the cuttings treated with of IBA 5000 ppm was found superior to improve rooting and shooting parameters of stem cuttings in Barbados cherry.

June, 2018

(B.S. Shivakumar)
Major Advisor

2. Effect of Growth Regulators on Rooting and Success of Stem Cuttings in Dragon Fruit [*Hylocereusundatus* (Haworth) Britton & Rose]

AYESHA SIDDIQUA

ABSTRACT

An experiment was conducted to study the effect of growth regulators on rooting of stem cuttings in Dragon fruit [*Hylocereusundatus*(Haworth) Britton & Rose] under low cost polyhouse of the Department of Horticulture, College of Agriculture, UAHS, Shivamogga, during the year 2017-18. The experiment was laid out by following Complete Randomized Design (CRD) with twelve treatments, replicated thrice. The stem cuttings of Dragon fruit treated with different plant growth regulators. The result reveals that, least number of days taken for root initiation (14.54), the maximum values recorded with respect to rooting (57.75 %), length of longest root (23.07 cm), average number of roots per cuttings (46.88), average length of roots per cuttings (12.41 cm), root volume (1.97 cc), root diameter (1.47 mm), fresh weight and dry weight of root (2.28 g and 0.67 g respectively), least number of days taken for sprout initiation (7.34), maximum percentage of sprouting (58.67 %), number of sprouts per cutting (2.43), length of the sprout and shoot (2.63 cm and 17.45 cm, respectively), shoot diameter (3.53 mm), fresh weight and dry weight of shoot (56.66 g and 11.12 g respectively). Also, the highest root to shoot ratio (0.67) were recorded in cuttings treated with IBA 7000 ppm (T_3).

The maximum values of biochemical parameters *viz.*, total chlorophyll content (1.30 mg/g of fresh weight) of leaves, total sugar content (3.20 %) and C:N ratio (7.95) was observed in cuttings treated with IBA 7000 ppm. Application of IBA 7000 and 6000 ppm resulted in maximum Benefit:cost ratio (4.0 and 4.1 respectively). From the above experiment, application of IBA 7000 and 6000 ppm was found to improve rooting and survivability (98.55 % and 97.15 % respectively) of stem cuttings in Dragon fruit and could be commercially used for propagation under low cost polyhouse condition.

July, 2018

(Thippesha, D)
Major Advisor

3. Effects of different Mulches on Water use Efficiency, Yield and Quality of Pomegranate (*PunicagranatumL.*)

LOKESHA R

ABSTRACT

A field experiment on 'Effects of different mulches on water use efficiency, yield and quality of pomegranate (*Punicagranatum*L.)' was carriedout at T.Nagenally, village of Hiriyur Taluka in Chitradurga district of karnataka during 2017-18. The experiment was laid out in a Randomized Block Design with nine types of mulches [Black polythene mulch, newspaper, arecanut husk, coconut husk, sawdust, maize stover, leaf litter, peanut hulls, pebbles and control (without mulch)].Among the different types of mulches, black polythene mulch found to be superior over others with respect to yield parameters *viz*., number of fruits (65.22/plant), fruit yield (18.97 kg/plant and 15.81 t/ha), fruit weight (311.31 g), fruit diameter (8.50 cm), fruit volume (345.93 cm^3), number of arils (452.44), weight of 100 arils (36.23 g), aril thickness (8.48 mm) and aril percentage (73.66). Among the qualitative characters, the higher total soluble solids (15.28º Brix), juice content (88.86 %), total sugars (14.35 %), reducing sugars (13.72 %), sugar to acid ratio (13.81 %) and lower acidity (0.54 %) were recorded in the black polythene mulch. Treatmentblack polythene mulch recorded the highest irrigation water use efficiency (10.68 kg/m^3), water productivity (119.0 l/kg) and high amount of water saved (28.71 %). Soil properties like mean soil temperature (25.49 ºC) and mean soil moisture (19.72 %) were maximum under black polythene mulch. Similarly, black polythene mulch recorded the highest leaf nitrogen (2.87 %). From the present investigation, it was found that black polythene mulch influenced pomegranate to produce for better yield and quality fruits in dry regions where water is a scarce resource.

August, 2018

(P. Narayanaswamy)
Major Advisor

4. Influence of Liquid Plant Growth Promoting Rhizomicrobial Consortia on Growth, yield and Quality of Strawberry (*Fragaria×ananassa* Duch.) under Naturally Ventilated Polyhouse

NISARGA, G.

ABSTRACT

An experiment was conducted to study theinfluence of liquid plant growth promoting rhizomicrobial consortia on growth, yield and quality of strawberry (*Fragaria×ananassa*Duch.) under naturally ventilated polyhouseat the Department of Fruit Science, College of Horticulture, Mudigereduring 2017-18. The experiment was laid out in Completely Randomized Design with eleven treatmentreplicated thrice.Significant differences were observed among treatments tested for different parameters. The maximum plant height (34.00 cm), number of trifoliate leaves (34.03), plant spread for North-South and East-West directions (44.67 and 43.33 cm respectively), number of crowns (4.93plant^{-1}), leaf area (140.17 cm^{2}) leaf area index (1.46), total dry weight (33.63 g plant^{-1}) and total chlorophyll content (2.36 mg g^{-1}of fresh weight) was recorded in the treatment 75 % RDF through fertigation(112.5:75:90 kg ha^{-1}) + *Azotobacter*+ PSB + KSB at 250 ml acre^{-1}.Among theyield parameters, minimum number of days taken for berry maturity (25.00 days), highest number of berries per plant (21.00), berry weight (20.90 g), fruit volume (21.67 cc), fruit length (4.78 cm)fruit diameter (3.90 cm) and high yield of 387.67 g plant^{-1}was found higher in the above treatment. Among fruit quality parameters maximum ascorbic acid content (68.83 mg/100 g), minimumtitratable acidity (0.68 %) and sugars to acid ratio (12.00),total sugar content (8.20%)and higher benefit cost ratio (2.90) was also noticed in the same treatment.Based on the results the plants supplied with 75% RDF through fertigation along with *Azotobacter*, PSB and KSB in liquid form showed promising results with respect to growth, yield and quality parameters.

July, 2018

(D. Madaiah)
Major Advisor

5. Evaluation of Tamarind Genotypes for Yield and Yield Attributing Traits

POOJA, G. K.

ABSTRACT

An experiment was conducted on evaluation of tamarind genotypes for yield and yield attributing traitsduring 2017-18 at Forest Research Station, Govinkovi, Honnali taluk, Davangere district in Karnataka. The experiment was laid out in a randomized block design with three replications involving 16 grafted genotypes which were of 14 years old. In the present study, the genotypesshowed variation in terms of tree shape, tree stature, growth habit, leaf colour, foliage arrangement, pod shapeand colour of the bud, petal, pod, pulp and seed.The analysis of variance revealed significant difference with respect to tree height (K-9 : 5.08 m), stem girth (K-9: 1.01 m), pod length (K-9:18.07 cm), pod width(D-2: 3.08 cm),pod thickness (K-10: 2.17 cm), pod circumference (S-8: 8.51 cm), pod weight (K-9: 39.90 g), pulp weight (K-9:19.50 g), shell weight (K-9 :8.57 g), seed weight (K-9: 9.38 g) and fibre weight (K-9:2.45 g).Correlation studies revealed that, thepod yield per tree showed highly significant and positive association with weight of the pod, pulp, shell, fibre and seed. While, pod length, pod thickness, weight of the pod, shell, pulp, seed, fibre and number of pods per tree exhibited positive direct effect on pod yield per tree.With respect to bio-chemical character the higher acidity content was recorded in genotype S-8 (11.25 %).Among 16 genotypes, the genotype K-9 was found superior with respect to pod length, pod width, pod circumference, pod weight, pulp weight, shell weight, seed weight and fibre weight. Therefore, genotype K-9 is most promising and can be used either for further evaluation or selection as a commercial cultivar or as gene source in tamarind improvement programme.

July, 2018

(NagarajappaAdivappar)
Major Advisor

6. Studies on the Effect of Silicon on Growth, Yield and Quality Attributes of Banana cv. Grand Naine in the Hill Zone of Karnataka

RAKESH, S. H.

ABSTRACT

An experiment was carried out to evaluate theinfluence of silicon on growth, yield and quality parameters of banana cv. Grand naine.The experiment was conducted in Zonal Agricultural and Horticultural Research Station, Mudigere during2017-18 and was laid out in Randomized Complete Block Design with ninetreatments.The treatment T_9 (soil application of calcium silicate @ 1,000 g per plant + foliar application of potassium silicate @ 5 ml l^{-1} per plant at 20 days interval)showed highest plant height (174.43 cm), plant girth (15.17 cm), number of leaves (15.07), leaf length (163.40 cm), leaf breadth (75.33 cm), leaf area (1.18 m^2), chlorophyll content (1.78 mg/ 100 g) and lowest days taken from shooting to maturity (67.20) and shooting to opening of bunches (18.11).T_9showed highest yield (23.53 kg per plant and 58.83 t ha^{-1}), weight of bunch (23.53 kg), length of bunch (81.03 cm), internodal length (8.70 cm), number of hands per bunch (10.17), weight of hand (3.77 kg), number of fingers per bunch (184.50), finger weight (182.00 g), finger length (20.10 cm) and finger girth (47.33 mm). The quality parameters were best in T_9 showing highest pulp to peel ratio (3.06), green life (8.87 days), shelf life (9.93 days), days taken for ripening (7.93 days), TSS (20.30 ^{0}Brix), reducing sugars (18.57 %), non-reducing sugars (3.23 %), total sugars (21.80 %) and lowest acidity (0.09 %). Lowest soil available nitrogen (150.23 kg ha^{-1}), available phosphorous (15.20 kg ha^{-1}), available potassium (110.52 kg ha^{-1}) and highest exchangeablecalcium (230.56 ppm) and available silicon (147.35 kg ha^{-1}) were observed in T_9. T_9showedhighesttotal nitrogen (3.97 %), phosphorous (0.34 %), potassium (3.11 %), calcium (0.98 %) and silicon (1.23 %) in leaf.Silicon had positive effect on growth, yield, quality parameters and nutrient content of banana plants.

October, 2018

(Yallesh Kumar, H. S)
Major Advisor

7. Performance of Strawberry (*Fragaria×ananassa* Duch.) as Influenced by Humic Acid and Water Soluble Fertilizers on Growth, Yield and Quality under Naturally Ventilated Polyhouse

SAMPADA C. MAREGUDDIKAR

ABSTRACT

An experiment was conducted to study the performance ofstrawberry (*Fragaria×ananassa*Duch.) as influenced by humic acid and water soluble fertilizers on growth, yield and quality under naturally ventilated polyhouseat Department of Fruit Science, College of Horticulture, Mudigere, during 2017-18. The experiment was laid out in Completely Randomized Design with fourteen treatments in three replications. Significant differences were observed among treatments for different parameters. The maximum plant height (33.03 cm), number of trifoliate leaves (32.32), plant spread along North-South and East-West direction (46.61 cm and 44.50 cm respectively), number of crowns (5.75 plant^{-1}), leaf area (176.86 cm^2), leaf area index (1.89), number of runners (2.02 plant^{-1}), total dry weight (30.29 g) and total chlorophyll content (2.44 mg/g of fresh weight) was recorded in treatment supplied with 100 % RDF (150:100:120 kgha^{-1}) through soil +Humic acid (2%) + 19:19:19 (1%) +Potassium nitrate (1%) through foliar application at 45, 60 and 75 days after planting. The fruit parameters such as minimum number of days taken for berry maturity (23.30 days), highest number of berries per plant (21.99), berry weight (20.70 g), fruit volume (21.33 cc), fruit length (4.90 cm)fruit diameter (4.03 cm) found higher in the above treatment and with respect to yield it recorded 390.70 g/plant and also fruit quality parameters maximum ascorbic acid content (67.03 mg/100 g), minimumtitratable acidity (0.67 %) and highest sugars to acid ratio (12.14), total sugar content (8.13 %) and higher benefit cost ratio (2.87). Based on the above results, plants supplied with 100 % RDF through soil integrated with Humic acid (2%) + 19:19:19 (1%) + potassium nitrate (1%) as a foliar application showed promising results with respect to increase in growth, yield and quality parameters of strawberry.

July, 2018

(D. Madaiah)
Major Advisor

8. Effect of Bunch Feeding and Spraying on Yield and Quality Attributes of Tissue Culture Banana cv. Ney Poovan (AB) under Hill Zone of Karnataka

SATISH B R

ABSTRACT

The field experiment was carried out at Department of Fruit Science, College of Horticulture, Mudigere, during the year 2017-18 to know the effect of bunch feeding and spraying on yield and quality attributes of tissue culture banana cv. Ney poovan. The treatments consist of bunch feeding *viz.*, urea (7.5 g), sulphate of potash (7.5 g), banana special (0.2 %), panchagavya (5 %) and amritpani (5 %) and bunch spraying with 2, 4-Dichlorophenoxyacetic acid (30 ppm) and compared with control. The experiment was laid out in a completely randomized block design with eight treatments, which were replicated thrice. Results of the present study showed that bunch feeding(urea 7.5 g and sulphate of potash 7.5 g) along with bunch spraying with 2, 4-Dichlorophenoxyacetic acid (30 ppm) recorded significantly higher bunch length (73.71 cm), mean finger length (14.92 cm), mean finger girth (38.86 mm), mean finger weight (88.60 g), mean hand weight (1.36 kg), bunch weight (15.63 kg), total yield (39.08 t/ha), green life (5.90 days), shelf life (7.52 days), lowest PLW (12.70 %), pulp weight (73.80 g), peel weight (11.00 g), pulp to peel ratio (6.78), benefit cost ratio (3.56) and nutrient content of fruits *viz.*, N (0.84 %), P (0.15 %) and K (0.92 %). Whereas, highest total soluble solids (23.80 ^{0}Brix), total sugar (21.70 %), sugar to acid ratio (89.18), lowest titratable acidity (0.24 %), and nutrient status of fruits *viz.*,Ca (0.22 %), Mg (0.10 %), S (0.47 %), Zn (19.87 ppm), B (20.52 ppm), Fe (124.51 ppm) andMn (102.46 ppm)were found in treatment with bunch feeding (sulphate of potash 7.5 g and banana special 0.2 %) along with bunch spraying with 2, 4-Dichlorophenoxyacetic acid (30 ppm).

August, 2018

(Yallesh Kumar, H. S)
Major Advisor

9. Evaluation of Macadamia (*Macadamia integrifolia* M.) Genotypes for Yield and Yield Attributing Traits

USHA, D. S.

ABSTRACT

An experiment was conducted to evaluate different macadamia genotypes (*Macadamia integrifolia* M.) for yield and yield attributing traits in the existing orchard of farmers field atGajanur village, Shivamogga district of Karnatakaduring 2017-18. The experiment was laid out in randomized complete block design with three replications involving 10 genotypes.The morphological traits showed variation in terms of tree shape, tree stature, bearing habit, leaf colour, leaf tip, leaf spines, inflorescence colour andpeak flowering period. The analysis of variance revealed significant difference for the traits *viz.*, tree height (G-11: 14.10 m), stem girth (G-6 :0.62 m), nut weight (G-5 : 10.66 g), nut diameter (G-5 : 2.99 cm), nut volume (G-5 : 11.40 cc),shell weight (G-6 : 6.53 g) shell thickness (G-4 : 3.00 mm), pericarp weight (G-9 : 3.53 g),kernel weight (G-5 : 3.17g), kernel thickness (G-5 : 12.89 mm), kernel recovery per cent (G-5 : 29.73 %), cluster length (G-5 : 10.80 cm), number of nuts per cluster(G-5 : 7.53) andnut yield per tree (G-5 : 16.16 kg). Correlation studies revealed that the nut yield per tree showed highly significant and positive association with kernel weight, kernel thickness, nut weight, cluster length and nuts per cluster. Whereas, nut weight, kernel weight, kernel thickness, cluster length and nuts per cluster exhibited positive direct effect on nut yield per tree. With respect to bio-chemical character higher protein (13.40 %) was recorded in G-5. Among 10 genotypes, G-5 was found superior with respect to nut weight, kernel weight, kernel thickness and kernel per cent. Hence, genotype G-5 found most promising and can be used either for further evaluation or as gene source in macadamia improvement programme.

August, 2018

(NagarajappaAdivappar)
Major Advisor

10. Effect of Pre-Harvest Foliar Application of Nutrients and Plant Growth Regulators on Yield and Post-Harvest Quality of Sapota under Hill Zone of Karnataka

VANI B. KUMBAR

ABSTRACT

An experiment was conducted to study the effect of pre-harvest foliar application of nutrients and plant growth regulators on yield and post-harvest quality of sapota at Department of Fruit Science, College of Horticulture, Mudigere, during 2017-18. The experiment was laid out in randomized complete block design with fifteen treatments in three replications. The study revealed that among yield parameters the maximum fruit weight (141.63g), fruit length (21.72cm), fruit diameter (60.83mm), fruit circumference (21.72cm), fruit volume (145.59cc) and yield per tree (109.29kg) were recorded in pre-harvest spray of 2,4-D at 10ppm.Theminimum per cent physiological loss in weight (14.71 and 10.00), fruit decay percentage (36.33 and 19.40%) with maximum days taken to ripening (9.87 and 25.17 days), fruit firmness (1.04 and 1.00 kg/cm^2) and shelf life (11.75 and 26.67 days) was recorded in the pre-harvest spray of $CaCl_2$ (1%).Among treatments the maximum TSS (23.81 and 23.80 ^oB), total sugar (22.42 and 25.08%), reducing sugar (12.90 and 13.76%), non-reducing sugar (9.52 and 10.39%), ascorbic acid (9.64 and 9.10 mg/100g pulp) and minimum titratable acidity were recorded in pre-harvest spray of $CaNO_3$ (1%) during both ambient (12 days) and cold storage (28 days) respectively andthe maximum benefit cost ratio (5.67) was recorded in pre-harvest spray of 2,4-D at 10 ppm.

July, 2018

(B.S. Shivakumar)
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. Effect of Different Media and Containers on Rooting of Black Pepper (*Piper nigrum* L.) Cuttings.

SHARATH, H. R.

ABSTARCT

An investigation on "Effect of different media and containers on rooting of black pepper (*Piper nigrum* L.) cuttings" was carried out in naturally ventilated polyhouse with three replications and twenty-three treatments at College of Horticulture, Mudigere during the period from November 2015 to February 2016. In black pepper cuttings, the success rate and root distribution pattern depends on many factors like media, type of containers, climate, planting material etc. Use of root trainers for raising pepper cuttings is a newer concept. Hence in this study the effect of root trainers on various shoot and root parameters is studied, over the conventional method of raising cuttings in polybags, using nine media in different combinations. Most of the shoot and root parameters were observed to be superior in the cuttings raised in root trainers compared to that of polybags. The treatment T_{13}(Soil+Perlite+Vermicompost-2:1:2) recorded early sprouting (20.20days and 20.90days), maximum sprouting percentage (78.20 and 80.00), maximum number of leaves (4.5 and 4.9), length of the shoot (16.54cm and 45.85cm), fresh weight (16.48g and 18.00g) and dry weight (6.55g and 6.94g) of the shoots in polybag and root trainer respectively. Root parameters were also found to be better in the same treatment (T_{13}). Highest rooting percentage (80.50) was recorded in root trainer compared to polybag (78.00). The treatment T_{13} also recorded maximum fresh (5.32 g and 4.81 g) and dry weight (1.93g and 1.63g) in trainers and polybags respectively. Root volume was found to be maximum in the root trainer (6.25cc) compared to that of polybag (5.5cc) in the treatment T_{12}(Soil+Perlite+FYM in 2:1:2). The treatment T_{19}(Cocopeat+Vermiculite+ FYM-1:1:2) recorded maximum root length (27.80 cm and 8.60 cm in polybag and root trainer respectively). The maximum benefit cost ratio was observed in treatment T_{13} (2.97:1 and 2.42:1 in polybag and root trainer respectively).

October, 2018

(Bhoomika, H.R.)
Major Advisor

2. Prospecting of *Moringa concanensis* Nimmo for various Chemical Constituents and Morphological Characterization

ANITHA, T. M.

ABSTRACT

An investigation was undertaken to study the morphological characters, chemical profiling and antioxidant activity of *Moringa concanensis* N. at Division of Plant Genetic Recourses, ICAR-Indian Institute of Horticultural Research, Hesaraghatta, Bengaluru during 2017-18. Among the ten accessions of *Moringa concanensis*the genotypic and phenotypic coefficients of variations were high for characters *viz*., petiole length, leaflet area, leaflet width, leaflet length,leaf length,trunk girth, number of pod per plant and pod yield. High heritability was observed in characters like number of pod per plant (99.87 %), plant spread (92.85 %), total pod yield (91.7 %), 100 seed weight (89.40 %), pod diameter (89.27 %), trunk girth (88.96%), pod length (83.00%), number of seeds per pod (81.25 %). The correlation study revealed that number of pods per plant had significant positive correlation with pod yield. According to path analysis, number of pods per plant, leaflet length, leaflet width,trunk girth, pod diameter, pod length and petiole length recorded positive and direct effect on pod yield per plant and leaflet area, number of seeds per pod and plant height showed negative direct effect towards pod yield.

Among the ten accessions the total phenolic content was more in leaves of accession MC-1 and total flavonoid content was more in flower of accession MC-8. In case of estimation of antioxidant activity, 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay showed more antioxidant activity than ferric reducing antioxidant power (FRAP) assay.In both the assays, theaccession MC-1 and MC–6 were found to have high antioxidant activity.

August, 2018

(Raviraja Shetty, G)
Major Advisor

3. Screening of Selected Rare, Endangered and Threatened Medicinal Plant Extracts against various Pathogens or Microbes

PALLAVI, C. R.

ABSTRACT

An investigation was undertaken to study the *in-vitro* antifungal activity of ten rare, endangered and threatened medicinal plant aqueous leaf extracts against four phytopathogens *viz., Alternaria solani, Fusarium oxysporum, Sclerotium rolfsii* and *Phytophthora capsici* at three different concentrations (5, 10 & 15 %), and chemical profiling of these plant extracts were carried out at Division of Plant Genetic Resources, ICAR - Indian Institute of Horticultural Research, Hesaraghatta, Bengaluru during 2017-18. The minimum mycelial growth of fungus varied greatly with three different concentrations indicating the antifungal activity of plant extract increases with increase in concentration, whereas the 15 per cent concentration showed highest antifungal activity compared to 5 and 10 per cent concentrations. However, all ten plant extracts found to have a good antifungal activity against all the tested pathogens with varied levels of reduction in mycelial growth of fungal organisms. Among ten aqueous plant extracts tested against four phytopathogens, *Embelia ribes* leaf extract showed minimum mycelial growth against *Alternaria solani* (4.73 mm) and *Fusarium oxysporum* (28.5 mm), whereas leaf extract of *Hydnocarpus pentandra* showed least mycelial growth against *Sclerotium rolfsii* (4.56 mm) and *Phytophthora capsici* (0.33 mm). However, the quantitative phytochemical analysis of dried powdered leaf extract found highest total phenolic content (70.15 mg GAE/100 g) and total flavonoid content (37.50 mg CE/100 g) in *Saraca asoca*.

August, 2018

(Raviraja Shetty, G)
Major Advisor

4. Standardization of Seed Rhizome Weight and Nutrition Levels for Mango Ginger (*Curcuma amada* Roxb.) under Arecanut Garden.

PRIYANKA, B. M.

ABSTRACT

A field study was conducted to standardize the seed rhizome weight and nutrition levels for mango ginger (*Curcuma amada* Roxb.) under arecanut garden at College of Horticulture, Mudigere, during 2017-18. The experiment was laid out in a Randomized Block Design with two factors. Factor one being seed rhizome weight (W_1-20 g, W_2-40 g, W_3-60 g) and factor two was nutrition (N_1- Control, N_2- 60:50:100 kg, N_3-90:75:150 kg, N_4-120:100:200 kg, N_5-150:125:250 kg and N_6-180:150:300 kg NPK/ha). Significant differences were recorded for all the parameters under study. Seed rhizomes weighing 60g recorded maximum sprouting, plant height, number of leaves, number of tillers per plant, leaf area, leaf area index, length and width of the rhizomes, primary and secondary rhizomes per clump, fresh and dry weight of rhizomes, yield per plot, yield per hectare and essential oil content in rhizomes. Among the nutrient levels, application of 180:150:300 kg NPK/ha recorded higher values for all the above growth, yield and quality parameters. Interaction effect of seed rhizome weights and nutrition levels were also found significant for the traits under study. The treatment W_3N_6 (seed rhizome weighing 60 g and nutrition level 180:150:300 kg NPK/ha) recorded maximum sprouting (96.33 %), higher plant height (58.20 cm), number of leaves (13.70), number of tillers per plant (3.64), leaf area (42.30 dm^2), leaf area index (4.98), length (17.26 cm) and width (16.10 cm) of the rhizome, primary (7.96) and secondary (16.43) rhizomes per clump, fresh (358.93 g) and dry (86 g) weight of the rhizome, dry recovery (24.02 %), yield per plot (10.75 kg), yield per hectare (35.86 t/ha) and essential oil content (0.78 %). The economics of cultivation was worked out and the treatment combination W_1N_6 recorded highest B:C ratio (2.11).

August, 2018

(Bhoomika, H.R.)
Major Advisor

5. Effect of Integrated Nutrient Management on Growth and Yield of French Basil (*Ocimumbasilicum* L.)

SAIF ALI KHAN

ABSTRACT

Field experiment was carried out to study the effect of integrated nutrient management on growth and yield of french basil during 2017-2018 at Agricultural and Horticultural Research Station, Thirthahalli. The experiment laid out in randomized complete block design (RCBD)comprised of nine treatments with three replications. Results revealed that application of (T_8)100 per cent RDF (125:75:60 kg NPK/ha) + vermicompost (10 tons/ha) + *Azotobacter* (12 kg/ha) recorded significantly higher plant height (84.53 cm), maximum number of primary and secondary branches (38.05 and 118.13), number of leaves (546.8), plant spread (N-S and E-W) (53.65 cm and 74.67 cm), leaf area per plant (4994.53 cm^2), higher fresh yield per plant (512.13 g), fresh yield per plot (48.11 kg), fresh yield per hectare(35.63 t) and dry yield per plant (267.27 g), dry yield per plot (25.11 kg) and dry yield per hectare (18.60 t), dry matter per cent (52.2%), higher oil yield (230.43 kg), and higher uptake of nitrogen (168.96 kg/ha)phosphorus (16.96 kg/ha), potassium (17.68 kg/ha) After the harvest of crop highest available nitrogen (521.67 kg/ha), phosphorus (35.67 kg/ha), potassium (286.95 kg/ha) and higher microbial content in soil *i.e.*, fungi (28.15 *cfu*X10^5/g soil), bacteria, (97.50*cfu*×10^3/g soil), actinomycets (12.50 *cfu*×10^2/g soil) and azotobacter (28.67 *cfu*X10^5/g soil) is observed in T_8. The economic analysis clearly indicated that application of 100 per cent RDF (125:75:60 kg NPK/ha.) + vermicompost (10 tons/ha) + *Azotobacter*(12 kg/ha) realized maximum net returns (Rs. 220694.17/ha) and B: C ratio (2.04).

August, 2018

(M. Ravikumar)
Major Advisor

6. Influence of Plant Growth Promoting Rhizo Micro-Organisms and Growth Hormones on Rooting of Plagiotropic Cuttings of Black Pepper (*Piper nigrum* L.)

SANNIDHI, H. S.

ABSTRACT

An experiment was conducted to evaluate the effects of different plant growth promoting rhizo-microorganisms (PGPRs) and growth hormones on rooting of plagiotropic cuttings of black pepperat College of Horticulture, Mudigere during 2017-18. There were nineteen treatments with three replications laid out in Completely Randomized Design inside a naturally ventilated polyhouse. The treatments comprised of three growth hormones*viz.*IBA, NAA and 2, 4-D at different concentrations and the liquid cultures of PGPRs *viz.Azospirillumlipoferum*and*Pseudomonas fluorescens* @ 5 ml and 10 ml per polybag.The treatments exhibited significant differences for most of the root and shoot parameters studied. Application of *Azospirillumlipoferum*@10 ml per polybag (T_5) resulted in early sprouting (19.49 days), maximum sprouting percentage (66.00), maximum shoot length (6.15 cm), more number of leaves (4.20), maximum chlorophyll content (55.50 Spad units), maximum leaf area (42.61 cm^2), higher fresh (8.95 g) and dry weight (3.11 g) of shoots. IBA @ 1000 ppm (T_8) resulted in maximum rooting percentage (65.30), more primary (7.48), secondary (18.83) and total roots per cutting (30.18), maximum root length (18.88cm), root volume (1.85 cc), fresh weight of root (1.10 g), dry weight of root (0.53 g) and survival percentage(54.04) of cuttings. Analysis of the microbial population of the rooting media was done at 180 days after planting and treatment T_5(*Azosprillumlipoferum* 10 ml)recorded the maximum counts for total bacteria (83.50 and 70.50 *cfu*g of $soil^{-1}$ at 10^{-5} and 10^{-6} dilution levels respectively), total fungii (48.25 and 31.00 *cfu*g of $soil^{-1}$ at 10^{-3} and 10^{-4} dilution levels respectively) and total actinomycetes population (19.00 and 15.00 *cfu*g of $soil^{-1}$ at 10^{-2} and 10^{-3} dilution levels respectively).The treatment T_8(IBA 1000 ppm) recorded maximum net returns (Rs. 10,885.00) and higher B: C ratio (3.28).

July, 2018

(Bhoomika, H.R.)
Major Advisor

7. Studies on Enhancement of Germination in *Pterocarpus santalinus* (Linn.f) and *Pterocarpus marsupium* Roxb. - An Endangered and Vulnerable Tree Medicinal Plants

THANUJA, P. C.

ABSTRACT

An experiment was carried out to study the enhancement of germination in *Pterocarpus santalinus* (Linn.f) and *Pterocarpus marsupium* Roxb. - an endangered and vulnerable tree medicinal plants at the Department of Plantation, Spices, Medicinal and Aromatic crops, College of Horticulture, Mudigere during the year 2017-18. The seeds of *P. santalinus* and *P. marsupium* were treated with different pre-sowing seed treatments which included organics, growth regulators and chemicals. Among the different germination inducing treatments, seeds treated with cow dung slurry (1:1) recorded minimum number of days for germination (11.50 days), days to final germination (45.50 days), maximum germination percentage (47.50), germination rate (0.62), seedling height (32.45 cm), seedling fresh weight (14.02 g), chlorophyll content of leaf (1.37 mg/g), seedling dry weight (6.57 g), root volume (1.33 cc), seedling vigour index I (1542.05) and seedling vigour index II (312.10) in *P. santalinus*.

In *P. marsupium*, seeds treated with sulphuric acid (2 %) recorded least number of days for germination (10.00 days), days to final germination (39.50 days), maximum germination percentage (65.83), germination rate (1.01), seedling height (79.63 cm), seedling fresh weight (22.95 g), chlorophyll content of leaf (1.33 mg / g), seedling dry weight (10.18 g), root volume (1.86 cc), seedling vigour index I (5033.51) and seedling vigour index II (669.85) compared to other treatments and control. From the findings of the present investigation, *P. santalinus* seeds treated with cow dung slurry (1:1) and *P marsupium* seeds treated with sulphuric acid (2 %) showed enhanced germination and better seedling growth. Hence, these seed treatments can be effectively used for large scale multiplication of both the species.

July, 2018

(Sadashiv Nadukeri)
Major Advisor

Vegetable Science

4. Assessment of Genetic Variability and Divergence in Cucumber (*Cucumis sativus* L.) Genotypes under Hill Zone of Karnataka

ANUSHA BHAGWAT

ABSTRACT

The present investigation on genetic variability and divergence in cucumber (*Cucumis sativus* L.) was carried out by adopting randomized complete block design at Department of Vegetable Science, College of Horticulture, Mudigere during 2017-18. Significant differences among the genotypes were observed for all the characters under study. High heritability (>60 %) coupled with high genetic advance as per cent over mean (>20 %) were recorded for the characters *viz*., vine length, number of branches per vine, node at first female flower appear, days to first female flower appearance, total number of fruits per vine, fruit diameter, fruit length, flesh thickness, average fruit weight, fruit yield per vine, fruit yield per hectare and rind thickness indicating predominance of additive gene component. Thus, there is ample scope for improving these characters through direct selection. Yield per hectare was positively and significantly correlated with total number of fruits per vine, days to last harvest of the fruit, per cent marketable fruits per vine, fruit length, fruit diameter and average fruit weight. Path analysis revealed that positive direct effects on yield per hectare was shown by days to first female flowering, per cent marketable fruits per vine, per cent unmarketable fruits per vine, yield per vine, fruit diameter and rind thickness. Based on Mahalonobis D^2 analysis, 30 genotypes were grouped into eleven clusters. The cluster I was the largest, comprising of nineteen genotypes had maximum intra cluster distance followed by cluster VII with two genotypes. The maximum inter distance was observed between cluster V and cluster X followed by cluster X and XI. Rind thickness contributed maximum to the genetic diversity followed by fruit length. Genotypes Banglore Local, Poinsette and Sirsi Local-2 recorded higher yield and these genotypes can be utilized for further crop improvement programme.

July, 2018

(V. Srinivasa)
Major Advisor

5. Genetic Investigation of Segregating Populations for Yield and its Component Traits in Okra [*Abelmoschusesculentus* (L.) Moench]

KAVYA, V. N.

ABSTRACT

The present investigation was carried to understand the extent of genetic variability, correlation and path coefficient analysis between yield and its components traits in F_2 and F_3 segregating populations of the three bi-parental crosses *viz*., IIHR-875× IIHR-478, IIHR-478 × IIHR-567 and IIHR-604 × IIHR-347 at ICAR-KVK, Babbur Farm, Hiriyur (Tq), Chitradurga (Dist) during2017-18. Magnitude of GCV and PCV values was high for number of fruits plant^{-1} in F_2, number of fruits plant^{-1} and total yield plant^{-1} in F_3 population of the bi-parental cross IIHR-875 ×IIHR-478. While the bi-parental cross IIHR-478 × IIHR-567 has shown high PCV and GCV for total yield plant^{-1}in F_2 and number of fruits plant^{-1}in F_3 population. Whereas the bi-parental cross IIHR-604 × IIHR-347 exhibited high PCV and GCV for number of fruits plant^{-1} and total yield plant^{-1} in both F_2 and F_3 populations. The $F_2$and F_3populations of the three bi-parental crosses showed high heritability with GAM for number of fruits plant^{-1} and total yield plant^{-1} indicating the involvement of additive gene action. In F_2 and F_3populations, total yield plant^{-1} was positively and significantly associated with number of branches plant^{-1}and number of fruits plant^{-1} in all the three bi-parental crosses. Number of fruits plant^{-1} manifested maximum direct effect on total yield plant^{-1} in all the three bi-parental crossesof F_2 and F_3populations and thus number of fruits plant^{-1}is the important trait for enhancing total yield plant^{-1} in okra.Higher numbers of superior segregants with respect to total yield plant-^{1} were more in IIHR-478× IIHR-567 (142) followed by IIHR-604 × IIHR-347(70) and IIHR-875 × IIHR-478 (51). The bi-parental cross IIHR-478 × IIHR-567 has shown higher level of iodine content (30 µg/100g), crude fiber (1.2 g/100g) and chlorophyll content (2.36 mg/g) than the other bi-parental crosses studied.

March, 2018

(Prakash Kerure)
Major Advisor

6. Effect of Boron and Copper Foliar Spray on Growth and Yield of Brinjal (*Solanum melongena* L.) under Hill Zone of Karnataka

MANASA, G. D.

ABSTRACT

The present investigation entitled “Effect of boron and copper foliar spray on growth and yield of brinjal (*Solanummelongena* L.) under hill zone of Karnataka” was carried out during summer 2018 at COH, Mudigere. The experiment was laid out in Randomized Complete Block Design with three replications. The experiment consisted of nine treatments. Among nine treatments, plants treated with RDF + Borax200ppm + $CuSO_4$ at 0.2 per cent recorded maximum plant height, number of primary and secondary branches, leaf area, leaf area index, chlorophyll content and nutrient content in leaf such as nitrogen, phosphorus, potassium, boron and copper . Similar trend was observed for yield and quality parameters such as number of flowers per cluster, number of cluster per plant, fruit length, fruit girth, average fruit weight, number of fruits per cluster, number of fruits per plant, fruit yield per plant, fruit yield per plot, fruit yield per hectare, firmness, shelf life and TSS. Minimum number of days taken for first flowering, first fruit set, first harvest, 50 per cent flowering and 50 per cent fruiting, was observed in same treatment. Similar trend was also observed with nutrient status of soil with respect to available nitrogen, phosphorus, potassium, boron and copper. The economic analysis clearly indicates that application of RDF + Borax200ppm + $CuSO_4$ at 0.2 per cent realized maximum net returns and benefit cost ratio (3.15). Hence the treatment RDF + Borax200ppm + $CuSO_4$ at 0.2 per cent can be recommended for higher brinjal production under hill zone of Karnataka.

November, 2018

(P. Umamaheswarappa)
Major Advisor

7. Effect of Fertigation on Pole Bean (*Phaseolus vulgaris* L.) under Naturally Ventilated Polyhouse

SAHANA, P.

ABSTRACT

An experiment was carried out during *Kharif* 2017-18 to determine the effect of fertigation on pole bean (*Phaseolus vulgaris* L.) under naturally ventilated polyhouse at Zonal Agricultural and Horticultural Research Station (ZAHRS), Navile, Shivamogga. The experiment was conducted in a randomized block design with 12 treatments which were replicated thrice. As there is no standard recommended dose of nutrientsfor pole bean under fertigation, recommended dose of nutrients of French bean (63:100:75 N, P_2O_5, K_2O kg/ha) was taken as the basis. The treatment having70 per cent of recommended dose of fertilizers with mulching and micronutrients spray recorded maximum plant height (46.02 cm & 175.83 cm) at 15 and 30 days after sowing,number of primary(5.50 & 7.79)and secondary (2.83 & 7.75)branches at 30 and 45 days after sowing,minimum days for initiation (32.53), 50 per cent (37.32) and 100 per cent (41.43) flowering, maximum number of pods per plant (29.20), higher pod length (19.87 cm), pod circumference (2.43 cm), pod weight (16.62 g), pod yield per plant (625.87 g) and pod yield per 1000 m^2 (2.18 t). The highest net return (₹39,217) and benefit-cost ratio (2.49) were accrued from the same treatment. The study thus revealed that 70 per cent of the recommended dose of nutrients through fertigation along with mulching (40µ, LDPE) and micronutrients spray [IIHR vegetable special (0.5%)] is ideal for the maximum growth and yield of pole bean and has an explicit role in increasing the productivity of pole bean under naturally ventilated polyhouse.

August, 2018

(Nagarajappa Adivappar)
Major Advisor

8. Effect of Foliar Application of Nutrients on Growth, Yield and Quality of Potato (*Solanum tuberosum* L.) under Hill Zone of Karnataka.

SHANWAZ AHMAD

ABSTRACT

The study was conductedto know the "Effect of foliar application of nutrients on growth, yield and quality of potato (*Solanum tuberosum* L.) under hill zone of Karnataka" at Department of Vegetable Science, College of Horticulture, Mudigere during *kharif* 2016-2017.The experiment was laid out in a Randomised Complete Block Design (RCBD) with twelve treatments and three replications. Among different treatment, plants treated with RDF + micronutrient mixture 0.5 per cent recorded maximum plant height, number of leaves, number of stems, leaf area, leaf area index, chlorophyll content, fresh weight of leaves, fresh weight of stem, dry weight of leaves, dry weight of stems, dry weight of roots, total dry matter production, absolute growth rate, crop growth rate, relative growth rate, net assimilation rate and nutrient content in leaf such as nitrogen, phosphorus, potassium, copper, zinc, iron and boron. Similar trend was observed for yield and quality parameters such as number of tubers per plant, number of tubers per plot, yield per plant, yield per plot, yield per hectare, marketable yield per hectare, tuber volume, tuber weight, tuber circumference, TSS, starch, non-reducing sugars, reducing sugars and total sugar. Low incidence of early blight, late blight and aphids, was observed in same treatment. Similar trend was also observed with nutrient status of soil with respect to nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, copper, zinc, iron and boron. The economic analysis clearly indicates that application of RDF + micronutrient mixture 0.5 per cent realized maximum net returns and benefit: cost ratio (2.55). Hence the treatment RDF + micronutrient mixture @ 0.5 per centcan be recommended for higher potato tuber production under hill zone of Karnataka.

July, 2018

(Devaraju)
Major Advisor

9. Genetic Investigations on Yield and Yield Attributing Characters in Sweet Potato (*Ipomoea batatas* (L.) LAM.) under Hill Zone of Karnataka

SHARAVATI, M. BAMMANAKATTI

ABSTRACT

An investigation on genetic variability studies in sweet potato was carried out in the experimental block of Department of Vegetable science, College of Horticulture, Mudigere during 2017-18. The experiment was laid out by adopting Randomized Complete Block Design. Analysis of variance revealed highly significant differences among the genotypes were observed for all the characters under the study. High heritability (>60 %) coupled with high genetic advance as per cent over mean (>20 %) were recorded for the characters *viz.*,vine length, number of leaves per vine, inter nodal length, vine girth, chlorophyll content, leaf area, tuber length, tuber weight, total tuber yield per vine, marketable yield per hectare,reducing sugars, non-reducing sugars, total sugars, starch content, crude protein and beta-carotene content indicting the prevalence of additive gene action for these traits.Thus, there is ample scope for improving these characters through direct selection. Correlation studies showed that marketable yield per hectare exhibited positive and significant phenotypic and genotypic association with vine length at 90 DAP, number of leaves per vine at 90 DAP, number of tubers per vine, tuber weight, total tuber yield per vine and dry weight of vine at 90 DAP. Path analysis revealed that highest positive direct effect on marketable tuber yield per hectare was shown by total tuber yield per vinefollowed by dry weight of vine at 90 DAP, tuber weight, number of leaves per vine at 90 DAP andvine girth 90 DAP. Based on Mahalanobis D^2 analysis, 30 genotypes of sweet potato were grouped into five clusters. Among the traits studied crude protein (37.24 %), beta-carotene content (36.55 %) and total sugars (13.1 %) contributed maximum to the total genetic diversity. The present study identified three promising genotypes *viz.*, BSP-29, BSP-18 and BSP-23 which can be utilized in the further crop improvement programme.

July, 2018

(V. Srinivasa)
Major Advisor

10. Effect of Integrated Nutrient Management on Growth, Yield and Quality of Potato (*Solanum tuberosum* L.)

SHUBHA, A. S.

ABSTRACT

The present investigation was undertaken to study the effect of INM on growth, yield and quality of potato at department of Vegetable Science, college of Horticulture, Mudigere during 2017-2018. The experiment was laid out in Randomized Complete Block Design (RCBD)with three replications and 14 treatments. The data clearly showed that the plants fertilized with 75% RDF + *Azotobacter* + PSB + KSB + $MgSO_4$ + Micronutrient mixture(T_{13}) registered the maximum values for sprouting (99.33 %), plant height(59.33 cm), number of leaves (298), plant spread(45.00 and 47.33 cm, North-South and East-West, respectively), number of stems (4.79),leaf area (6296.55 cm^2), leaf area index (5.25), fresh weight of leaves (45.41 g), fresh weight of stem (74.67 g) and fresh weight of tuber(301.67 g), dry weight of leaves (9.39 g), dry weight of stem (17.90 g) and dry weight of tuber (55 g), AGR (0.75 g/plant/day), CGR(1.37 g/m^2/day), RGR(0.00808 g/g/day), NAR (0.002100 × 10^{-2} g/dm^2/day), number of tubers per plant(2.97), yield per plant(263.12 g/plant), yield per hectare (21.50 t/ha), marketable yield per plant (171.03 g/plant), marketable yield per hectare (14.22 t/ha),total sugar(2.34 %), reducing sugar(1.27 %), non reducing sugar (1.07 %), starch (18.47 %) and tuber dry matter (22 %) content.Whereas minimum growth, yield and quality parameters were found in the control. Soil available nutrient status *viz*., N(400 Kg/ha), P(62.33 Kg/ha) andK(294.67 Kg/ha) were recorded maximum in the same treatment. The treatment T_{13} recorded the highest cost benefit ratio of (2.47) and maximum net returns(Rs 303638).

August, 2018

(V. Srinivasa)
Major Advisor

Forestry

Silviculture and Agroforestry

University of Agricultural and Horticultural Sciences, Shivamogga

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

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1. Assessment of Tree Diversity and Above Ground Carbon Stock in Natural Forest, Teak Plantation and Coffee Agroforests of Kodagu

NAGAMANI, N.

ABSTRACT

Tropical landscapes are biologically very rich harboring the diverse flora and faunal as well with high productivity. Understanding the patterns of diversity and biomass distribution in such landscapes is essential for conservation planning and sustainable utilization of the natural resource.Hence, it is prudent to understand the diversity of different land use systems which help in planning the strategy for sustainable management. In this study,diversity and species composition under three different land use systems *i.e.* natural forests, teak plantations and coffee agroforests were studied in Thithimathi, Southern part of Virajpettaluk, Kodagu. In each land use type, 20 quadrats of 20 x 20 m size were randomly laidwhich approximately accounts for 0.001 per cent sampling intensity. Tree species were identified and their height and girth were measured. Non-destructive sampling method was used for estimation of above ground tree biomass using allometric equation developed by Chave*et al.* (2005) for tropical forest region. The results revealed that, Coffee agroforests recorded higher number of species (29 species) and diversity (H' = 2.58) which resembled natural forests.Similarly, these landscapes also recorded highest tree density (415 trees ha^{-1}) with basal area of 39.06 m^3 ha^{-1}.The above ground biomass was highest in coffee agroforests followed by teak plantation and lowest in natural forest which might be attributed to different degree of disturbances. Based on these results it may be concluded that human managed landscapes such as coffee agroforests are equally important as that of natural forests for conserving biodiversityand ecosystem services, while providing economic opportunity and essential natural resources.

February, 2018

(M. N Ramesh)
Major Advisor

Forest Biology and Tree Improvement

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M. Sc. (Forestry) theses abstracts produced in the Department of Forest Biology and Tree Improvement

1. Dynamics of Native Tree Structure and Diversity in Coffee Agroforest

BHAVYA C. K.

ABSTRACT

In tropical landscapes conversion of natural forest for non-forest use due to agricultural intensification is identified as the most prominent drivers of land use change and biodiversity loss. Studies in tropics suggests that agroforestry systems are among the most promising land use for achieving both conservation goals and supporting rural livelihoods at landscape level. Coffee agroforest are one such example of agroforestry systems, managed with traditional management practices. Kodagu district in the Western Ghats, is the largest shade coffee growing region in the country hosting rich biodiversity. In the recent days, the density and diversity of the shade cover in the coffee agroforest are in a continuous change due to land tenure system as well as increase coffee production. With the base line data from Coffee Agro-Forestry Network, the study was conducted in four villages namely, Arekad, Hachinad, Yeduru and Byrambada. Similar sampling procedure and observations were recorded as of base line data. Results revealed that the *Grevillea robusta* remained as the dominant tree species in the coffee agroforest with an increasing importance value index from 36.05 in 2008 to 53.29 in 2017. Existence of significant difference for the tree density was evident in the present study which showed decreasing trend from 2008 (420±349 number of stems ha^{-1}) to 2017 (274±82 number of stems ha^{-1}). In contrast, basal area was found to be increased from 2008 (27.62±11.27 m^2ha^{-1}) to 2017(30.31±11.03m^2ha^{-1}) which was not statistically significant. Compared with, tenure system unredeem land has more no of stems ha^{-1}compared with redeem land. Similarly in different size classes of coffee agroforest,significant changes in tree density and diversity among plantations belonging to all size classes.

March, 2018

(C. G. Kushalappa)
Major Advisor