Agriculture

Agricultural Extension Education

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Agricultural Extension Education

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1. ATTITUDE AND UTILIZATION PATTERN OF PRADHAN MANTRI KISAN SAMMAN NIDHI YOJANA (PM-KISAN) BENEFICIARY FARMERS OF SHIVAMOGGA DISTRICT.

(AJAY, K.)

ABSTRACT

The Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) scheme provides income support to farmers with the aim of supplementing their financial needs for agriculture and allied activities. For the study four taluks were selected namely, Shikaripura, Soraba, Bhadravathi and Shivamogga from Shivamogga district. Five villages were selected from each taluk and ten farmers were chosen from each village, resulting in a total sample of 200. The findings revealed that a majority of farmers (63.00 %) had favorable to more favorable attitude towards PM-KISAN scheme with a significant association with factors like education, family size, landholding, occupation, annual income, source of information and economic motivation. Majority of the benefited farmers use the money for land preparation (63.50 %) and purchasing of seed (47.50%). A small percentage of respondents used this money for labour charges (37.50%) and 34.50 per cent of farmers used for harvesting purpose. An around 14.50 per cent of farmers used benefits for herbicide purchase and 12.00 per cent for hand weeding purpose. In animal husbandry 13.50 per cent of farmers used for feeding purposes. In non-agriculture, majority of farmers (38.50%) utilize the PM-KISAN scheme for house hold expenses and a small portion of respondents use the scheme for recreational expenses (10.20%). About 68.50 per cent of the beneficiaries belonged to middle age group and educated up to high school (32.00 %). Nearly half of the beneficiaries had marginal land holding (49.00%) and had taken up agriculture as primary occupation (42.00%). Majority of the beneficiaries belonged to medium level of extension contact (60.50%), risk orientation (67.50%) and economic motivation (46.11 %). The major constraints were delay in fund disbursement which stands first rank with Garrett score 77.19 and most of the respondents suggest to increase the frequency of instalments (80. 00 %).

November, 2024

(Dhananjaya, B.)
Major Advisor

2. IMPACT OF FRONT LINE DEMONSTRATIONS IMPLEMENTED BY KRISHI VIGYAN KENDRA CHIKKAMAGALURU

(AKASH, K. P.)

ABSTRACT

The Front Line Demonstrations (FLDs) unique program which connects researchers and farmers directly, showcasing agricultural technologies in real-world farm settings. The present study was conducted in Chikkamagaluru District during 2023-24 examined six FLDs across three cluster villages. The study aimed to assess the impact of FLDs on farmers and the extent of adoption. Six FLDs were selected from G. Hosalli, Tadaga and Beeranahalli to know the impact of these FLDs on adopted Farmers. The second part of research consist of Extent of Adoption of these FLDs practices. The study reveals that FLDs had a moderate impact on most farmers, with 68.00 per cent of respondents reporting a medium level of impact. The extent of adoption level by farmers was found to be medium, with a significant majority of 68.00 per cent of respondents reporting a moderate level of adoption. Most respondents were middle-aged (67.33 %), educated up to high school (26.67 %), and belonged to medium-sized families. Most (86.66 %) came from medium-sized families. Agriculture and dairy were the main occupations for 34.67 per cent of respondents. The majority (80%) had a medium annual income. In terms of information sources, 68 per cent relied on medium-level sources. Social participation was also moderate, with 39.33 per cent engaging in activities at a medium level. The major problem expressed by the beneficiaries is high labour wages and labour shortage. The major suggestion given by the farmers was “To provide sufficient, easy and low interest credit facilities”. In this context the present study was attempted to know the how these FLDs impacted on adopted farming communities and Extent of Adoption of these FLDs. Thus, it shows a great potentiality of FLDs using them as effective means of agricultural technologies transfer to the farmers.

December, 2024

(A. T. Krishnamurthy)
Major Advisor

3. JOB COMPETENCE AND PERFORMANCE OF WOMEN AGRICULTURE EXTENSION FUNCTIONARIES

(NAVEENA, V. D.)

ABSTRACT

The present study was conducted in Shivamogga and Chikkamagalur districts of Karnataka during 2023-24, to assess the job competence and performance of women agriculture extension functionaries (WAEF). The sample of 120 from public and private WAEF were selected for the study. The data was collected through questionnaire developed for the study. The findings of the study showed that majority of the respondents were young aged, undergraduates and had low level of experience in extension work. Most of the respondents had medium level of accountability to clientele, self-reliance, achievement motivation, work load, organizational climate, facilities and resources, extension contact and training attended. Further, the study indicated that majority (73.33 %) of the WAEF were found to in medium job competence, followed by high level (14.17 %) and low level (12.50 %) of job competence. The majority (70.83 %) of the WAEF were found to in medium job performance, followed by high level (15.00 %) and low level (14.17 %) of job performance. WAEF experience in extension work, achievement motivation and organization climate found to be highly significantly influence their job competence and age, educational qualifications, self-reliance, accountability to clientele, workload, organizational communication, facilities-resources, extension contact and trainings attended found to be significantly influence with their job competence. The major constraints faced by WAEF were lack of trained village level extension functionaries (I rank), followed by less number of refresher training on ICTs (II rank), Over burden of work (III rank) and political interference in implementing schemes / programmes (IV rank). The major suggestions given by WAEF were provision of government vehicle during the crop season (79.17 %), followed by development of online platforms for technology transfer (63.00 %) and appointment of the vacant supporting staff (54.17 %).

November, 2024

(Gajendra, T. H.)
Major Advisor

4. CONTENT ANALYSIS OF AGRICULTURAL INFORMATION AND READING HABIT OF FARM JOURNALS IN KARNATAKA

(PRANEET, BASAVARAJ KALE)

ABSTRACT

Among the mass media, print media is the most commonly used medium. Agricultural journals serve as an educational and entertainment medium. The present study was conducted during the year 2023-24 in Bangalore, Bagalkot, Raichur and Shivamogga districts where in these districts farm journals published by state agricultural universities. The Journals viz., Negila Miditha, Krishi Vignana, Krishi Pradeepike and Udyana Loka were selected to know the space provided to publish different categories of agricultural information in these farm journals. The second part of research consist of reading habit of farm journal reader farmers. The study reveals that a total of 94.44 per cent space provided to publish agricultural information comprising in four farm journals. The articles published in Krishi Vignana, Krishi Pradeepike and Udyana Loka could be read by the farmers who had an education up to high school. Whereas, the Negila Miditha articles could be read by the farmers who had an education up to middle school. With respect to overall reading habit (35.00 %) and (33.50 %) of the reader farmers had medium level and high level of reading habit. Majority 58.50 per cent respondents belonged to middle age group and educated up to middle school 45.50 per cent. Majority of respondents belonged to nuclear family type (76.00 %). Majority belonged to medium level of annual income (56.00 %), social participation (46.00 %). The suggestion given by the reader farmers was “Use more local and familiar words” and “Journals should be made available through online”. In this context the present study was attempted to know the space provided to publish the farm information in farm journals and reading habit of farmers in farm journals. Thus, it shows a great potentiality of farm journals in using them as effective means of communicating the agricultural technologies to the reader farmers.

November, 2024

(K. Amaresh Kumar)
Major Advisor

5. COMPARATIVE ANALYSIS OF ENTREPRENEURIAL BEHAVIOUR OF CONTRACT AND NON-CONTRACT FARMERS IN HAVERI DISTRICT

(TEJASHWINI PATIL)

ABSTRACT

Agriculture plays crucial role in the Indian economy. Contract farming is seems to be a tool to increase agricultural productivity and income in developing countries. The study was conducted in Haveri district. Four taluks were selected for study based on highest area under contract farming. Hirekerur and Shiggaon taluks were selected for sunflower, for marigold Haveri and Ranebennur taluks were selected. From each crop 100 farmers were selected, thus the total sample size for study was 200. The study revealed that, 44.00 per cent of sunflower contract farmers had high to very high level of composite entrepreneurial index (0.6 to 1.00) which was relatively higher compared to non-contract farmers (28.00 %). In case of marigold farming, equal number of farmers (40.00 %) in contract and non-contract farmers had high to very high composite entrepreneurial behaviour index. The overall social impact of contract farming in both the crops was positive, where all the social indicators like, social participation, public recognition, employability skills, and purchasing power shows the significant difference at 1.00 per cent level of significance. In case of economics the net returns realised in sunflower was more Rs.21,501/- compared to non-contract farming (13,048/-). Whereas, marigold farmers realised higher net returns in contract farming (Rs.48, 286/-) compared to non-contract farming (Rs.28,736/-) Major constraints faced by the contract farmers in both crops were delay in payment, low contract price and disease outbreak. Lack of credit infrastructure, high transportation cost were the constraints of non-contract farmers. Contract farmers in both crops asserted to supply the good quality of seeds, in-time payment and in time technical guidance and non-contract farmers suggested to creation of profitable marketing channels and increase employment opportunities. Results from the study provides policy decision to encourage the farmers to take up profit-oriented cultivation practices through contract farming.

November, 2024

(Sahana, S.)
Major Advisor

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6. IMPACT OF NON-GOVERNMENTAL ORGANIZATIONS (NGOS) ON LIVELIHOOD OF BENEFICIARIES

(VIRUPAKSHI ASKI)

ABSTRACT

The study was conducted in Shivamogga district during the year 2023-24, to assess the impact of NGOs on livelihood of beneficiaries. Three functioning NGOs were selected for the study based on active involvement in agriculture and rural development and coverage of beneficiaries. From each NGOs 60 beneficiaries were selected randomly. Thus, the total sample was 180 beneficiaries. The study indicated that selected NGOs had medium level of impact on economic, social, food, environmental, health, psychological and physical components of livelihood. Medium level of knowledge about the activities of NGOs was found in 50.56 per cent of the beneficiaries. About 55.00 per cent of the beneficiaries belonged to middle age group and educated up to high school (25.56 %). Majority of the beneficiaries belonged to small family size (56.11 %). More than half of the beneficiaries had marginal land holding (58.33 %) and had taken up agriculture as primary occupation (46.11 %). Majority belonged to backward class category (48.33 %), medium level extension contact (52.22 %). Majority (42.78 %) of the beneficiaries have high motivation. Majority of the beneficiaries belonged to medium duration of contact (39.44 %), participation in NGOs extension activities (53.33 %) and economic motivation (46.11 %). About 84.44 per cent were borrowers and 60.00 per cent of the beneficiaries were regular repayers of loan. Insufficient financial resources (55.75 %), insufficient training, skill improvement and organizational strengthening within NGOs (53.89 %), absence of strategic planning (53.68 %) and irregular monitoring (50.26 %) were the constraints expressed by beneficiaries of NGOs. The major suggestions provided by beneficiaries to provide adequate loans (78.88 %), followed by need based advisories from extension personal (75.00 %), increase role of NGO activities in rural areas (66.11 %), proper training should be provided to the workers (57.22 %).

October, 2024

(Basavaraj Beerannavar)
Major Advisor

Agronomy

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

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

1. EFFECT OF FYM, ARECA HUSK COMPOST AND COIR PITH COMPOST ON GROWTH, YIELD AND QUALITY OF BABYCORN (*Zea mays* L.)

(AKSHAY, N. V.)

ABSTRACT

A field experiment was conducted during *rabi* 2023 at College of Agriculture, Navile, Shivamogga. The experiment was laid out in RCBD with thirteen treatments replicated thrice. Treatments consisted of twelve organic nutrition treatments and an inorganic treatment which followed the standard package of practice (150:75:40 kg N: P_2O_5: K_2O ha^{-1}). In organic treatments, the organic manures FYM, areca husk compost and coir pith compost were applied in combination and sole. The result of the experiment revealed that among the organic treatments, application of 50 per cent N through FYM + 50 per cent N through areca husk compost (T_2) reported higher plant height (153.13 cm), leaf area (48.49 dm^2 $plant^{-1}$), leaf area index (5.39), dry matter accumulation (15.4 t ha^{-1}), husked babycorn yield (119.0 q ha^{-1}), dehusked babycorn yield (45.1 q ha^{-1}) and green fodder yield of babycorn (29.1 t ha^{-1}) which was on par with the package of practice (T_1). Quality parameters of babycorn like, crude protein (17.37 %), starch content (8.96 %), ascorbic acid content (93.29 mg g^{-1}) and total sugars (0.418 %) were significantly higher with the application of 50 per cent N through FYM + 50 per cent N through areca husk compost (T_2). Soil microbes, bacteria (61.06 x 10^7 CFU g^{-1} soil), fungi (18.03 x 10^5 CFU g^{-1} soil) and actinomycetes (21.10 x 10^4 CFU g^{-1} soil) were significantly higher with the application of 100 per cent N through coir pith compost (T_{13}). Among the different treatments, application of 50 per cent N through FYM + 50 per cent N through areca husk compost (T_2) was recorded higher net returns (₹ 255447 ha^{-1}) and the application of 100 per cent N through areca husk compost (T_{12}) was recorded higher B:C ratio (3.30).

November, 2024

(Basavalingaiah)
Major Advisor

2. ASSESSING THE FEASIBILITY OF INTERCROPPING DIFFERENT VEGETABLE LEGUMES IN SWEET CORN (*Zea mays* L. *saccharata*) UNDER SOUTHERN TRANSITION ZONE OF KARNATAKA

(ANUSHREE, G.)

ABSTRACT

A field experiment entitled "Assessing the feasibility of intercropping different vegetable legumes in sweet corn (*Zea mays* L. *saccharata*) under Southern Transition Zone of Karnataka" was conducted at Zonal Agricultural and Horticultural Research Station, Navile, Shivamogga during *rabi* 2023. The experiment was laid out in Randomized Complete Block Design with ten treatments replicated thrice. Treatments comprised of intercropping different vegetable legumes *viz*., French bean, Vegetable cowpea and Field bean with Sweet corn in 2:2 (T_1 to T_3) and 3:2 (T_4 to T_6) row proportions and sole planting (T_7 to T_{10}) of each crops for comparative studies. The outcome revealed that sole sweet corn recorded significantly higher plant height (225.53 cm), leaf area (95.51 dm^2 $plant^{-1}$), dry matter accumulation (226.33 g $plant^{-1}$), cob yield (201 q ha^{-1}) and stover yield (287 q ha^{-1}). Among the intercropping systems, sweet corn + field bean (2:2) recorded significantly higher plant height (209.9 cm), leaf area (72.19 dm^2 $plant^{-1}$), dry matter accumulation (180 g $plant^{-1}$), cob yield (125 q ha^{-1}) and stover yield (179 q ha^{-1}) followed by sweet corn + vegetable cowpea (2:2). Evaluation of intercropping system was performed on the basis of several competitive indices *viz*., sweet corn equivalent yield (SEY), land equivalent ratio (LER), area time equivalent ratio (ATER), relative crowding coefficient (RCC), system productivity index (SPI) and monetary advantage index (MAI), where significantly higher SEY (244 q ha^{-1}), LER (1.22), ATER (1.10), RCC (1.66), SPI (246) and MAI (₹. 89,567 ha^{-1}) was obtained with sweet corn + field bean (2:2) followed by sweet corn + vegetable cowpea (2:2). Better growth and yield in the said treatment favoured in higher net return (₹. 3,68,733 ha^{-1}) and BC ratio (4.06). Therefore, sweet corn intercropped with field bean at 2:2 row proportion found most compatible and remunerative intercropping system.

November, 2024

(T. M. Soumya)
Major Advisor

3. EFFECT OF NANO-DAP ON GROWTH, YIELD AND QUALITY OF SOYBEAN (*Glycine max* L. MERRILL)

(BHAVYASHREE, B. A.)

ABSTRACT

A field experiment entitled "Effect of Nano-DAP on Growth, Yield and Quality of Soybean (*Glycine max* L. Merrill)" was conducted during late *Kharif*, 2023 at ZAHRS, Navile, Shivamogga. The experiment was laid out in RCBD with twelve treatments replicated thrice. Treatments include combinations of basal application of recommended N and P (RDNP) through conventional urea and DAP, respectively, at 75 and 100 per cent in combination with varied levels and methods of nano DAP (2.5 ml and 5 ml nano DAP per kg of seeds for seed treatment and 4 ml nano DAP per litre for foliar spray at 30 DAS), which were compared with package and absolute control. Among different treatments, the application of RDNP (100 %) as basal along with nano DAP seed treatment @ 5 ml kg^{-1} of seeds followed by foliar spray of nano DAP @ 4 ml l^{-1} at 30 DAS (T_{12}) has recorded significantly higher plant height (49.05 cm), number of branches $plant^{-1}$ (8.8) and dry matter (18.96 g $plant^{-1}$) at harvest, leaf area (7.01 dm^2 $plant^{-1}$) and Leaf area index (2.1) at 60 DAS and better yield traits of soybean *viz.*, number of pods $plant^{-1}$ (52.84), seed yield per plant (14.82 g) and test weight (13.24 g). Further, soybean root nodules counted at 45 DAS (51.30 per plant) also found statistically better in this treatment (T_{12}). The better values of these indices in the treatment not only resulted in enhanced grain yield (2,096 kg ha^{-1}), haulm yield (3,294 kg ha^{-1}) but also nutrient uptake (215.29 kg ha^{-1} of N, 23.02 kg ha^{-1} of P and 92.68 kg ha^{-1} of K) which was statistically on par with the T_{11}. The grain yield and haulm yield increment achieved by this treatment was 15.04 and 11.97 per cent higher than that of recommended package application.

November, 2024

(Basavaraj Naik, T.)
Major Advisor

4. EFFECT OF NANO DAP ON GROWTH, YIELD AND QUALITY OF GROUNDNUT (*Arachis hypogaea* L.)

(HEMANTHKUMARA, C. S.)

ABSTARCT

A field experiment was conducted at ZAHRS, KSNUAHS, Shivamogga during *Kharif 2023*. The experiment was laid out in RCBD with twelve treatments replicated thrice. The treatments comprised of absolute control (T_1), recommended dose of fertilizer (T_2), 75 per cent recommended N & P + seed treatment of nano DAP at 2.5 ml & 5 ml kg^{-1} of seeds in treatment T_3 & T_4 respectively, 75 per cent recommended N & P + one spray of nano DAP at 4 ml l^{-1} (T_5), T_3 + one spray of nano DAP at 4 ml l^{-1} (T_6), T_4 + one spray of nano DAP at 4 ml l^{-1}(T_7), 100 per cent recommended N & P + seed treatment of nano DAP at 2.5 ml & 5 ml kg^{-1} of seeds in treatment T_8 & T_9 respectively, 100 per cent recommended N & P + one spray of nano DAP at 4 ml l^{-1} (T_{10}), T_8 + one spray of nano DAP at 4 ml l^{-1} (T_{11}), T_9 + one spray of nano DAP at 4 ml l^{-1} (T_{12}). The results revealed that application of 100 per cent recommended N & P + seed treatment of nano DAP at 2.5 ml kg^{-1} of seeds + one spray of nano DAP at 4 ml l^{-1} recorded higher plant height (44.91 cm), root volume (9.53 cm^3), number of root nodules (85.27), dry matter (12.26 g $plant^{-1}$), number of pods $plant^{-1}$ (45.84), shelling percentage (74.69 %), protein and oil content (27.82 and 48.26 % respectively), pod yield (3562 kg ha^{-1}), net returns (₹ 1,41,716 ha^{-1}) and B:C ratio of 2.88, which was on par with the treatment T_8 and T_{10}. Compared to T_2, 12.48 per cent increase in pod yield and improved nitrogen (47.15 %) and phosphorus (32.92 %) use efficiency was realized with T_{11}.

November, 2024

(C. Sunil .)
Major Advisor

5. PERFORMANCE OF PRE-RELEASED FINGER MILLET GENOTYPES UNDER VARIED LEVELS OF NPK FERTILIZERS FOR HIGHER PRODUCTIVITY AND QUALITY IN SOUTHERN TRANSITION ZONE OF KARNATAKA

(SALMA)

ABSTRACT

A field experiment entitled "Performance of pre-released finger millet genotypes under varied levels of NPK fertilizers for higher productivity and quality in Southern Transition Zone of Karnataka" was conducted during late-*Kharif* 2023 at Zonal Agricultural and Horticultural Research Station, Navile, Shivamogga. The experiment was laid out in Randomized complete block design (factorial concept) with twelve treatment combinations consists of four genotypes (CFMV-1, KMR-630, ML-365 and GPU-28) with three different levels of NPK fertilizer (75 per cent RDF- 75:37.5:37.5 kg NPK ha^{-1}, 100 per cent RDF 100:50:50 kg NPK ha^{-1} and 125 per cent RDF 125:62.5:62.5 kg NPK ha^{-1}) replicated three times. The results of the experiment showed that, among different genotypes, CFMV-1 recorded significantly higher plant height (114.90 cm), number of tillers (3.52 $plant^{-1}$), leaf area (632.58 cm^2 $plant^{-1}$), total dry matter accumulation (57.21 g $plant^{-1}$), crop growth rate (23.83 g m^{-2} day^{-1}) , number of fingers per ear head (7.38), grain yield (3104 kg ha^{-1}) and straw yield (5456 kg ha^{-1}) over KMR-630. The application of 125 per cent RDF recorded significantly taller plants (112.25), number of tillers (3.57), leaf area (549 cm^2 $plant^{-1}$), total dry matter accumulation (46 g $plant^{-1}$), crop growth rate (20.19 g m^{-2} day^{-1}), number of fingers per ear head (6.69), grain yield (3011 kg ha^{-1}) and straw yield (5343 kg ha^{-1}) over 75 per cent RDF. The total nutrient uptake of nitrogen, potassium, phosphorus and quality parameters was significantly higher in CFMV-1 over KMR-630. The interaction of genotypes and fertility levels did not significantly influence the growth and yield parameters of finger millet. From this study, it can be concluded that, CFMV-1 with fertilizer of 125 per cent recommended dose of fertilizer was found to be an economically viable technology for sustainable yield and income benefits.

November, 2024

(Rudragouda F. Channagouda.)
Major Advisor

6. EFFECT OF FERTILIZER AND BIOSTIMULANT ON GROWTH, YIELD AND QUALITY OF COWPEA (*Vigna unguiculata* L.)

(SHUBHA, J. K.)

ABSTRACT

A field experiment entitled "Effect of fertilizer and biostimulant on growth, yield and quality of cowpea (*Vigna unguiculata* L.)" was conducted during summer 2024 at College of Agriculture, Navile, Shivamogga. The experiment was laid out in Randomized complete block design consist of eight treatments replicated thrice. The treatments consist of 100 per cent RDF control (T_1), 75 per cent RDF (T_2), 100 per cent RDF + 2 ml l^{-1} foliar application of biostimulant (T_3), 100 per cent RDF + 2.5 ml l^{-1} foliar application of biostimulant (T_4), 100 per cent RDF + 3 ml l^{-1} foliar of biostimulant (T_5), 75 per cent RDF + 2 ml l^{-1} foliar application of biostimulant (T_6), 75 per cent RDF + 2.5 ml l^{-1} foliar application of biostimulant (T_7) and 75 per cent RDF + 3 ml l^{-1} foliar application of biostimulant (T_8). Biostimulant was sprayed at 25 DAS. Results of experiment revealed that, among the treatments, 100 per cent RDF with foliar application of biostimulant @ 3 ml l^{-1} recorded significantly higher plant height (46.6 cm), number of branches (17.87 plant $^{-1}$), leaf area (13.07 dm^2 $plant^{-1}$), leaf area index (2.90), number of effective nodules (17.85), dry matter accumulation (36.72 g $plant^{-1}$), pod length (27.00 cm), number of pods (16.50 $plant^{-1}$), seed yield (1512.00 kg ha^{-1}) and haulm yield (2420.37 kg ha^{-1}) over 75 per cent RDF alone. Significantly higher total nutrient uptake of nitrogen (68.16 kg ha^{-1}), phosphorus (26.61 kg ha^{-1}), potassium (49.41 kg ha^{-1}), protein yield (307.99 kg ha^{-1}), higher gross returns (87758.18 ₹ ha^{-1}), net returns (51725.02 ₹ ha^{-1}) and benefit cost ratio of (3.02) were registered in 100 per cent RDF with foliar application of 3 ml l^{-1} biostimulant over 75 per cent RDF alone.

November, 2024

(C. J. Sridhara)
Major Advisor

7. EFFECT OF INTEGRATED NUTRIENT MANAGEMENT ON GROWTH, YIELD AND QUALITY OF FODDER SORGHUM.

(SUCHITHRA, V. R.)

ABSTRACT

A field experiment was carried out at Livestock Farm Complex, Veterinary College, Shivamogga, Karnataka during late-*Kharif* 2023 in sandy clay soil to study the "Effect of integrated nutrient management on growth, yield and quality of fodder sorghum". The experiment was laid out in a randomized complete block design (RCBD) with ten treatments with three replications. The treatments consist of package of practice (POP) (T_1), 100 per cent recommended dose of fertilizer (T_2), From T_3 to T_6, 75 per cent RDN through inorganic fertilizer and 25 per cent N through FYM (T_3), vermicompost (T_4), poultry manure (T_5), sheep and goat manure (T_6), From T_7 to T_{10}, 50 per cent RDN through inorganic fertilizer and 50 per cent N through FYM (T_7), vermicompost (T_8), poultry manure (T_9), sheep and goat manure (T_{10}) and FYM @ 7.5 t ha^{-1} were applied to all treatments except T_2. Among different treatments, POP showed significantly higher values of growth parameters like plant height (228.33 cm), leaf area (92.93 dm^2 $hill^{-1}$), number of tillers $hill^{-1}$ (10.77) and green fodder yield (18.01t ha^{-1}) and same treatment recorded significantly improved quality parameters *viz.*, crude protein (9.97 %), crude fibre (23.78 %), NDF (49.83 %) and ADF (30.19 %) at first cut, which was on par with T_5 and same treatments showed significantly higher values at subsequent second and third cuts. Highest nitrogen uptake (128.63 kg ha^{-1}), phosphorous uptake (33.31 kg ha^{-1}), potassium uptake (162.42 kg ha^{-1}), maximum net return (160641 ₹ ha^{-1}) and B: C ratio (4.15) were also recorded in POP which was on par with T_5. The lowest values observed in treatment where 100 per cent RDF alone is used.

November, 2024

(Sannathimmappa, H. G.)
Major Advisor

8. PERFORMANCE OF GROUNDNUT GENOTYPES UNDER DIFFERENT SOWING WINDOWS AND CROP WEATHER RELATIONS

(YASHASWINI, S. N.)

ABSTRACT

A field experiment was conducted during *Rabi* 2023 at the ZAHRS, Hiriyur, Chitradurga to study the "Performance of groundnut genotypes under different sowing windows and crop weather relations". The experiment was laid in strip plot design consisting of three sowing windows as vertical factor [D_1: 42nd MW (15 October- 21 October), D_2: 48th MW (26 November- 02 December), D_3: 52nd MW (24 December- 31 December)] and four varieties as horizontal factor (V_1: Dh-256,V_2:K-6,V_3:KL-1812,V_4: TMV-2) and replicated thrice. The results revealed that, crop sown on 48th MW recorded significantly higher pod yield (1937 kg ha^{-1}) and oil yield (617 kg ha^{-1}) with higher growth and yield components and was statistically on par with crop sown on 52nd MW (1890 kg ha^{-1} and 594 kg ha^{-1}, respectively). Among the varieties, KL-1812 produced significantly higher pod yield (2240 kg ha^{-1}) and oil yield (716 kg ha^{-1}). However, it was statistically on par with K-6 (2061 kg ha^{-1} and 648 kg ha^{-1}, respectively). The interaction effect indicated that variety KL-1812 sown on 48th MW recorded significantly higher pod yield (2472 kg ha^{-1}) and oil yield (826 kg ha^{-1}) and found on par with KL-1812 sown on 52nd MW (2386 kg ha^{-1} and 796 kg ha^{-1} ,respectively).Correlation analysis between weather parameters and seed yield at different phenophases of groundnut indicated that maximum temperature (r=0.468**), minimum temperature (r = 0.384*), cumulative bright sunshine hours (r = 0.405*) and cumulative pan evaporation(r=0.502**) from pod development to physiological maturity stage had significantly positive relationship with seed yield. On the other hand, minimum temperature (r=-0.519**), minimum relative humidity (r=-0.431**), maximum relative humidity (r=-0.378*) and wind speed (r =-0.473**) from pegging to pod development stage had a significantly negative relationship with seed yield.

November, 2024

(Sannathimmappa, H. G.)
Major Advisor

Entomology

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

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

1. ABUNDANCE AND DISTRIBUTION OF MELIPONINES (HYMENOPTERA : APIDAE) IN DIFFERENT HABITATS OF CHIKKAMAGALURU

(ADARSH, K. R.)

ABSTRACT

A comprehensive study was conducted in Western Ghats of Chikkamagaluru district, Karnataka, from August 2023 to February 2024, to assess the abundance, distribution pattern and environmental influence on meliponines. The study revealed that only one species of stingless bee (meliponine), *Tetragonula irridipennis*, was present across various habitats, including coffee, black pepper, arecanut, cardamom, and forest. A total of 4758 individuals were collected from 120 colonies. The highest abundance was observed in Mudigere, particularly in coffee and black pepper habitats, while the lowest was recorded in Koppa, especially in cardamom habitat. Coffee ecosystems intercropped with blackpepper was the most preferred habitat for stingless bees. The distribution pattern of stingless bees was analyzed using the Morisita index. The highest Morisita index of 1.79 was observed in forest habitat, while the lowest index of 1.32 was recorded for cardamom habitat. Based on Morista index, clustered distribution was observed in most of the habitats, except coffee and black pepper, which exhibited a random pattern. Similarly, clustered distribution was found in most of the talukas, except Mudigere, which showed random pattern. These variations in distribution patterns were likely to be influenced by factors *viz*., food availability, nesting sites, social behavior, and environmental conditions. While the species diversity was limited, significant morphological variations were observed among individuals from different regions. Stingless bees from Chikkamagaluru exhibited the largest body size and other morphological traits, while those from Kalasa and Narasimharajapura showed the smallest. Correlation between weather parameters and stingless bee abundance indicated that maximum temperature and morning relative humidity positively influenced abundance in most of the talukas and habitats. Conversely, rainfall, minimum temperature, evening humidity, sunshine, and wind direction were negatively correlated. These findings suggest that warmer temperatures and specific humidity levels are crucial for the abundance and distribution of stingless bees.

November, 2024

(Suchithra Kumari, M. H.)
Major Advisor

2. STUDIES ON STANDARDIZING THE METHODS FOR QUALITY OUTPUT OF BLACK SOLDIER FLY *Hermetia illucens*, (LINNAEUS) (DIPTERA: STRATIOMYIIDAE) LARVAE

(AISHWARYA BELLANKI)

ABSTRACT

The aim of the present investigation was to standardize the harvesting stage and drying method for quality output of black soldier fly larvae (BSFL). This study also focused on pesticide residue analysis in BSFL and feeding substrates. Larvae of 5 days old fed by kitchen waste were harvested at 3 (D3), 5 (D5), 7 (D7), 9 (D9), 11(D11) and 13(D13) days after rearing. The rapid increase of crude fat content observed in the development of 5–18 days larvae with its maximum level reaching 59.06 per cent in 18 day old larva. Even though there was no significant difference in crude fat of 14, 16 and 18 day old larva, higher crude protein content observed in 16 day old larva with 27.80 per cent. Therefore, 16 day old larva was considered as the best stage for harvesting. Larvae were dried using five different methods include drying by microwave oven, solar tunnel drying, tray drying, sun drying and drum roasting. Each method employs different time and temperature interaction. Results indicated, the drum roasting method showed higher crude protein and fat content *i.e.*, 32.72 and 48.52 per cent, respectively. After defatting, crude protein content was increased to 49.17 per cent and crude fat content was reduced to 1.31 per cent. Therefore, this study suggested that drum roasting method was better than other drying methods. Furthermore, pesticide residue analysis on BSFL and feeding substrates was conducted. The BSFL were fed with different substrates of Brinjal, Cabbage, Cauliflower, Tomato, Poultry feed and waste. Residue of persisted insecticides in tested substrates accumulated in BSFL were below their maximum residue limit (MRL). Also, they did not affect survival, fecundity and biomass growth of BSFL. Hence, rearing BSFL on feed containing insecticides at concentration equal to respective MRLs, did not affect the survival and growth of insect.

October, 2024

(S. Pradeep)
Major Advisor

3. DYNAMICS OF INSECT PESTS AND NATURAL ENEMIES IN A RICE GERMPLASM

(LAVANYA, S.)

ABSTRACT

The research on "Dynamics of insect pests and natural enemies in a rice germplasm" was undertaken at ZAHRS, Navile, Shivamogga during *Kharif* 2023. Seventeen types of insect pests were recorded from the rice germplasm. The major insect pests were yellow stem borer (*Scirpophaga incertulas*), leaffolder (*Cnaphalocrocis medinalis),* earheadbug (*Leptocorisa oratoria*) *and* green leafhopper (*Nephotettix virescens, N. nigropictus*). The maximum number of green leafhopper (2.63 No./hill) and grasshopper (0.5 No./hill) was noticed during 45 DAT, leaffolder (7.68%) and white leafhopper (1.16 No./ hill) was noticed during 60 DAT. Gundhibug (1.11 No./10hills) and yellow stem borer (4.99%) were noticed during 75 DAT and 90 DAT, respectively. Seventeen types of natural enemies were recorded from the rice germplasm. The major predators were spiders (0.26 no./hill), dragonfly

(0.12 no./hill), damselfly (0.13 no./hill) and coccinellids (0.16 no./hill). Among 258 rice genotypes screened against major insect pests. The lowest gundhibug infestation was recorded in SGRL-112 genotype (2.06%) and highest damage was recorded in SGRL-38 (17.38%). The lowest leaffolder infestation was noticed in genotype SGRL-51 (4.01%) and the highest damage was in SGRL-210 (20.99%). The lowest white ears caused by stem borer was recorded in genotype SGRL-68 (2.38%) and the highest in SGRL-253 (22.92%). Leaffolder, green leafhopper, white leafhopper, grasshopper was negatively correlated with the maximum temperature and positively correlated with the minimum temperature and relative humidity. The infestation of stem borer was significantly positive correlated with the maximum temperature and negative correlated with the minimum temperature and relative humidity. The natural enemies of rice pests were positively correlated with the maximum temperature and negatively correlated with the minimum temperature and relative humidity except rove beetles which were positively correlated with the morning and evening relative humidity. All insect pests and their natural enemies occurring in a rice germplasm were negatively correlated with rainfall.

October, 2024

(Revanna Revannavar)
Major Advisor

4. BIOCONVERSION AND FEEDING PREFERENCE FOR ORGANIC WASTES USING BLACK SOLDIER FLY, *Hermetia illucens* (LINNAEUS)

(NISCHITHA, G. P.)

ABSTRACT

The present study investigated the performance of Black Soldier Fly Larvae (BSFL) (*Hermatia illucens* L.) across various feed substrates (kitchen waste, cow dung, paddy husk, cotton cake, broken maize seeds and fruit waste), focusing on growth, development, feeding preference and nutritional composition of BSFL at Department of Entomology, College of Agriculture, Shivamogga. Among the feed substrates tested, kitchen waste recorded highest individual pre-pupal weight of 0.3 grams, individual pupal weight of 0.24 grams and pupal period of 11.66 days. In contrast, larvae fed on paddy husk demonstrated the least growth, with pre-pupal weight of 0.11 grams and development time of 35 days. The bioconversion ratio was highest for kitchen waste at 5.22% and least in paddy husk (1.34 %). Furthermore, fruit waste exhibited the highest feed reduction ratio (FRR) of 77.13 per cent, while paddy husk was exhibited the least FRR of 42.65 per cent. The feeding behaviour of BSFL demonstrates significant variability across different substrates at various developmental stages (7, 9, 12, 14, 16, and 18 days). Cow dung came out as the most attractive substrate for BSFL, while paddy husk showed negligible appeal. Nutritional assessments indicated that kitchen waste provided the highest protein (18.57%) and fat (19.63%) content, whereas cotton cake had the highest fiber content (30.20%). The nutritional profile of BSFL varied significantly depending on the substrate, with fifth instar larvae exhibiting the highest protein (45.59%) and fat (24.30%) levels, which decreased upon maturation into pupae. The nutrient content of the frass also differed by substrate, with BSFL reared on cotton cake containing the highest nitrogen (2.03%), phosphorus (2.69%) and potassium (1.43%) levels and micronutrient content varied significantly across substrates *viz*., copper (9.63-15.23 ppm), zinc (7.86-17.10 ppm), iron (302.39-840.33 ppm) and manganese (24.80-107.06 ppm).

November, 2024

(Sharanabasappa)
Major Advisor

5. SUBLETHAL EFFECTS OF NEWER ACARICIDES ON THE BIOLOGICAL PARAMETERS OF SPIDER MITE, *Tetranychus urticae* KOCH (ACARI: TETRANYCHIDAE) AND ITS PREDATORY MITE, *Neoseiulus longispinosus* EVANS (MESOSTIGMATA: PHYTOSEIIDAE)

(SANDEEP, V.)

ABSTRACT

The two-spotted spider mite, *Tetranychus urticae* Koch is a major pest of horticultural and agricultural crops. It causes damage across all growth stages and quickly develop the resistance to most of acaricides. The present study evaluated the sublethal effects of chlorfenapyr and cyenopyrafen on *T. urticae*. The LC_{50} values recorded were 4.22 ppm for chlorfenapyr and 0.357 ppm for cyenopyrafen. In F_1 generation, both the acaricides significantly reduced developmental stages at LC_{10}, LC_{20} and LC_{30} concentrations. In LC_{30} concentration, total lifespan was significantly shortened with 11.34 days for females, 11.10 days for males treated with cyenopyrafen and 14.06 days for females, 11.94 days for males, treated with chlorfenapyr. The lowest fecundity was recorded in LC_{30} concentration with 19.55 offspring/female for cyenopyrafen and 23.30 offspring/female for chlorfenapyr. The egg hatchability were also lowest in LC_{30} (51.64% for cyenopyrafen and 68.14% for chlorfenapyr). The mean generation time, gross reproductive rate (*GRR*), net reproductive rate (*Ro*) and intrinsic rate of increase (r_m) were also decreased. In F_2 generation, developmental stages were prolonged and reproductive periods were shortened in LC_{20} and LC_{30} concentrations. The net reproductive rate (*Ro*) decreased to 16.19 for cyenopyrafen and 13.49 offspring/individual for chlorfenapyr, while the intrinsic rate of increase (r_m) dropped to 0.08 day^{-1} for cyenopyrafen and 0.13 day^{-1} for chlorfenapyr. The predator, *Neoseiulus longispinosus* showed prolonged developmental stages in LC_{10}, LC_{20} and LC_{30} concentrations in both sexes. But female adult longevity was significantly shortened in LC_{20} with 22.17 days for cyenopyrafen and 21.21 days for chlorfenapyr. In LC_{30} concentration, it was 19.41 and 19.21 days for cyenopyrafen and chlorfenapyr. And lowest fecundity of 25.34 and 18.63 offspring/female for cyenopyrafen and chlorfenapyr were recorded in LC_{30} concentrations. Chlorfenapyr and cyenopyrafen demonstrated more substantial decrease in population of *T. urticae*, but showed negative impact on *N. longispinosus*.

October, 2024

(Rajashekharappa, K.)
Major Advisor

6. STUDIES ON ABUNDANCE AND DIVERSITY OF SOIL ARTHROPODS IN MAJOR PLANTATION CROPS UNDER DIFFERENT FARMING PRACTICES

(SHREYA, K. S.)

ABSTRACT

The Agricultural Practices on soil management points to the combination of farming practices with soil biodiversity. In this study, three farms (arecanut, coconut and coffee plantations) in Chikkamagaluru district at different agro climatic zones *viz*, hilly, transition and dry land, managed with natural farming, organic farming and inorganic farming practices were studied from August, 2023 to May, 2024 to highlight the impact of different crops and soil managements on soil arthropods, in terms of abundance, composition and soil biological quality. Highest abundance of soil arthropods recorded in natural farming practice (31.90 individuals per 400g of soil) in coconut ecosystem followed by organic farming practice (12.39 individuals per 400g of soil) and lowest in inorganic farming practices (5.39 individuals per 400g of soil) in arecanut and coffee ecosystem, respectively. Diversity of arthropods under Shannon Weiner index showed highest diversity in natural farming system with 2.13, whereas, the lowest diversity was recorded in Inorganic farming practices (Shannon-Wiener: 0.69). Significant differences was observed between Natural farming practices, followed by organic farming which supported higher diversity and abundance of soil fauna compared to inorganic farming practices. Soil nutrient status showed high fertility in natural farming, followed by organic farming, while, inorganic farming had the lowest fertility status. The abundance of Soil arthropods exhibited a significant positive correlation with organic carbon, available nitrogen, available phosphorus, available potassium and clay content and significant negative correlation with soil pH. Natural farming practice recorded the overall higher abundance of arthropods, owing to the high number of Acari, Collembola and others, while the number of arthropod groups were generally higher in crop residues as mulching.

November, 2024

(Girish, R.)
Major Advisor

7. STUDIES ON LEAF MINERS IN HORTICULTURAL CROP ECOSYSTEM WITH SPECIAL REFERENCE TO CUCUMBER

(SUGNANA GOWRAVI)

ABSTRACT

Studies on Leaf Miners in Horticultural Crop Ecosystem with Special Reference to Cucumber was conducted at the College of Agriculture, Shivamogga during 2023-24. During the survey, Shivamogga (including Harnahalli, Shivamogga local, Bommanakatte, and Kommanalu), Chikkamagaluru (Ajjampura and Kaduru), Davanagere (Savalanga, Nyamthi and Honnali) and Hassan (Hassan local, Banavara, and Sakaleshpura) were covered and different host plants of *Liriomyza sativae viz*., cucumber, tomato, pumpkin, ridge gourd, ivy gourd, gaillardia, field bean, marigold, onion, beetroot, *Tinospora* and beans were recorded and lepidopteran leaf miners in citrus and mango were collected. Among the 17 cucumber cultivars screened for resistance to the leaf miner during *Kharif* and *Rabi* seasons of 2023, based on number of live mines per five leaves per plant, the cultivars were designated as per susceptibility index in which Malini, Shanti, Vishal, Sharmili, White long, Pusa Uday, Pusa Barkha, Pusa long green, F1 Hybrid-18, Arka Veera, were categorized as less susceptible, F1 Deepa 488, NS 415, Navya F1, F1 hybrid were categorized as moderately susceptible, F1cucumber Siri and Shakti as less susceptible in *Kharif*, 2023 and moderately susceptible in *Rabi*, 2023. Biochemical analysis of seventeen cucumber cultivars during *Kharif* and *Rabi* seasons of 2023 revealed that there was strong positive correlations between total sugars and leaf miner infestation, reducing sugars and non-reducing sugars also had positive but non-significant correlations with leaf miner infestation and total phenol content and tannins showed significantly negative correlations with leaf miner infestation. Among the six insecticides evaluated, the highest per cent mean reduction of leaf miner maggot was recorded with Broflanilide 300 G/L SC @ 0.2 ml/l (78.74 and 81.29 in *Kharif* and *Rabi*, respectively) compared to all the other treatments.

November, 2024

(Jayalaxmi Narayan Hegde)

Major Advisor

8. STUDIES ON INCIDENCE AND MANAGEMENT OF MIRID BUG COMPLEX ON *BT* COTTON

(SUMA)

ABSTRACT

The present investigation was carried out on Studies on Incidence and Management of Mirid bug Complex on *Bt* Cotton under field condition during *Kharif*, 2023-24 at College of Agriculture, Shivamogga. During the investigation, the highest population of mirid bugs was observed in Dharwad followed by Raichur, whereas the least bug population was recorded in Shivamogga (13.9 bugs/ 25 squares) and low to moderate were recorded in Chitradurga (14.2 bugs/ 25 squares) and Davanagere (18.4 bugs/ 25 squares). Totally six species of mirid bugs were recorded on *Bt* cotton *viz*., *Poppiocapsidea biseratense*, *Dortus primarius*, *Campylomma* sp., *Hyalopeplus similis*, *Taylorilygus apicalis* and *Calocoris* sp. Among these, *Poppiocapsidea biseratense*, *Dortus primaries* and *Campylomma* sp. were distributed in all five districts whereas, *Taylorilygus apicalis* and *Calocoris* sp. were recorded in Shivamogga, *Hyalopeplus similis and Calocoris* sp. were recorded in Raichur district. Four natural enemies were recorded on mirid bugs on *Bt* cotton *i.e.* big-eyed bugs, lady bird beetles, green lacewings and spiders. The mirid bug infestation commenced after tenth week of (36th SMW) sowing with 0.05 bugs per 5 squares. Further, the pest density increased gradually with the crop age and peaked at (5.73 bugs/ 5 squares) on 45th SMW. Thus, the pest was active from the second week of September to the last week of December and it's incidence were positively correlated with maximum temperature, sunshine hours and rainfall whereas, negatively correlated with minimum temperature, morning and evening relative humidity. Among the insecticides evaluated, afidopyropen 10 SC @ 2.0 ml per litre at 105 and 120 days after sowing effectively reduced mirid bugs in *Bt* cotton with the highest yield (2602 kg/ha) and B: C ratio (1:3.01), followed by pyrifluquinazon 20 WG @ 1.0 g per litre.

November, 2024

(B. K. Shivanna)
Major Advisor

Genetics and Plant Breeding

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Agri.) theses abstracts produced in the Department of Genetics & Plant Breeding

1. GENETIC VARIABILITY STUDIES IN CHICKPEA (*Cicer arietinum*. L) GENOTYPES FOR YIELD AND YIELD ATTRIBUTING TRAITS

(APOORVA K. S.)

ABSTRACT

A field experiment was conducted during *rabi* 2023 at Agricultural and Horticultural Research Station, Bhavikere, to study genetic variability, correlation, path analysis, genetic diversity and quality trait among 100 chickpea genotypes. High genotypic coefficient of variation (GCV) and high phenotypic coefficient of variation (PCV) were observed for seed yield per plant (30.32% and 38.23%) followed by number of pods per plant and test weight. High GCV suggested greater potential for improving the traits. High heritability coupled with high genetic advance as per cent of mean was found for test weight (92.44%) followed by number of pods per plant, plant height, number of seeds per pod, number of primary branches per plant, number of secondary branches per plant and seed yield per plant. Test weight (0.64) showed the highest positive significant association with seed yield per plant followed by number of secondary branches per plant, number of pods per plant, number of primary branches per plant, protein content. Test weight (0.71) showed the highest positive direct effect on seed yield. K-means clustering was utilised to ascertain genetic distances among 100 chickpea germplasm accessions which were grouped into 5 different clusters. Cluster III was the biggest and had the most genotypes (45), followed by clusters V (27), IV (10), II (9) and I (9). Clusters III and V, as well as clusters II and V, were the most divergent, with the maximum inter-cluster distances. Highest intra-cluster distance was recorded in cluster V. Based on mean performance *desi* types *viz*., NBeG-47, ICCX-100105-23, KCD-2304, ICCX-130116 and *kabuli* types *viz*., NBeG-440, ICCX-130124-B-B-B-B-B-8-B-B, BGM-21-10, NBeG-810 were recognized as high yielding. Quality analysis for these genotypes revealed that protein content ranged from 9 to 28.82%. The genotypes such as ICCV-191325, ICCV-211402, ICCX-120040-B-B-B-B-13-B-B, ICCX-150031-B-B-B-B-16-B, ICCV-191124, ICCX-130075 and BGM-21-18 were recorded for high protein content.

November, 2024

(Shashikala S. Kolakar)
(Major Advisor)

2. STUDIES ON GENETIC VARIABILITY AND DIVERSITY IN CHICKPEA GENOTYPES FOR GROWTH AND YIELD ATTRIBUTES

(MOULYA G.)

ABSTRACT

The improvement in crop yield depends upon the magnitude of genetic variability and diversity available in breeding material. An investigation was carried out during *Rabi* 2023 at ZAHRS, Hiriyur using 100 germplasm lines and 4 checks in an augmented design in 5 blocks. The analysis of variance revealed the presence of significant differences among germplasm for all traits studied. High GCV, PCV coupled with heritability and GAM were observed for traits - number of primary branches, number of pods per plant, hundred seed weight and seed yield. Correlation studies revealed that, seed yield was in positive association with number of pods per plant, plant height and test weight. Multivariate analysis was conducted to study diversity including principal component analysis and cluster analysis. The first four principal components with eigen value greater than one, accounted for 67% of total existing variation in principal component analysis and characters, yield, number of pods per plant, plant height and number of primary branches per plant contributed to the total diversity. The optimal number of clusters formed in cluster analysis is six. Among 6 clusters, cluster III contained the most genotypes (35) and the cluster VI had the solitary genotype. The highest inter-cluster distance was observed between cluster VI and cluster II and highest intra-cluster distance was observed in cluster III. Cluster means for plant height, number of pods per plant and seed yield was maximum in cluster I reflecting the selection of genotypes for these traits in this cluster would be fruitful. The accessions SLCC-50, SLCC-97, SLCC-83-11, SLCC-56, SLCC-91 and A-1 from cluster I, SKM17 and DBGV-II-147 belonging to cluster II, SLCC-46, SLCC-113 and HBGV5-33 belonging to cluster III, DBGV-II-162 and DBGV-II-146 from cluster IV, were found good yielding diverse lines that can be used in further crop improvement programme.

October, 2024

(B. N. Harish Babu)
(Major Advisor)

3. STUDIES ON GENETIC VARIABILITY FOR YIELD AND QUALITY TRAITS IN BREEDING LINES OF RICE (*Oryza sativa* L.)

(MOUNIKA N.)

ABSTRACT

The present study was conducted during *kharif* 2023. Forty five breeding lines of rice of cross RNR-15048 × Tunga, along with five checks were studied under randomized complete block design for genetic variability and character association at Agricultural and Horticultural Research Station, Kathalagere. The analysis of variance revealed significant variation across 16 traits in rice. Genetic variability revealed moderate to high estimates of phenotypic coefficient of variation (PCV), genotypic coefficient of variation (GCV), heritability and genetic advance as *per cent* of mean for the traits *viz*., plant height, number of tillers per plant, number of productive tillers per plant, number of grains per panicle, number of filled grains per panicle, test weight, protein content, length to breadth ratio and grain yield. Correlation study revealed the highest significant positive association of the number of productive tillers (0.694) followed by number of tillers, panicle length, number of grains per panicle, number of filled grains per panicle, test weight and length to breadth ratio while plant height (-0.335) showed negative correlation with grain yield.The trait number of productive tillers per plant (0.383) exhibited highest positive direct effect on grain yield per plant followed by panicle length (0.285), number of tillers per plant (0.122) indicating the effectiveness of direct selection for these traits in improvement of grain yield per plant. The breeding lines R×T-9-1-14 and R×T-8-9-21 showed superior grain yield, while R×T-8-9-21 and R×T-9-1-12 excelled in both yield and protein content. R×T-8-9-21 also had good grain yield with moderate carbohydrate content, making these lines valuable for crop improvement programs.

November, 2024

(Manjunatha B.)
(Major Advisor)

4. MORPHOLOGICAL CHARACTERIZATION AND ASSESSMENT OF GRAIN ZINC, IRON AND PROTEIN CONTENT IN RED RICE (*Oryza sativa* L.) GENOTYPES

(NAVYA B. HULMANI)

ABSTRACT

An experiment was conducted during *Kharif* 2023 at the Zonal Agricultural and Horticultural Research Station, Brahmavar. A total of 108 red rice genotypes were grown in randomized complete block design in two replications, to study the morphological characters and to assess the grain zinc (Zn), iron (Fe) and protein content in 108 red rice genotypes. 54 DUS characters were evaluated as per the guidelines of PPV and FRA, 2001, among them six characters were common in all the genotypes, whereas the remaining characters were unique and distinct among the genotypes. Analysis of variance revealed significant variation among the genotypes for all the characters studied. Grain Zn, Fe and protein content showed wide range of variability which ranged from 11.4-44.7 ppm, 13.11-37.12 ppm and 5.0-11.43 %, respectively. High GCV, PCV, heritability combined with high genetic advance as per cent of mean were observed for Zn content, number of productive tillers per plant, Fe content, grain yield per plant and number of grains per panicle. By diversity analysis genotypes were grouped into six clusters based on Mahalanobis' D^2 values, maximum inter-cluster distance was observed between cluster V and cluster VI, cluster VI exhibited maximum intra-cluster distance. Correlation studies revealed that grain yield per plant exhibited significant positive association with number of productive tillers per plant, number of grains per panicle and test weight. Plant height, panicle length, protein and Fe content had negative association with grain yield whereas, Zn content exhibited non-significant positive association with grain yield. Protein content displayed significant positive association with Zn and non-significant association with Fe content. Assessment of these red rice genotypes indicated high variability in grain Zn, Fe and protein content, where Karthika, Bilihallga and Shahara genotypes have high protein, iron and zinc content respectively, which can be used in the further breeding program to develop nutritionally rich varieties.

November, 2024

(Shridevi A. Jakkeral)
(Major Advisor)

5. GENETIC DIVERGENCE AND CHARACTER ASSOCIATION STUDIES IN DOLICHOS BEAN (*Lablab purpureus* L.) FOR YIELD AND YIELD TRAITS

(REVANTH P. B.)

ABSTRACT

The present study was carried out during *late kharif* 2023 at College of Agriculture, Navile, Shivamogga. A total of 60 advanced breeding lines of dolichos bean were sown along with four checks in an augmented design with six blocks and observations were recorded on 13 quantitative traits. Analysis of variance revealed that significant variation was observed among the genotypes for all the characters studied. High genotypic coefficient of variation (GCV) was observed for pods per plant (48.10%) followed by pod yield per plant, clusters per plant, pods per cluster, plant height and pod width. High GCV indicates better scope for improvement of characters. High phenotypic coefficient of variation (PCV) was observed for pod yield per plant (50%) followed by pods per plant, clusters per plant, pods per cluster, plant height and pod width. High heritability (>60%) was observed for all the traits studied. High heritability combined with high genetic advance as *per cent* of mean was found for pods per plant (95.49%) followed by pod yield per plant, clusters per plant, pods per cluster, pod width and plant height which indicates that improvement of those characters through selection can be possible due to additive gene action. Five clusters were formed based on k-means clustering analysis and the cluster III having maximum number of genotypes (23). Highest intercluster distance was observed between Cluster IV and Cluster V (9.36) and Cluster I (2.34) has highest intracluster distance. Significant correlation was observed for pods per plant (0.96) with pod yield. Pods per plant (0.45) showed the highest positive significant association. Pods per plant (0.62) showed the highest positive direct effect. Based on mean performance, ABL-41, ABL-46, ABL-36, ABL-56, ABL-48, ABL-30, ABL-25, ABL-16, ABL-45, ABL-34 and ABL-35 lines were identified as high yielding lines. These genotypes can be utilized for further crop improvement programme.

November, 2024

(Lakshmana, D.)
(Major Advisor)

6. ASSESSMENT OF GENETIC VARIABILITY FOR YIELD AND QUALITY TRAITS IN BREEDING LINES OF RICE (*Oryza sativa* L.)

(VIDYA M. N)

ABSTRACT

An experiment was carried out during *kharif 2023* at Agriculture and Horticulture Research Station, Kathalagere, to assess the genetic variability, character association, direct and indirect effect between yield and yield attributing traits among 32 breeding lines of rice derived from the cross RNR-15048 x KPR-1 along with four checks under randomized complete block design in two replications. Plant height, number of grains per panicle, and number of filled grains per panicle exhibited high genetic advance as *per cent* of mean combined with high heritability as well as moderate to high values for both genotypic and phenotypic coefficients of variation (GCV and PCV). Panicle length (0.88), number of productive tillers per plant (0.76), number of tillers per plant (0.73), number of grains (0.40) and number of filled grains per panicle (0.38) exhibited positive significant association with grain yield per plant while, non-significant negative correlations were observed with days to maturity (-0.24), days to 50 *per cent* flowering (-0.21), spikelet fertility (-0.19), test weight (-0.09), protein concentration (-0.06) and carbohydrate concentration (-0.05). Positive direct effect was exhibited by days to 50 *per cent* flowering (0.337), days to maturity (0.589), plant height (1.635), number of productive tillers per plant (1.633), number of filled grains per panicle (1.194), test weight (0.755) and protein concentration (0.539). Quality analysis for the seeds of these genotypes revealed that protein and carbohydrates ranges from 7.43-10.91 and 68.72-74.67 grams *per* 100 grams respectively. The information derived from these analysis helps to derive the traits having positive effect on grain yield and thus give insights on formulation of selection indices enhancing productivity.

November, 2024

(Manjunatha, B.)
(Major Advisor)

Plant Pathology

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

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

1. STUDIES ON MAJOR SOIL BORNE FUNGAL DISEASES IN GROUNDNUT WITH SPECIAL REFERENCE TO STEM ROT CAUSED BY *Sclerotium rolfsii* SACC

(DIVYASREE, J. P)

ABSTRACT

Groundnut (*Arachis hypogea* L.) is an important oil seed crop cultivated in India as well as in tropical and sub tropical regions of the world. It is considered as “poor man’s almond” due to rich source of edible oil (43-55 %) and protein (25-28 %). Among different diseases affecting groundnut, soil borne diseases are of greater importance causing 25 per cent yield loss in groundnut. Hence, roving survey was conducted during the year 2023-2024 to assess the occurrence of major soil borne fungal diseases of groundnut in Chitradurga and Tumkur districts. Among two districts surveyed the highest stem rot disease incidence of 9.33 per cent was recorded in Tumkur district. In case of collar rot the highest disease incidence of 8.76 per cent was recorded in Chitradurga district. Cultural and morphological studies showed that the maximum radial growth of the pathogen was recorded on Potato Dextrose Agar (90.00 mm), while the least growth was on Malt Extract Agar (33.00 mm). Sabouraud's Agar supported the production of 558 brown, oval-shaped sclerotia, while Oatmeal Agar produced the largest sclerotia with a mean diameter of 1.57 mm and Corn Meal Agar produced the smallest sclerotia, with a mean diameter of 0.91 mm. Pathogen was confirmed as *Sclerotium rolfsii* by molecular characterization. Analysis of toxin in culture filtrates revealed the presence of oxalic acid and formic acid as major metabolites which aggrevates the stem rot disease. Bouganvillea (31.85 %) inhibited maximum mycelia growth among the botanicals evaluated *in vitro* against *S. rolfsii* and the least inhibition was recorded on Touch me not (3.21%). Dual culture technique revealed that fungal bio-agent *Trichoderma longibrachiatum* (55.43 %) was found effective than other bioagents tested, in inhibiting the mycelial growth of *S. rolfsii*.

October,2024

(R. Ganesh Naik)
Major Advisor

2. INVESTIGATIONS ON CROSS-INOCULATION POTENTIAL OF *Colletotrichum* spp. IN ARECANUT

(KEERTI SHARMA)

ABSTRACT

Investigation on *Colletotrichum* spp., a polyphagous pathogen causing leaf spot disease of arecanut, poses a serious threat for the cultivation of arecanut in the regions receiving heavy rainfall during *Kharif* and post *Kharif* seasons. From the past one decade, *Colletotrichum* become a major pathogen on arecanut due to changing climatic condition and its ability to infect different crops grown along with arecanut, that resulted in epidemic nature of disease and with significant management implifications. Present studies were aimed to identify and characterize the pathogen isolates through cultural, morphological and molecular means, cross-inoculation assay to assess the effect of *Colletotrichum* spp. isolated from different hosts and its cross-infection capability along with *in vitro* evaluation of botanicals and bioagents against pathogen. To fulfil these objectives, ten isolates each from arecanut and naturally infected different fruits, vegetable and plantation crops were isolated and identified for further studies. Molecular study of isolates from Koppa and Mudigere regions confirmed as *C. aotearoa* whereas other eight areca isolates were found to be *C. gloeosporioides*. Pathogen isolated from non-areca hosts *viz*., banana anthracnose (*C. musae*), anthracnose of mango, papaya, coffee (*C. gloeosporioides*) and pepper anthracnose confirmed to be *C. siamense*. Further cross-infection potential of isolates obtained from arecanut on other hosts and vice-versa revealed the polyphagous nature of the pathogen, wherein *Colletotrichum* isolated from arecanut showed pathogenicity on all the other hosts tested. Similarly all the *Colletotrichum* isolates from different hosts also showed pathogenicity on arecanut. Among all tested isolates on arecanut seedling, maximum virulence (84.12 mm^2 lesion area) was recorded by papaya and least (15.85 mm^2) was recorded from dragon fruit. Bioassay study revealed that, among the botanicals tested garlic bulb extract showed highest inhibition (41.41 %). Whereas, *T. harzianum* found to be an effective bioagents in inhibiting the growth of the pathogen (57.41 %).

October,2024

(B. Gangadhara Naik)
Major Advisor

3. STUDIES ON FRUIT ROT OF JACKFRUIT (*Artocarpus heterophyllus* L.) INCITED BY *Rhizopus stolonifer* (EHRENB.) VUILL.

(PUSHPALATHA, H. S.)

ABSTRACT

Jackfruit (*Artocarpus heterophyllus* L.) is one of the versatile fruit crops commonly found in forest areas as well as in home gardens. Fruit rot caused by *Rhizopus stolonifer* (Ehrenb.) Vuill. is a destructive fungal disease affecting jackfruit from the early inflorescence period to young and matured fruits. The present research work was carried out to assess pathogen isolation and identification through morphological, physiological, molecular characterization along with evaluation of botanicals, bioagents and fungicides under *in-vitro*. The pathogen on PDA medium produced whitish colonies of ceonocytic mycelia which later turned to greyish black. Morphological studies revealed that the sporangiophores were smooth-walled, light brownish which measured about a mean of 287.52 µm in length and 12.85 µm in diameter. Sporangiospores were 14.8 µm in length and 194.81 µm in diameter. Sporangia were globose and blackish in colour. Columella was cylindrical and hyaline. Rhizoids were hyaline to dark brown, root-shaped and present abundantly. Stolons were pale brownish and measured about 10.23 µm in diameter. Physiological studies revealed that, highest fresh and dry mycelial weight of pathogen was produced at an incubation temperature of 35 °C with a pH of 7.0. Molecular assay revealed the causal organism as *Rhizopus stolonifer* with an accession number (PQ268796) obtained from NCBI Genbank. *In vitro* efficacy of botanical extracts determined that bulb extracts of garlic was most effective in inhibiting the pathogen growth (77.18 %) followed by rhizome extracts of turmeric (72.33 %). Amongst bioagents evaluated, the maximum inhibition (64.72 %) was recorded with *Trichoderma hamatum* followed by *T. harzianum* (61.29 %). *In vitro* studies of contact, systemic and combi product fungicides revealed that copper oxychloride (at 250, 500 and 1000 ppm), tebuconazole (at 100, 150 and 250 ppm) and mancozeb + carbendazim (at 150, 250 and 500 ppm) recorded the highest mycelial inhibition of the pathogen.

December,2024

(R. Ganesh Naik)
Major Advisor

4. STUDIES ON BLACK BANDED DISEASE OF MANGO INCITED BY *Peziotrichum corticolum* (MASSEE) SUBRAMANIAN

(SUNITA MANTOOR)

ABSTRACT

Mango (*Mangifera indica* L.) is described as the "King of fruits" known for its strong aroma, delicious taste and high nutritive value, is a prominent horticultural crop in India. This crop suffers from various diseases, among them black banded disease of mango caused by *Peziotrichum corticolum* is becoming severe in all the mango growing regions. The results of survey conducted during 2023-24 revealed that the maximum per cent disease incidence was recorded in Chikkamagaluru (27.38 %) district. On the contrary, lowest per cent disease incidence was recorded in Chitradurga (7.31 %). The identity of the fungus was confirmed as *Peziotrichum corticolum* by pathogenicity test and also based on spore and mycelial morphology. Cultural studies revealed that potato carrot agar and oat meal agar recorded the highest mean radial growth (90.00 mm). Morphological studies revealed that mycelia was septate, brown in colour measuring from 2.8-7.4 µm in width. Conidia were single celled, pale brown, globose, smooth-walled; 11.75-18.8 µm in diameter. Physiological studies revealed that the optimum temperature for the growth of *P. corticolum* was in between 20 to 25 °C and pH 6.0 to 6.5 was the optimum pH. Among various botanicals evaluated against *P. corticolum*, Turmeric rhizome extract (68.56 %) given highest mean mycelial inhibition. A dual culture technique with bioagents revealed that *Trichoderma harzianum* (50.74 %) showed maximum mycelial inhibition. *In vitro* evaluation of fungicides revealed that Mancozeb from dithiocarbamate group, Carbendazim from benzimidazole group and combi products *viz*., Mancozeb 63 % + Carbendazim 12 % WP and Tebunconazole 50 % + Trifloxystrobin 25 % WG were effective in inhibiting pathogen growth by 100 per cent. *In vivo* studies revealed that the highest per cent disease severity reduction over control was noticed in the treatment with Mancozeb 63 % + Carbendazim 12 % WP (65.19 %).

October,2024

(G. N. Hosagoudar)
Major Advisor

5. STUDIES ON FOLIAR DISEASES OF OIL PALM (*Elaeis guineensis* JACQ.)

(YASHWANTHA, P.)

ABSTRACT

Oil palm (*Elaeis guineensis* Jacq.) is an economically important crop belonging to the family Arecaceae which is mainly cultivated for oil production, synthesis of biofuels, lubricants and cosmetics *etc*. Area under oil palm is expanding in the recent years which has made the crop prone to several stresses. Among them, foliar diseases are creating havoc leading to decrease in the yield. An investigation was carried out on foliar diseases of oil palm with an aim to assess the severity of disease, characterizing the pathogens through cultural, morphological and molecular means and *in vitro* evaluation of botanicals, fungicides against foliar pathogens *Colletotrichum siamense* and *Neopestalotiopsis cubana* causing anthracnose and leaf spot disease, respectively. Among the districts surveyed, maximum per cent disease index (30.01 %) was recorded in Davanagere. Whereas, least PDI was recorded in Shivamogga (24.20 %). Cultural studies showed that V-8 juice agar medium (90.00 mm), oat meal agar (90.00 mm) supported maximum mycelial growth of *C. siamense* and *N. cubana*, respectively. Morphological studies indicated that, conidia of *C. siamense* were found to be cylindrical, dumbel, aseptate with rounded ends and *N. cubana* conidia were spindle or clavate, five celled with three central coloured cells and two hyaline cells. Further, molecular characterization of pathogen causing anthracnose and leaf spot disease through polymerase chain reaction (PCR) assay using ITS rDNA primer was confirmed as *Colletotrichum siamense* and *Neopestalotiopsis cubana* with 99.43 and 99.80 homology, respectively. *In vitro* evaluation of botanicals revealed that, highest mycelial inhibition of 43.99 and 59.01 per cent was recorded by *Curcuma longa* against both the pathogens. Among contact, systemic and combi fungicides, copper oxychloride (250 ppm), tebuconazole (150 ppm), carbendazim (100 ppm), propiconazole + difenoconazole (250 ppm) and carbendazim + mancozeb (250 ppm) recorded maximum mycelial inhibition of both the pathogens.

November,2024

(Suresha D. Ekabote)
Major Advisor

Soil

Science

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Agri.) theses abstracts produced in the Department of Soil Science

1. STATUS OF POTASSIUM IN SOIL UNDER DIFFERENT LAND USE SYSTEMS IN CHANNAGIRI TALUK OF DAVANGERE DISTRICT KARNATAKA.

(AKSHAY GOWDA)

ABSTRACT

An investigation was carried out at college of agriculture, Shivamogga during the year 2023-24 to study the status of potassium in soil under different land use systems in Channagiri taluk of Davangere district Karnataka. Total 150 Soil samples were collected from paddy, maize, sugarcane and areanut land use systems. The processed soil sample were analysed for soil physical and chemical properties and status of different forms of potassium in soil. The results revealed that the texture of the soil samples varied from sandy clay loam to clay, soil reaction was acidic to alkaline (5.53 to 8.41). The electrical conductivity (EC) was found normal (<1 dS m^{-1} at 25 ^{o}C). The soil organic carbon was varied from 2.4 to 14.3 g kg^{-1} in study area. Highest soil organic carbon was recorded in soils under arecanut plantations and concentration varied with soil depth. The soil available potassium status was low to high and it ranged from 105.43 to 592.38 kg ha^{-1} in soils under arecanut plantations, 86.53 to 524.9 kg ha^{-1} in paddy growing soil, 79.35 to 584.23 kg ha^{-1} under maize growing soil and 112.8 to 607.5 kg ha^{-1} under sugarcane land use system. Under various land use systems, the distribution of potassium fractions varied significantly. The concentrations of water-soluble, exchangeable, non-exchangeable (or fixed) and lattice potassium ranged from 3.85 to 24.13 mg kg^{-1}, 49.71 to 249.42 mg kg^{-1}, 117.09 to 276.66 mg kg^{-1}, and 2597.70 to 3998.00 mg kg^{-1} respectively. The potassium fixation capacity of the selected soils was positively and significantly correlated with soil clay content and cation exchange capacity.

November, 2024

(Sarvajna B. Salimath)
Major Advisor

2. CARBON AND POTASSIUM STATUS IN SOILS UNDER MECHANIZED HARVEST OF PADDY IN BHADRA COMMAND AREA

(KARTHIK, N.)

ABSTRACT

A study was carried out to know the carbon and potassium status in soils under mechanized harvest of paddy in Bhadra Command area during the year 2023-24 at College of Agriculture, KSNUAHS, Shivamogga. Under this investigation, 70 and 10 soil samples were collected from mechanized and manual harvested paddy fields, respectively in Davanagere and Channagiri taluks of Davanagere district. Soil samples were processed and analyzed for physical and chemical properties including carbon and potassium fractions. Soils had sandy clay loam, clay loam and clayey texture. Bulk density was lower in soils under mechanized harvest system with mean of 1.28 Mg m^{-3}. Soil reaction varied from slightly acidic to slightly alkaline and EC was normal in soils under both harvest systems. OC, available N, P_2O_5 and K_2O contents were recorded higher in soils under mechanized harvest system with mean of 8.41 g kg^{-1}, 350.73, 37.06 and 319.46 kg ha^{-1}, respectively. Exchangeable Ca and Mg were found to be lower in soils under mechanized harvest system with mean of 8.29 and 3.82 cmol (p^+) kg^{-1}, respectively. Available sulphur and micronutrients such as B, Fe, Mn, Cu and Zn contents recorded higher in soils under mechanized harvest system with mean of 12.42, 0.68, 30.29, 12.13, 2.62 and 1.30 mg kg^{-1}, respectively. Soil carbon fractions *viz.*, water soluble, active and total carbon contents in soils were recorded higher in soils under mechanized harvest system with mean of 48.33 mg kg^{-1}, 561.37 mg kg^{-1} and 17.19 g kg^{-1}, respectively. The distribution of K fractions were found in the order of lattice > non exchangeable > exchangeable > water soluble K in the soils. From the incubation study on decomposition, soils incorporated with paddy stubble and decomposer culture led to rapid decomposition and higher CO_2 evolution compared to soil + paddy stubble alone.

November, 2024

(G. N. Thippeshappa)
Major Advisor

3. STUDIES ON NITROGEN AND POTASSIUM FRACTIONS IN SOILS UNDER DIFFERENT LAND USE SYSTEMS OF KHAVASAPURA-I MICRO WATERSHED OF SHIKARIPURA TALUK, SHIVAMOGGA DISTRICT

(MADHAVI KOPPAD)

ABSTRACT

The present investigation was carried out to study the physicochemical properties, nitrogen and potassium fractions in different land use systems of Khavasapura-I Micro watershed of Shikaripura taluk, Shivamogga district. The geographical area of micro watershed is 902.93 ha which belongs to southern transition zone (Zone -7). 150 surface soil samples were collected at the depth of 0-30 cm from three land use systems *viz.*, arecanut, paddy and maize. 50 samples from each land use system were collected, the collected soil samples were analyzed for physicochemical properties, nitrogen and potassium fractions using standard methods. The results revealed that the texture of the soil samples varied from sandy loam to sandy clay loam, soil reaction was slightly acidic to alkaline in arecanut (6.32 - 8.84), paddy (6.04 - 7.98) and maize (5.49 - 8.24) land uses with normal electrical conductivity (< 1 dS m^{-1}). The soil organic carbon was 3.45 -15.82 g kg^{-1} in arecanut, 2.6 - 13.85 g kg^{-1} in paddy and 2.85 - 14.09 g kg^{-1} in maize land use system. The soil available potassium was 230.78 - 570.38 kg ha^{-1} in arecanut, 243.14 -537.10 kg ha^{-1} in paddy and 124.63 - 372.67 kg ha^{-1} in maize land use system. Soil available nitrogen was 182.8 - 440.12 kg ha^{-1} in arecanut, 193.28 - 408.02 kg ha^{-1} in paddy and 182.41 - 398.68 kg ha^{-1} in maize land use system. Higher trend of organic carbon, available nitrogen and potassium was found in arecanut land use system followed by paddy and maize land use system. Nitrogen and potassium fractions are found higher in arecanut followed by paddy and maize land use systems. Among the nitrogen fractions all the forms are significant and have positive correlation with each other, similarly potassium fractions also have significant and positive correlation with all other potassium fractions.

November, 2024

(Ganapathi)
Major Advisor

4. EFFECT OF SOURCES AND LEVELS OF SULPHUR APPLICATION ON PRODUCTIVITY AND QUALITY OF CHILLI (*Capsicum annuum*)

(MADHUSHREE, A.)

ABSTRACT

An experiment was conducted during the late summer of 2024 at AHRS, Bavikere, KSNUAHS, Shivamogga to study the "Effect of sources and levels of sulphur application on productivity and quality of chilli (*Capsicum annuum*)". The experiment was laid out in RCBD with ten treatments and replicated thrice. The treatments consisted two sources of sulphur *viz.*, gypsum and $MgSO_4$ applied at varied levels of 10, 20, 30 and 40 kg ha^{-1}. The results revealed that, among different sources and levels of sulphur, application of sulphur at 40 kg ha^{-1} through gypsum recorded significantly higher growth, yield and quality parameters such as plant height (76.75 cm), number of branches per plant (11.55), leaf area (4708.20 cm^2), dry matter (142.30 g $plant^{-1}$), green chilli yield (21.51t ha^{-1}), fruit length (10.88 cm), average fruit weight (6.23 g), number of fruits $plant^{-1}$ (147.30), quality parameters like capsaicin content (0.81%) and ascorbic acid content (173.70 mg $100g^{-1}$). At harvest, higher calcium concentration (0.59% and 0.29%), sulphur (0.21% and 0.33%) and higher uptake of calcium (10.80 kg $ha^{-1}$and 12.50 kg ha^{-1}), sulphur (7.66 kg ha^{-1} and 11.30 kg ha^{-1}) were recorded application of sulphur at 40 kg ha^{-1} through gypsum in plant and fruit respectively. Significantly higher magnesium concentration (0.15% and 0.21%) and uptake (4.70 kg ha^{-1} and 8.70 kg ha^{-1}) was found in treatment T_{10} with 40 kg S ha^{-1} applied through $MgSO_4$ in plant and fruit respectively. In soil after harvest of the crop there was significant higher exchangeable calcium (5.29 cmol (p^+) kg^{-1}) and available sulphur (17.59 mg kg^{-1}) were recorded in treatment T_6 (T_2 + 40 kg S ha^{-1} through Gypsum) and significantly higher magnesium (1.80 cmol (p^+) kg^{-1}) was recorded in the treatment T_{10} (T_2 + 40 kg S ha^{-1} through $MgSO_4$).

November, 2024

(B. C. Dhananjaya)
Major Advisor

5. CHARACTERIZATION OF POMEGRANATE (*Punica granatum* L.) GROWING SOILS OF CHALLAKERE TALUK, KARNATAKA

(MADIVALAPPA V. DALAWAI)

ABSTRACT

A study was conducted to characterize the soils under pomegranate orchards of Challakere taluk, Chitradurga district, Karnataka, during 2023-24. Soil samples were collected at two depths (0-20 and 20-40 cm) from different pomegranate growing orchards of Challakere taluk. The soil samples were analyzed for various soil parameters. The results revealed, pH ranged from 5.90 to 9.20 and 5.74 to 9.30 in surface (0-20 cm) and subsurface (20-40 cm) soils respectively. The electrical conductivity of soils varied from 0.45 to 3.50 dS m^{-1} and 0.41 to 2.80 dS m^{-1} in surface and subsurface samples respectively. Organic carbon was low to medium (1.50-7.20 g kg^{-1}) in surface and low in subsurface soil. In surface soil sand and clay content ranged from 41.80 to 86.30 and 6.10 to 39.10 per cent respectively, subsurface sand content varied from 40.00 to 85.70 and clay from 6.61 to 39.70 per cent. The bulk density of the soil increased with increase in depth of soil. The Available N (188.16 to 507.87 kg ha^{-1}) and P_2O_5 (2.80 to 34.33 kg ha^{-1}) were low to medium in surface samples and low to medium in status for subsurface. Available K_2O (94.75 to 618.51 kg ha^{-1} at 0-20 cm) ranged from low to high, in surface and subsurface soil. In subsurface, most samples were low in available N and P_2O_5. The soils were sufficient in exchangeable calcium and magnesium and deficient in available sulphur and boron. DTPA-extractable Fe, Mn, Zn and Cu were found to be sufficient in the majority of the surface and subsurface samples. In the correlation study nitrogen, phosphorus (r=0.221**), potassium and micronutrients were positively correlated with organic carbon. pH negatively correlated with P_2O_5, Fe, Mn, and Cu. Exchangeable calcium (r=0.152*) correlated positively with pH and clay. Sulphur positively correlated with organic carbon. Sand negatively correlated with micronutrients.

November, 2024

(Jayaprakash R.)
Major Advisor

6. STATUS OF ZINC AND BORON IN SOILS UNDER PADDY COVER OF UDUPI DISTRICT, KARNATAKA

(MANOJ, N.)

ABSTRACT

In order to know the dynamics of zinc and boron in soils under paddy cover of Udupi district, Karnataka a study was conducted during 2023-24 in the Department of Soil Science, College of Agriculture, Shivamogga, KSNUAHS, Shivamogga. 140 surface soil samples (0-15 cm) were collected and analysed for chemical properties, available zinc and boron status. Further, selected samples were used for fractionation and adsorption studies. The results indicated that soil pH, electrical conductivity and organic carbon ranged from 3.92 to 6.15, 0.06 to 0.89 dS m^{-1} at 25 °C and 1.12 to 23.44 g kg^{-1}, respectively. Available Zn and B status varied from 0.23 to 5.72 and 0.04 to 1.06 mg kg^{-1}, respectively with 20 and 92.14 per cent of the samples deficient in available Zn and B, respectively.The magnitude of distribution of zinc fractions in soils followed the order of carbonate bound < water-soluble < organic matter bound < easily reducible manganese bound < iron and aluminium oxide bound < sorbed < residual zinc. Similarly, boron fractions followed the order of readily soluble < specifically adsorbed < oxide bound < organically bound < residual boron in soils. Path coefficient analysis indicated that water soluble, sorbed and organically bound zinc fractions contributed majorly to available zinc pool while, readily soluble, specifically adsorbed and organically bound boron were the major contributors to available boron pool.Zinc adsorption increased from 18.11 to 950.55 µg g^{-1} with increase in zinc concentration from 5.0 to 220.0 µg ml^{-1} in the equilibrium solution. Similarly, boron adsorption varied from 8.76 to 181.50 µg g^{-1} with increase in boron concentration from 1.0 to 20.0 µg ml^{-1}. The adsorption data fitted well to Freundlich model but did not follow Langmuir model.

November, 2024

(H. M. Chidanandappa)
Major Advisor

7. EFFECT OF NANO-DAP ON NUTRIENT STATUS, UPTAKE, GROWTH AND YIELD OF PADDY (*Oryza sativa* L.)

(MEGHANA, V. C.)

ABSTRACT

A field experiment entitled "Effect of nano-DAP on nutrient status, uptake, growth and yield of paddy (*Oryza sativa* L.)" was conducted during *Kharif* 2023 at AHRS, Honnavile, Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga. The experiment was laid out in RCBD with ten treatments and replicated thrice. The treatments consist of no phosphorus (T_1), 50 % RDP (T_2), 75 % RDP (T_3), 100 % RDP (T_4), application of conventional DAP at 0, 50 and 75 per cent of recommended dose of phosphorus with nano-DAP at various combinations of methods and levels (2.5 ml and 5 ml nano-DAP per litre of water for seedling dip and 2 ml nano-DAP per litre of water for foliar spray at 25 DAT, respectively) (T_5-T_{10}). Among the treatments, application of 75 per cent RDP combined with nano-DAP as seedling dip at 5 ml L^{-1} and foliar spray at 2 ml L^{-1} at 25 DAT (T_{10}) treatment has recorded significantly higher plant height (79.42 cm) and number of tillers per hill (21.68), number of panicles per plant (25.48), number of grains per panicle (108.22), grain yield (46.88 q ha^{-1}), straw yield (57.59 q ha^{-1}), N, P, K, Ca, Mg and S uptake (131.52, 45.29, 107.43, 53.13, 23.10 and 21.24 kg ha^{-1}, respectively), Fe, Mn, Cu and Zn uptake (754.29, 327.15, 152.30 and 255.79 g ha^{-1}, respectively), available phosphorus (52.65 kg ha^{-1}), gross returns (₹ 1,02,398 ha^{-1}), net returns (₹ 61,506 ha^{-1}) and benefit-cost ratio (2.50), which was statistically on par with the T_9 and T_4. The grain yield increment achieved by T_{10} treatment was 5.20 per cent over package of practice. The significant enhancement can be attributed to high reactivity of nano particles resulting in targeted delivery which will boost nutrient absorption, enzymatic activity and photosynthesis leading to increased biomass and crop productivity.

November, 2024

(K. T. Gurumurthy)
Major Advisor

8. APPLICATION OF DIFFERENT SOURCES OF PHOSPHORUS AND THEIR INFLUENCE ON PHOSPHORUS UPTAKE BY SOYBEAN (*Glycine max* L.)

(PALLAVI, K.)

ABSTRACT

An experiment was conducted to evaluate the effect of different sources of phosphorus on soybean (JS-335 variety) yield and phosphorus uptake. The recommended dose of phosphorus (80 kg ha^{-1}) was applied at 2 levels (100 % and 50 %) through fertilizers alone (Without FYM; T_3 and T_4), fertilizers + FYM (POP; T_5 and T_6), P-enriched compost (P-EC; T_7 and T_8) and P-rich organic manure (PROM; T_9 and T_{10}). Recommended dose of nutrients 20 kg N ha^{-1} and 40 kg K_2O ha^{-1} fertilizers were applied to all the plots under T_3-T_{10} treatments. The recommended dose of organic manure @ 10 t ha^{-1} was applied through FYM to T_5-T_{10} treatments. Thus, 3 different sources of phosphorus namely, Fertilizer-P, P-Enriched compost (P-EC) and Phosphate rich organic manure (PROM) were applied at 100 and 50 per cent levels. Application of PROM and P-EC at both 100 and 50 per cent levels recorded significant positive effects on growth, yields, nutrient content and nutrient uptake. Soil chemical and biological properties also varied significantly. Among different P-sources, application of P-EC and PROM were found superior over all other treatments (T_1-T_6). The general recommended practice of POP (100 % fertilizer with FYM) and fertilizer alone recorded lesser growth, lower yields and nutrient uptake compared to P-EC and PROM treatments. The above variation was observed both at 100 and 50 per cent P levels. Among fertilizer with FYM treatments (T_5 to T_{10}), no significant differences were recorded in terms of soil chemical and biological properties. Application of half of RDP at 50 per cent through enriched compost (T_8) was found on par with T_5 (POP) treatment receiving both fertilizer and FYM at recommended level. The experimental results suggest that the use of P-enriched composts through P-EC and PROM appear to have better effect than existing practice of direct application through fertilizer and FYM.

November, 2024

(M. S. Nagaraja)
Major Advisor

9. NUTRIENT UPTAKE AND YIELD OF FINGER MILLET (*Eleusine coracana* L.) IN CENTRAL DRY ZONE OF KARNATAKA

(SHIVAKUMAR MENASINAKAI)

ABSTRACT

A field experiment was conducted during *Rabi*-2023 at farmer's field, Chillahalli, Hiriyur taluk, Chitradurga district, to evaluate the different approaches of fertilizer application on soil properties, nutrient uptake and yield of finger millet. In order to evaluate the various approaches of fertilizer recommendation, fertilizers were applied on the basis of package of practice (T_2), LMH (Low-Medium-High) approach (T_3), Farmer's practice (T_4), STCR approach based on actual soil test value (T_5-T_8) and STCR approach based on Dhartimitra app based value (T_9-T_{12}) and T_1 was used as absolute control. The experiment was laid out in RCBD design consisting of twelve treatments replicated thrice. Results indicated that significant higher grain yield (34.35 q ha^{-1}) and straw yield (71.33 q ha^{-1}), total uptake of N (213.92 kg ha^{-1}), P (27.10 kg ha^{-1}) and K (137.16 kg ha^{-1}), available N (211.72 kg ha^{-1}), P_2O_5 (72.96 kg ha^{-1}) and K_2O (179.10 kg ha^{-1}) in the post-harvest soil were recorded significantly higher in treatment T_8 receiving fertilizers as per STCR target yield of 35 q ha^{-1} using organic and inorganic sources based on actual soil test value. Agronomic nutrient use efficiency, apparent recovery efficiency and partial factor productivity of major nutrients were recorded significantly higher in STCR treatments compared to other approaches of fertilizer application. Treatment T_8 also recorded the highest yield response (1489 kg ha^{-1}) and showed the least fluctuation (1.96) below the targeted yield. While response yard stick was observed highest (4.18) in treatment T_{12} receiving fertilizers as per STCR target yield of 35 q ha^{-1} using organic and inorganic sources based on Dhartimitra app based value. Benefit cost ratio recorded significantly higher in treatment T_{11} (3.03) where fertilizers were applied for target yield of 35 q ha^{-1} using only inorganic sources based on Dhartimitra based value.

November, 2024

(Ravikumar D.)
Major Advisor

Horticulture

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

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

1. EFFECT OF PLANT GROWTH PROMOTING SUBSTANCES IN MICROPROPAGATION OF BANANA (*Musa paradisiaca* L.) cv. NEY POOVAN

(CHANDANA, M.)

ABSTRACT

Ney Poovan is the choicest diploid cultivar which is under commercial monoclonal cultivation on a large scale, especially in Karnataka. Less availability of *in vitro* propagated seedlings are due to inherent problems such as high degree of explant browning and poor multiplication rates. Therefore, an experiment was conducted to know the effect of plant growth promoting substances in micropropagation of banana (*Musa paradisiaca* L.) cv. Ney Poovan at Tissue Culture Laboratory, Biocentre, Department of Horticulture, Shivamogga during the year November 2023 - August 2024. The experiment was laid out in completely randomized design (CRD) with 25 treatments replicated thrice for development of shoots using BAP and kinetin with different concentration, for controlling browning Ascorbic acid and Polyvinylpyrrolidone (PVP) was used. For root development and hardening, the rooting hormones *viz*. IBA and IAA with different concentrations was laid on 16 treatments with 3 replications. The result showed that, early shoot initiation (8.13 days), maximum number of shoots per explant (5.02), highest length of the shoot (5.20 cm) with minimum browning and maximum survival percentage (73.33%) was seen in MS medium supplied with Ascorbic acid 200 mg/l + BAP 2.5 mg/l+ Kinetin 2.0 mg/l (T_{12}). While observing rooting and hardening parameters, the minimum days taken for root initiation (8.48 days), maximum number of roots per shoot (4.55) and highest root length (6.84 cm). Further, after secondary hardening, maximum height of the plantlets (16.17 cm), maximum girth of the plantlets (3.80 cm), maximum number of leaves (5.40), maximum leaf length (13.32 cm), maximum leaf breadth (5.04 cm) and maximum survival percentage (100 %) were recorded in MS media supplied with IAA 1.0 mg/l + IBA 1.5 mg/l (T_9). The least values for shooting and rooting parameters were recorded in control (T_1) without any growth promoting substances during the investigation.

November, 2024

(D. Thippesha)
(Major Advisor)

Horticulture

Floriculture and Landscaping

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Floriculture & Landscaping

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1. EFFECT OF FOLIAR APPLICATION OF ORGANIC FORMULATIONS ON GROWTH, YIELD AND QUALITY OF *Phalaenopsis* ORCHID UNDER HILL ZONE OF KARNATAKA

(CHANDANA, B. S.)

ABSTRACT

An experiment was conducted in the glass house of Zonal Agricultural and Horticultural Research Station, Mudigere during 2023-2024 to study the "Effect of foliar application of organic formulations on growth, yield and quality of *Phalaenopsis* orchid under hill zone of Karnataka". The experiment was laid out in Completely Randomized Design (CRD) witheleven treatments *viz*., T_1 (control), T_2 (Panchagavya @1%), T_3 (Panchagavya @2%), T_4 (Jeevamrutha @1%), T_5 (Jeevamrutha @2%),T_6 (Vermiwash @ 1%), T_7 (Vermiwash @ 2%), T_8 (Cow urine @ 1%), T_9 (Cow urine @2%), T_{10} (Tender coconut water @ 1%)and T_{11} (Tender coconut water @ 2%)and replicated thrice. The tissue cultured *Phalaenopsis* orchid plants were treated with foliar applications of organic formulations at different concentrations at 15 days interval. Among the treatments, foliar application of one per cent tender coconut water (T_{10}) recorded maximum plant height (24.87 cm), number of leaves per plant (5.94), leaf length (20.33cm), leaf breadth (6.57cm), leaf thickness (2.75mm), and leaf area per plant at 150 days (354.06 cm^2). Whereas,one per cent cow urine (T_8) recorded early spike initiation (135.33 days), early first floret opening (213.12 days), last floret opening (232.44 days), stalk length (38.18 cm), stalk girth (4.77 mm), bud diameter (10.44 mm), flower diameter (6.00 cm) number of florets per spike (13.56), weight of cut flower stem (19.18 g), number of spikes per plant (2.00), vase life (30.00 days), anthocyanin (1.63 mg/100g), total biomass (75.89 g) with the highest B:C ratio of 1.25 compare to control.As a cumulative effect, better vegetative parameters were observed in one per cent tender coconut water and one per cent cow urine showed good effect on flowering and quality parameters. Hence, both can be recommended for commercial cultivation of *Phalaenopsis* orchid.

December, 2024

(B. V. Champa)

Major Advisor

2. DIVERSITY OF *Habenaria* ORCHIDS AND ECOLOGICAL NICHE MODELLING OF *Habenaria roxburghii* NICOLSON. IN WESTERN GHATS OF CHIKKAMAGALURU

(MANDIRA, M.)

ABSTRACT

The study entitled "Diversity of *Habenaria* orchids and Ecological Niche Modelling of *Habenaria roxburghii* Nicolson. in Western Ghats of Chikkamagaluru" was conducted at the College of Horticulture, Mudigere during 2023-24. The Western Ghats, renowned for its biodiversity which harbour a diverse array of terrestrial orchids belonging to the genus *Habenaria*. Diversity analysis showed that *Habenaria heyneana* Lindl. had the highest frequency (0.66), followed by *Habenaria longicorniculata* J. Graham (0.41) and*Habenaria roxburghii* Nicolson had the lowest (0.04). Density was highest for *Habenaria heyneana* Lindl. (131.76), followed by *Habenaria longicorniculata* J. Graham (46.13) and lowest for *Habenaria roxburghii* Nicolson (1.65). Abundance was similarly highest for *Habenaria heyneana* Lindl. (141.3), followed by *Habenaria longicorniculata* J. Graham (45.09) and lowest for *Habenaria roxburghii* Nicolson (1.65).Diversity indices revealed that Byrapura had the highest Shannon (1.26) and Simpson (0.66) diversity, while Kalsapura and Sakrayapatna recorded the lowest (0.00) indicating low orchid diversity in these areas.Through diversity study, *Habenaria roxburghii* Nicolson was identified as the least abundant species, leading to employEcological Niche Modelling to understand its distribution and conservation strategies.Ecological niche modeling for *Habenaria roxburghii* Nicolson identified key climatic factors influencing its distribution, with the average contribution of the factors being: BIO19 (precipitation of the coldest quarter, 32.08%), BIO3 (isothermality, 28.56%), BIO12 (annual precipitation, 10.52%), BIO6 (minimum temperature of the coldest month, 7.90%) and BIO18 (precipitation of the warmest quarter, 6.66%). These factors shape the species ecological niche across its habitat. These factors shaped its ecological niche, mainly across the Western and Eastern Ghats and South-central India.This study highlights the importance of conserving these critical habitats to ensure the survival of *Habenaria roxburghii* and other *Habenaria* species, providing valuable insights for targeted conservation efforts in response to climate change.

December, 2024

(Nataraj, S. K)
Major Advisor

3. STUDIES ON INTEGRATED NUTRIENT MANAGEMENT FOR GROWTH, FLOWERING, YIELD AND QUALITY OF ALSTROEMERIA UNDER NATURALLY VENTILATED POLYHOUSE

(PAVITRA, S. HADAPAD)

ABSTRACT

The present investigation entitled,"Studies on integrated nutrient management for growth, flowering, yield and quality of alstroemeria under naturally ventilated polyhouse" was conducted at Down Ham Farm Kalhatty, Ooty, during the year 2023-2024 from Department of Floriculture and Landscaping, College of Horticulture, Mudigere. The experiment was laid out in Randomized Block Design (RBD) comprising of nine treatments *viz*., T_1[RDF (30:15:30 g/m^2)], T_2[RDF (30:15:30 g/m^2)+ *Azospirillum*], T_3 (75%N +100% PK +*Azospirillum*), T_4[RDF(30:15:30g/m^2) + PSB], T_5 (75% P + 100% NK + PSB), T_6 [RDF (30:15:30 g/m²) + KSB], T_7 (75% K+100% NP+ KSB), T_8 [RDF (30:15:30 g/m²)+ *Azospirillum*+ PSB+ KSB], T_9 (75% NPK + *Azospirillum*+ PSB+ KSB) with three replications.Results revealed that growth, flowering, yield and quality were significantly influenced by Integrated Nutrient Management (INM). The treatment T_9(75% NPK + *Azospirillum* + PSB + KSB)achieved the maximum plant height (90.18 cm), number of leaves per plant (369.20), vegetative shoots per clump (22.00)and reproductive shoots per clump (3.70), the maximum duration of flowering (68.47 days), bud length (4.42 cm), individualweight of cut flower (28.81 g), number of spikes per plant (9.07), per 1000 m^2 (36266.67) and rhizome yield (11.41 q/1000 m²) with the highest B:C ratio of 2.71. Hence, 75 per cent NPK with *Azospirillum*, PSB and KSB may be recommended for commercial cultivation of alstroemeria. Further it was also standardized the vase chemicals for extending the longevity of alstroemeria cut flowers. The treatment T_8(6% Sucrose + Citric acid 100ppm) exhibited the maximum water uptake (5.18 g), water loss (5.32 g), final fresh weight of flower (39.81 g) and vase life (9.00 days) compared to control (5.00 days). Hence, citric acid 100 ppm with 6 per cent sucrose may be recommended for extending the longevity of alstroemeria cut flowers.

October, 2024

(Hemla Naik, B)

Major Advisor

4. EFFECT OF PLANT GROWTH RETARDANTS ON GROWTH AND YIELD OF CUT CHRYSANTHEMUM (*Dendranthema grandiflora* TZVELVE.) UNDER PROTECTED CULTIVATION

(ROHITH)

ABSTRACT

An experiment entitled "Effect of growth retardants on growth and yieldof cut chrysanthemum (*Dendranthema grandiflora* Tzvelve.)"was conducted atDepartment of Floriculture and Landscaping, College of Horticulture,Mudigere during 2023-24 for two experiments.The experiment was laid out in Randomized Block Design using variety Arctic queen. The treatments taken wereT_1 -Maleic hydrazide @ 500 ppm,T_2 - Maleic hydrazide @ 1000 ppm,T_3 -Maleic hydrazide @ 1500 ppm, T_4 - Paclobutrazol @ 50 ppm, T_5 - Paclobutrazol @ 100 ppm, T_6 - Paclobutrazol @ 150ppm, T_7 - Daminozide @ 750 ppm, T_8 - Daminozide @ 1000 ppm, T_9 - Daminozide @ 1250 ppm, T_{10} - Cycocel@ 1500 ppm, T_{11}-Cycocel @ 3000 ppm, T_{12}-Cycocel@ 4500 ppm and T_{13}- controlin the first experiment.Themaximum plant height (120.47cm)was recorded in T_{13}. Whereas, maximum plant spread(391.40 cm^2), stem girth (5.50 mm),minimum days for bud initiation (53.00)and duration of flowering (10.00 days), maximum flower diameter (7.17 cm), maximum number of flowers per stalk (8.40)and B:C ratio (3.63)were found in T_9.In second experiment, among T_1-Maleic hydrazide at 1250 ppm, T_2-Maleic hydrazide at 1500 ppm, T_3-Maleic hydrazide at 1750 ppm, T_4-Daminozide at 1100 ppm, T_5-Daminozide at 1250 ppm, T_6-Daminozide at 1400 ppm,T_7-Control, T_7recorded maximum plant height(120.33 cm). Whereas, maximum stem girth (4.89 mm),plant spread (404.01cm^2),minimum days for bud initiation (43.66)and duration of flowering (10.34 days),maximum flower diameter (6.74 cm), number of flowers per stalk (7.30)and B:C ratio (2.89) was recorded in T_6. Hence T_6*i.e.*, Daminozide @ 1400 ppm may be recommended for commercial cultivation of cut chrysanthemum under protected cultivation.

October, 2024 (Hemanth Kumar, P.)

Major Advisor

5. VARIABILITY STUDIES OF *Alstroemeria aurea* L. FOR MORPHOLOGICAL, FLOWERING, YIELD AND QUALITY ATTRIBUTING CHARACTERS UNDER POLYHOUSE CONDITION

(VISMITHA, C. Y.)

ABSTRACT

An experiment entitled "Variability studies of *Alstroemeria aurea* L. for Morphological, Flowering, Yield and QualityAttributing Characters under Polyhouse Condition" was conducted at the College of Horticulture, Mudigere, 2023-24. The experiment consisted of 12 genotypes*viz.*, Capri, Piantum, Riana, Pluto, Pink Panther, Ooty Collection-1, Ooty Collection-2, Ooty Collection-3, Ooty Collection-4, Darjeeling Collection-1, Darjeeling Collection-2 and Darjeeling Collection-3, which were replicated thrice in a Randomized complete block design (RCBD). The results revealed that the genotype Pink Panther recorded maximum plant height (81.07 cm) and stalk length (88.20 cm), the genotype Ooty Collection -1 recorded maximum leaves per plant (380.93)and shoots per clump (26.05). The genotype Ooty Collection -3 showed maximumleaf width, leaf area and total chlorophyll content(2.84 cm,8407.28 cm^2/plantand 10.95 mg/g fresh weight, respectively),which took minimumdays for flower bud initiation (70.07). The genotype Capri took minimum days for first floret opening (11.20) and flower stalk harvesting (88.20). The maximum flower length (7.15 cm), flower diameter (54.92 mm), number of flowers/spike (12.03), stalk girth (8.05 mm), stalk weight (30.40 g), number of spikes/m^2 (20.80) and number of spikes/1000m^2 (20,280) were recorded in Ooty Collection-1. High heritability coupled with high genetic advance were observed for all the characters studied, except number of reproductive shoots per clump. Correlation and path analysisstudies revealed that number of leaves/plant, leaf width, leaf area, number of flowers/spike, flower diameter and stalk weight showed significant strong positive correlation and positive direct effect with number of spikes/m^2. The maximum B:C ratio was recorded in the genotype Ooty Collection -1 (2.98), followed by Ooty Collection -3 (2.62). Among the genotypes under study, the best performing in order of merit are Ooty Collection - 1, Ooty Collection -3, Capri and Pluto. Hence, these genotypes may be recommended for commercial cultivation under polyhouse condition.

October, 2024

(Chandrashekar, S. Y.)

Major Advisor

Fruit Science

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Hort.) theses abstracts produced in the Department of Fruit Science

1. STANDARDIZATION OF GERMINATION IN MACADAMIA NUT (*Macadamia integrifolia* M.)

(BHOOMIKA, S.)

ABSTRACT

Germination studies plays vital role in raising of rootstocks for multiplication. The seeds of macadamia possess both physical and physiological dormancy which hinders germination. No research was reported on impact of chemicals and organics on germination ofmacadamia nut in India. Hence, the study was initiated to know the effect of different pre-sowing seed treatments on germination and seedling attributes at Abbalagere in Shivamogga district during 2023-24. The experiment was laid out in Completely Randomized Design comprising of 14 treatments. Seeds were pre-soaked for 48 hours in water, Cow urine 5% and 10 %, GA_3 @ 500 ppm, 1000 ppm and 1500 ppm, DA-6 @ 300 ppm and 600 ppm, Atonik @ 300 ppm and 600 ppm, Nitric acid 1% and 2%, Thiourea 1% and 2%, which are replicated thrice. Results showed that germination and seedling growth were significantly influenced by the treatments. Early germination (23.20 days) and maximum germination (38.66 %) were recorded in Nitric acid 1% and Nitric acid 2%, respectively. The growth parameters like height of seedling (25.45 cm), number of branches per seedling (0.34), chlorophyll a (1.99 mg), chlorophyll b (0.64 mg), total chlorophyll (2.60 mg), C:N (50.63) and reducing sugars (4.53 %) was found maximum in seeds treated with GA_3 1000 ppm. The B:C was found highest (2.46:1) in GA_3 1000 ppm followed by GA_3 1500 ppm. It is concluded that GA_3 1000 ppm was found ideal with respect to germination parameters, seedling growth parameters, biochemical parameters and survival of seedlings, followed by GA_3 1500 ppm and Cow urine 5 % over control.

November, 2024

(Nagarajappa Adivappar.)
Major Advisor

2. EVALUATION OF JACKFRUIT (*Artocarpus heterophyllus* LAM.) ECOTYPES OF SAKHARAYAPATNA REGION

(CHANDINI, A. S.)

ABSTRACT

The present study entitled "Evaluation of Jackfruit (*Artocarpus heterophyllus* Lam.) Ecotypes of SakharayapatnaRegion" was conductedat Sakharayapatna region of Chikkamagalur district in Karnataka during the year 2023-24. All the ecotypes showed a wide variation for fruit, flake and seed characteristics. Analysis of variance revealed the significant difference among the ecotypes for all the characteristics studied and recorded higher ripe fruit size (20.29 kg), fruit length (49.93 cm), number of flakes per fruit (346.00), weight of flakes with seed (11.68 kg), weight of flakes without seed (6.91 kg) and seed weight (4.77 kg) in the ecotype SKPJ-56, while the ecotypes SKPJ-59 (9.50 cm) and SKPJ-41 (5.07 cm) recorded significantly higher flake length and flake width, respectively. Whereas, thicker flakewas observed in SKPJ-33 (0.59 cm). Bio-chemical analysis of the ecotypes revealed that SKPJ-20 had highest TSS (24.03 $^{\circ}$B), total sugars (35.13 %), reducing sugars (12.22 %) and non-reducing sugars (22.91 %). The ecotype SKPJ-33 was found to be highly suitable for table purpose with higher TSS to acid and Sugar toacid ratio. High level of genotypic coefficient of variation (GCV) and phenotypic coefficient of variation (PCV) were recorded for most of the traits studied, indicating a high level of variability within the ecotypes. All the characters have significant and positive correlation with the yield per tree except number of flakes per kg of fruit, flake width, flake to fruit ratio, TSS, titratable acidity and reducing sugars. Diversity studies revealed that the ecotypes weregrouped into six clusters. The fruit yield per tree contributed more towards total genetic divergence followed by seed weight and less contribution was noticed in TSS.The ecotype SKPJ-56 was found to be superior for fruit and yield parameters whereas, the ecotypes SKPJ-20, SKPJ-32, SKPJ-33 and SKPJ-52 were found best for bio-chemical parameters.

November, 2024

(Shivakumar, B. S)

Major Advisor

3. ASSESSMENT OF JACKFRUIT CULTIVARS FOR FRUIT AND SEED POWDER PREPARATION

(LEKSHMI, S.)

ABSTRACT

The study was carried out during the year 2023-24 at Department of Post-Harvest Technology, College of Horticulture, Mudigere to assess different jackfruit cultivars for fruit and seed powder preparation. The experiment was laid out in Completely RandomizedDesign comprising of seven treatments*viz.*, T_1 (Prakashchandra), T_2 (Tamaka Selection-1), T_3 (Tamaka Selection-2), T_4 (Shankara), T_5 (Vietnam Super Early), T_6 (Siddu), T_7 (Dangsuriya) and replicated thrice. Different jackfruit cultivars showed significant differences in the physico-chemical and sensory parameters of both fruitand seed powder. With respect to fruit powder, T_3 (Tamaka Selection-2)showed better results like bulk density (0.82g/ml), water holding capacity (147.37 %), sensory evaluation score (4.79), bio-chemical parameters like carbohydrate (83.26 %), protein (3.77 %) and calcium (62.20 mg/100g) with higher B:C ratio (2.32). T_4 (Shankara) recorded highest powder recovery (36.18 %) and colour value *a**(19.77), while T_5 (Vietnam Super Early) recorded minimum drying duration (6.83 hrs). With respect to seed powder, T_4(Shankara) showed better results for physical, functional and bio-chemical parameters like powder recovery (50.59 %), drying duration (5.33 hrs), bulk density (0.69 g/ml), water absorption capacity (230.40 %), oil absorption capacity (97.62 %), colour value *L** (77.63), carbohydrate (71.37 %), crude fibre (2.48 %), calcium (79.15 mg/100g) and potassium (502.27 mg/100g) with higher B:C ratio (2.88).During 180 days of storage under vaccum packaged conditions, T_3(Tamaka Selection-2) recorded minimum difference in most of the bio-chemical and sensory parameters of fruit powder and in case of seed powder, T_4(Shankara) obtained the minimum difference for the same. Based on the obtained results with respect to physico-chemical and sensory properties, for fruit powder preparation, the cultivar Tamaka selection-2 and for seed powder preparation, the cultivar Shankara can be considered best.

November, 2024

(Shivakumar, B. S)

Major Advisor

4. IMPACT OF HARVESTING STAGES AND BRINE CONCENTRATION FOR RETORT PACKAGING OF TENDER JACK (*Artocarpus heterophyllus* L.)

(SUHANA, R.)

ABSTRACT

The experiment was carried out during the year 2023-24 at College of Horticulture, Mudigere to optimize the harvesting stages and brine concentrations on physico-chemical and sensory properties of retort packed tender jack. The experiment was laid out in Factorial Completely Randomized Design with two factors *viz*., Harvesting stage at H_1(45 DAFS -Days After Fruit Set) and H_2 (60 DAFS) along with B- Brine concentration at five levels (B_1-2%, B_2-3%, B_3-4%, B_4- 5%, B_5- 6%). Among different treatment combinations H_2B_3 showed the better results with respect to physico-chemical parameters *viz*., texture (8.14 N), protein (2.75 %), carbohydrate (14.82 %), crude fibre (3.09 %), calcium(57.92 mg $100g^{-1}$) and potassium (227.62 mg $100g^{-1}$), total phenol content (34.38 GAE $100g^{-1}$)and the highvalues for degree of lightness(*L**) 75.17. The highest sensory score for appearance (4.86), texture (4.65), color (4.88) and overall acceptability (4.58) was found in H_2B_3 and also with optimum B:C ratio (1.79:1) The treatment combinations also recorded the minimum decreasing trend during initial to 180 days of storage with respect to changes in physico-chemical parameters *viz*., texture (8.14 N to 7.96 N), degree of lightness (75.17 to 73.81 *L**), pH (4.39 to 4.53), protein (2.75 to 2.69 %), carbohydrate (14.82 to 14.56 %) calcium (57.92 to 51.12 mg $100g^{-1}$) potassium (227.62 to 221.77 mg $100g^{-1}$) and overall acceptability score ranging from (4.58 to 4.03).The results obtained with respect to physico-chemical, sensory properties storability and B:C ratio, was observed in the tender jack harvested at 60 days after fruit set with brine concentration ranges 3.76 to 4.02 per cent was suitable for retort packing of tender jack.

November, 2024

(Kantharaj, Y)
Major Advisor

5. INFLUENCE OF ORGANIC MANURES AND PGPRS ON YIELD AND QUALITY ATTRIBUTES OF POMEGRANATE CV. BHAGWA.

(SUSHMITHA, T.)

ABSTRACT

A field experiment was carried out in farmer's field in Challakere (Chitradurga district) during the year 2023-2024 On 'Influence of Organic Manures and PGPRs on Yield and Quality Attributes of Pomegranate cv. Bhagwa' under central dry zone of Karnataka. Pomegranate is an important fruit crop grown in the dry regions of India. The excessive use of these fertilizers and chemicals leads to the degradation of soil health and its nutritional status. The quest to enhance pomegranate yield and quality while maintaining soil health has prompted the exploration of innovative agricultural practices. The experiment was laid out in Randomized Block Design, comprising nine treatments *viz.*, T_1- Control, T_2- FYM, T_3- Poultry manure, T_4- Vermicompost, T_5- Composted coir pith, T_6- FYM+PGPRs, T_7- Poultry manure + PGPRs, T_8- Vermicompost + PGPRs, and T_9- Composted coir pith + PGPRs with three replications, applied after first irrigation. Among the treatments, T_8- Vermicompost + PGPRs recorded significant differences for the fruit yield and quality parameters *viz.*, maximum Fruit Weight (375.24g), Fruit Length (8.65 cm), Fruit Diameter (8.97 cm), Rind Thickness (2.71 mm), Rind Weight (102.80 g), Aril Weight per Fruit (272.73 g), and Marketable Fruits (88.18 %). Meanwhile, T_8 also recorded maximum Fruit colourL^*(31.10), a^* (50.24), b^* (22.72) coordinates representing Lightness (L^*), Redness (a^*) andYellowness (b^*) respectively, total sugars (13.78 %), TSS (15.91 ºBrix) and Shelf life (28.25 days). Hence T_8-Vermicompost + PGPRs proved to be promising in enhancing the yield and quality of pomegranate.

December, 2024

(Sridhar, R.)

Major Advisor

Plantation, Spices, Medicinal and Aromatic Crops

Keladi Shivappa Nayaka 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 FOLIAR APPLICATION OF GROWTH STIMULANTS AND MICRONUTRIENTS ON GROWTH, YIELD ANDQUALITY OF MANDUKAPARNI (*Centella asiatica* L.)

(ARYA SIVADAS)

ABSTRACT

A field experiment was conducted at College of Horticulture, Mudigere duringsummer 2023-24to study the effect of foliar application of growth stimulants and micronutrients on growth, herbage yield and triterpenoid content of mandukaparni.The experiment was laid out in Randomized Complete Block Design with twelve treatments and three replications. Among different treatments studied, the treatment T_{10}: Potassium humate @ 1% + $ZnSO_4$ @ 0.1% + $FeSO_4$ @ 0.1% as foliar spray recorded highest growth parameters such stolon length (141.77 cm), number of nodes per stolon (17.13), internodal length (16.75 cm), rosette length (22.83 cm), rosette diameter (16.76 cm), petiole length (18.73 cm), number of leaves per rosette (8.73), leaf length (3.90 cm), leaf width (7.24 cm), leaf area (26.80 cm^2)and total chlorophyll content (4.10 mg/g).The treatment T_{10} recorded highest fresh(1338.67g/m^2 and 13.39 t/ha) and dry herbage (277.3g/m^2 and 2.77 t/ha)yield.The treatment T_{10}also recorded the highest total triterpenoid yield (77.43kg/ha). Whereas, least was recorded in the treatmentT_{12}: Control (14.41kg/ha).The plant nutrient analysis of *Centella* revealed that treatment T_{10}showed a higher iron (85.69 mg/100g) and zinc (77.08 mg/100g).Among the various treatments studied,the lower values of available N (227 kg/ha), P (14.00 kg/ha), K (85.33 kg/ha), Fe (10.08 mg/kg) and Zn (0.38 mg/kg) in the soil after harvest were recorded in T_{10}. While, highestavailable NPK (230.00, 26.00 and 116.00 kg/ha, respectively), Fe (23.15 mg/kg) and Zn (0.90 mg/kg) were recorded in T_{12} (control).The economics analysis indicated that treatment T_{10}had a higher net return (₹ 3,17,706 ha^{-1}) with B:C ratio of 2.53:1. Hence, it can be concluded that, T_{10}: Potassium humate @ 1% + $ZnSO_4$ @ 0.1% + $FeSO_4$ @ 0.1%proved to be promising treatment to enhance the overall growth, herbage and total triterpenoid yield.

November, 2024

(Ravi, C. S)
Major Advisor

2. MORPHOLOGICAL CHARACTERIZATION AND GENETIC DIVERSITY STUDIES IN NUTMEG ECOTYPES

(RAJATH GOWDA, K. S.)

ABSTRACT

Nutmeg (*Myristica fragrans* Houtt.) is an introduced crop to India. Assessment of the existing variability is a prerequisite fortaking up successfulcrop improvement programmes, which is very much limited in this tree spice. In this context, the present study entitled "Morphological characterization and genetic diversity studies in nutmeg ecotypes" was taken up at College of Horticulture, Mudigere during the year 2023-2024.A field survey was conducted in the nutmeg growing tracts of Chikkamagaluru district of Karnataka withthe objective of studying the genetic variability in nutmeg accessions based on morphological, yield and biochemical parameters, to scale the variability in a multidimensional way and to identify elite nutmeg accessions for yield and quality.Significant differences were noted among the accessions for the traits under study.Acc. 26 recorded maximum plant height (12.43m) whereas, maximum canopy spread was noted in Acc. 10(32.47m^2). Significantly higher number of fruits per tree (602), higher fruit weight (87.10g), fresh weight of nut (19.12g), dry weight of nut (8.41g), dry weight of kernel (6.26g) and dry kernel yield per tree (3761.96g)were also observed in Acc. 10.Acc. 05 recorded maximum fresh (2335 mg) and dry weight (1208mg) and higher mace yield per tree (361.79mg). Acc. 05 also resulted in higher oleoresin and volatile oil content in both mace and kernel. The higher GCV and PCV coupled with higher heritability and the genetic advance was observed for most of the economic traits indicating that these characters are highly heritable and likely to provide high selection response. Correlation and path coefficient studies revealed that the dry kernel yield per tree had a positive and highly significant correlation with kernel dry weight, fresh and dry nut weight, no. of fruits per tree, mace yield per tree and fruit weightat both genotypic and phenotypic levels.

December, 2024

(Bhoomika, H. R)
Major Advisor

3. ENHANCEMENT OF FLOWERING, FRUIT SET AND NUT YIELD OF CASHEW (*Anacardium occidentale* L.) BY FOLIAR APPLICATION OF NUTRIENTS AT COASTAL ZONE OF KARNATAKA

(RANJAN, D. N.)

ABSTRACT

A field experiment on "Enhancement of flowering, fruit set and nut yield of Cashew (*Anacardium occidentale* L.) by foliar application of nutrients at coastal zone of Karnataka" was carried out during 2023-24 at KrishiVigyan Kendra, Brahmavara, Udupi. The experiment was laid out in Randomized Complete Block Design comprising of nine treatments, each replicated thrice. Results revealed that trees treated with RDF + Nano urea @ 4ml/L + Borax @ 0.1 % + $ZnSO_4$ @ 0.2 % (T_9) recorded maximum number of new shoot(21.22/m^2),new shoot length (33.68 cm), number of lateral shoots (3.67), number of new leaves/shoot (14.78), leaf length (14.82 cm), leaf width (8.34 cm), leaf area/leaf (95.54 cm^2), chlorophyll a (1.74 mg/g), chlorophyll b (0.97 mg/g) and total chlorophyll (2.46 mg/g), number of flowering panicles/m^2 (23.67), total number of staminate flowers/panicle (237.44),total number of perfect flowers/panicle (86.78), sex ratio (0.37), panicle length (27.94 cm), panicle width (28.50 cm),fruit set (9.64 %), number of nuts per panicle (8.33), length of apple (48.79 mm), girth of apple (43.96 mm),apple weight (82.00 g), nut length (32.93 mm), nut width (23.99 mm), nut weight (8.83 g),nut yield per tree (3.90 kg), nut yield per ha (682.69 kg), shelling percentage (29.64), kernel length (24.83 mm), kernel width (15.88 mm),kernel weight (2.62 g) and minimum flowering duration (109.22), number of nuts per kg (125.56), number of kernels per pound (197.67) and kernel grade WW-180. The economic analysis revealed that foliar application of RDF + Nano urea @ 4ml/L + Borax @ 0.1 % + $ZnSO_4$ @ 0.2 % (T_9) yielded the highest B:C ratio of 1.36, indicating maximum returns. Whereas minimum was recorded in (T_1) control.

November, 2024

(Raviraj Shetty, G.)
Major Advisor

4. STUDIES ON ORGANIC MULCHES AND SEQUENTIAL APPLICATION OF HERBICIDES ON GROWTH, YIELD AND QUALITY OF MANDUKAPARNI (*Centella asiatica* L.)

(SUSHMA, N.)

ABSTRACT

An experiment was carried out at College of Horticulture, Mudigere, during summer 2023-24 to evaluate the effectiveness of organic mulches and sequential application of herbicides in managing weeds and enhancing the growth, yield and quality of mandukaparni (*Centella asiatica* L.).Among the organic mulches evaluated, the treatment T_4(Areca husk)recorded the lowest counts of grassy(3.00/m²), sedges (5.33/m²)and broadleaved weeds (57.33/m²) resulting in lowest weed density (65.67/m²), fresh (44.00 g/m²) and dry weight (5.43 g/m²) of weedsand greater weed control efficiency (91.33 %) at 75 days after transplanting along with better weed index (6.78 %). Among the organic mulches studied, the treatment T_4 (Areca husk) recorded highest in all the growth parameters. The highest fresh (1232.67 g/m² and 12.33 t/ha) and dry herbage yield(223.44 g/m² and 2.23 t/ha)and total triterpenoids yield (77.91 kg/ha) was also noted in the treatment T_4, whilethe lowest fresh (498 g/m² and 4.98 t/ha) and dry herbage yield (76.00 g/m² and 0.76 t/ha)and total triterpenoids yield was recorded in T_7(Weedycheck). The sequential application of preand early postemergent herbicides indicated that the treatmentT_6 (Oxyfluorfen 23.5% EC @ 1 ml/l*fb* one hand weeding @ 45 DAT) effectively controlled grassy weeds and sedges,whilebroadleaved weeds (23.00/m²)were also found minimum with least weed density (23.00/m^2), weed index (12.22 %) and highest weed control efficiency (97.90%).At harvest, the treatment T_6also recorded highest in all the growth parameters studied. The highest fresh (1146.67 g/m² and 11.47 t/ha) and dry herbage yield (207.78 g/m² and 2.08 t/ha) with maximum total terpenoid yield (47.76 kg/ha) was also recorded in T_6. In all the herbicide treated plant samples, only the traces of herbicides were found and the residues were detected below the threshold limits.

November, 2024

(Ravi, C. S)
Major Advisor

5. EFFECT OF PRE-TREATMENTS AND DRYING METHODS ON QUALITY OF DRY GINGER

(VARSHINI, N. V.)

ABSTRACT

The present experiment was conducted at the Department of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture, Mudigere during 2023-2024. The statistical design adopted was Factorial Completely Randomized Design. Among different treatments drying time varied significantly and minimum drying time (60 hours) was noticed in treatment T_8 (Blanching @ 80°C for 2 min and dried in tray drying) while, maximum drying time (238 hours) was observed in treatment T_4 (KMS @ 0.2 per cent for 2 minutes and dried under sun). Among different treatments T_3(Lime @ 2 % for 6 hours and dried in solar tunnel dryer) recorded maximum essential oil (1.75 %), oleoresin content (4.53 %), crude fibre (7 %), starch (58.72 %) and dry recovery (28.23 %).Antioxidant activity of the ginger powder was also recorded which ranged from 57.47 per cent in T_{10} (Control and dried under Sun) to 84.96 per cent in T_3. Colour values of the dried rhizomes was measured using colourimeter for Lightness (L^*), Redness (a^*) and Yellowness (b^*). Best colour values were recorded in T_6-KMS @ 0.2 per cent for 2 minutes and dried in solar tunnel dryer (L^*-68.2, a^*-1.7, b^*-19.5). With respect to storage studies T_3 (Lime @ 2 % for 6 hours and solar tunnel drying + gunny bag with polyethylene lining) retained maximum oil (1.52 %), oleoresin (3.55 %), starch (57.50 %), crude fibre (6.89 %) and also recorded minimum moisture (12.5 %) and microbial load (3.55×10^4 CFU) after 180 days after storage. Pretreating the rhizomes with lime @ 2 per cent for 6 hours followed by solar tunnel drying recorded best results with respect to physicochemical parameters of rhizomes and gunny bag with polyethylene lining found to be the best packaging material for storing the dry rhizomes which maintained better physicochemical properties till 180 DAS.

Vegetable Science

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Vegetable Science

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1. ASSESSMENT OF GENETIC VARIABILITY FOR YIELD AND YIELD ATTRIBUTES IN F_4 SEGREGATING POPULATION OF TOMATO (*Solanum lycopersicum* L.) UNDER PROTECTED CONDITION

(PRAJWAL, P.)

ABSTRACT

The study under protected condition was conducted to assess the extent of genetic variability, correlation and path coefficient analysis between yield and yield attributes in F_4 segregating population of the two tomato crosses *viz*., EC15127 × EC362941 and EC521069 × EC362941. The experiment was carried out during 2023-24 at the College of Horticulture, Mudigere. Analysis of variance showed highly significant differences among different traits. High PCV and GCV were registered for number of fruits per cluster, number of fruits per plant, fruit yield per plant and locules per fruit among the progenies of both the crosses. Estimates of high heritability coupled with high genetic advance as per cent over mean recorded for most of the studied characters which supports the notion that selection could actually improve these traits by highlighting the significance of additive gene action. Correlation study revealed that fruit yield per plant had highly significant positive correlation with number of fruits per plant, average fruit weight, fruit volume and fruit length in both the studied crosses. Path coefficient analysis for fruit yield per plant showed that number of fruits per plant, average fruit weight and fruit volume had positive direct effect in both the crosses suggesting the possibility of increasing fruit yield per plant by selecting these traits directly. The superior segregants identified with respect to fruit yield per plant in the cross EC15127 × EC362941 were F_4 - 170(100)- 2.67kg, F_4 -103(192)- 2.35kg and F_4 -125(187)- 2.32kg. Whereas, in the cross EC521069 × EC362941, F_4-100(02)- 2.68kg, F_4 -26(28)- 2.50kg and F_4-114(140)- 2.45kg were identified as superior segregants, which could be developed into pure lines by selfing and selection or released as variety after stabilization.

October, 2024

(Srinivasa, V.)
Major Advisor

2. ASSESSMENT OF BREEDING POTENTIAL OF MUSKMELON (*Cucumis melo* L.) GENOTYPES

(POOJA, C. B.)

ABSTRACT

An investigation on genetic variability studies in muskmelon was carried out in the experimental block of Department of Vegetable Science, College of Horticulture, Mudigere during 2023-24. The experiment was laid out in Randomized Complete Block Design with three replication, Analysis of variance revealed highly significant differences among the genotypes for all the characters under the study. High heritability coupled with high genetic advance as per cent over mean was recorded for vine length at 30 and 60 days after sowing (DAS), number of nodes per vine at 60 DAS, node at first female flower appears, days to first female flower appears, days to fifty per cent flowering, male to female ratio, total number of fruits per vine, fruit length, polar diameter of fruit, average fruit weight, fruit yield per vine, fruit yield per plot, fruit yield per hectare, flesh thickness, rind thickness, TSS, β- carotene and titratable acidity content indicating the prevalence of additive gene action for these traits. Thus, there is ample scope for improving these traits through direct selection. Correlation studies showed that fruit yield per vine exhibited positive and highly significant genotypic and phenotypic association with vine length, number of nodes per vine, internode length and average fruit weight. Path analysis revealed that highest positive direct effect on fruit yield per vine was shown by average fruit weight and polar diameter of fruit. Based on Mahalanobis D^2 analysis, 21 genotypes of muskmelon were grouped into five clusters. Among the trait studied average fruit weight (41.43 %) followed by fruit length (21.43 %) contributed maximum to the total genetic diversity. In this study promising genotypes *viz.*, Honnali Local, Kashi Madhu, RM-43 followed by Arka Jeet have been identified for higher yield, which can be utilized for further crop improvement programme.

November, 2024

(Devaraju)
Major Advisor

3. EVALUATION OF OKRA (*Abelmoschus esculentus* L.) GENOTYPES FOR GROWTH, YIELD AND QUALITY ATTRIBUTES UNDER HILL ZONE OF KARNATAKA

(MANJUNATHA, M.)

ABSTRACT

A study was undertaken for the evaluation of 21 okra genotypes in the experimental block of the Department of Vegetable Science, College of Horticulture, Mudigere, Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga during 2023-24. The experiment was laid out in a Randomized Complete Block Design with three replications. Analysis of variance showed highly significant differences among all the genotypes for all the characters studied. The high estimates of heritability coupled with high genetic advance as per cent over mean were noticed for the traits such as plant height, number of leaves, number of nodes, stem girth at 30, 60 and 90 DAS, inter nodal length at 30 and 90 DAS, fruit length, fruit girth, average fruit weight, number of fruits per plant, fruit yield per plant, fruit yield per plot, fruit yield per hectare, chlorophyll a, total chlorophyll, shelf life, number of ridges on fruit surface and crude fibre, which indicates that these characters are under the influence of additive gene effect which can be improved through selection. Correlation studies exhibited that fruit yield per plant recorded highly significant and positive association with plant height, number of leaves, number of nodes at 60 and 90 DAS, internodal length at 60 DAS, average fruit weight, number of fruits per plant and fruit length. Path analysis revealed that number of nodes and number of leaves at 60 and 90 DAS, inter nodal length at 90 DAS, average fruit weight, number of fruits per plant and fruit length had a direct and positive effect on fruit yield per plant. Based on the mean performance, genotypes such as Halu bhendi, Sirsi local-01 and Siddapura local-02 have been identified as promising for higher yield, which can be utilized for the further crop improvement programme under the hill zone of Karnataka.

November, 2024

(P. Umamaheswarappa.)
Major Advisor

4. EFFECT OF WATER-SOLUBLE FERTILIZERS AND BIO STIMULANTS ON GROWTH, YIELD AND QUALITY OF POLE BEAN (*Phaseolus vulgaris* L.) UNDER PROTECTED CONDITION.

(KAVYA. K. A.)

ABSTRACT

An experiment was conducted to study the "Effect of water-soluble fertilizers and bio stimulants on growth, yield and quality of pole bean (*Phaseolus vulgaris* L.) under protected condition" at department of vegetable science, College of Horticulture, Mudigere during the year 2023-24. The study was laid out in Randomized Complete Block Design with twelve treatments and three replications. The treatments comprised of water soluble fertilizers (*viz*., 1 % 19:19:19, 0.5 % monoammonium phosphate and 0.5% potassium nitrate) and bio stimulants (*viz*., 0.5 % humic acid, 0.5 % sea weed extract and 3 % panchagavya) along with RDF. Among different treatment combinations, foliar application of monoammonium phosphate and potassium nitrate each @ 0.5 per cent with 0.5 per cent humic acid, 0.5 per cent seaweed extract and 3 per cent panchagavya along with RDF (T_{12}) recorded significantly maximum plant height (580.00 cm), number of primary branches (7.20), secondary branches (8.53), number of leaves (154.00), leaf area per plant (5807.01 cm^2), leaf area index (2.15) at 75 DAS, total dry matter production (55.79 g) at 60 DAS, protein (21.14%) in seeds, crude fibre content (15.92%), total chlorophyll content in leaves (2.57 mg/g), chlorophyll content in pods (1.85 mg/g) and minimum days to flower bud initiation (35.00 days) and days to 50 per cent flowering (41.07 days). Same treatment also recorded significantly higher NPK content in leaves, maximum number of pods (55.28), pod length (19.84 cm), pod girth (2.37 cm), pod weight (14.96 g), pod yield per plant (621.74 g) and pod yield per $1000m^2$ (2.30 t) over control. Higher gross return (₹ 1,15,138), net returns (₹ 84,382) and B: C ratio (3.74) registered with foliar application of T_{12} (MAP @ 0.5% + KNO_3 @ 0.5% + Humic acid 0.5% + Sea weed extract 0.5% + Panchagavya 3%) along with RDF.

November, 2024

(Srinivasa, V.)
Major Advisor

5. GENETIC STUDIES OF OKRA [*Abelmoschus esculentus* (L.) MONECH] F_4 POPULATION FOR YIELD AND YIELD RELATED TRAITS.

(CHARAN, K.)

ABSTRACT

The present investigation was carried out to understand the extent of genetic variability, correlation and path coefficient analysis between yield and its traits in F_4 segregating populations of the three bi-parental crosses *viz.*, IIHR-875 × IIHR-478, IIHR-478 × IIHR-567 and IIHR-604 × IIHR-347 at ZAHRS, Babbur Farm, Hiriyur during 2023 – 24. In the bi-parental cross IIHR-875 × IIHR-478 has shown high GCV and PCV values for the character first fruit producing node. While, in the bi-parental cross IIHR-604 × IIHR-347 recorded high magnitude of GCV and PCV values for the traits like plant height and total yield plant per plant. Magnitude of high heritability coupled with high GAM were recorded for the traits like inter nodal length, first fruit producing node, fruit length, fruit diameter and total yield plant per plant in the bi-parental cross IIHR-875 × IIHR-478. While in the bi-parental cross IIHR-478 × IIHR-567 high heritability coupled with high GAM was recorded for the character first fruit producing node. In F_4 population, total yield plant per plant was positively and highly significant association with plant height, number of fruits per plant and average fruit weight in all the three bi-parental crosses. Plant height, number of fruits per plant and average fruit weight manifested maximum positive direct effect on total yield plant in all the three bi-parental crosses of F_4 population and thus direct selection of these traits would reward for improvement of yield. More number of best transgressive segregants with respect to total yield plant per plant were in IIHR-875 × IIHR-478 than the other bi-parental crosses studied. The bi-parental cross IIHR-478 × IIHR-567 has shown higher level of chlorophyll content (2.28 mg/g) and crude fiber (1.11 g/100g) than the other bi-parental crosses studied.

November, 2024

(Prakash Kerure)
Major Advisor

6. EFFECT OF NANO DAP AND UREA ON GROWTH, YIELD AND QUALITY OF CHILLI (*Capsicum annuum* L.)

(RAJESHWARI NEERUGGI)

ABSTRACT

Field experiment was conducted at College of Horticulture, Mudigere during the year 2022-23 to investigate effect of Nano DAP and urea on growth, yield and quality of chilli (*Capsicum annuum* L.). The study consists of ten treatments with three replications laid out in Randomized Complete Block Design (RCBD). Treatments include Nano DAP and Urea each of 2, 4 and 6 ml concentration with 50, 75 and 100 per cent RNP- (recommended dose of Nitrogen and phosphorus) Results showed that, treatment consisting of 6 ml each of Nano DAP and Urea + 100% RNP significantly recorded maximum plant height (74.48 cm), number of leaves per plant (315.60), internodal length (8.02 cm), number of primary branches per plant (15.12), leaf area per plant (8673 m^2), leaf area index (3.212), total chlorophyll content (2.25 mg/g) and ascorbic acid content (135.07 mg/100 g). The lowest physiological loss in weight (2.21 , 4.17 and 10.12 %), rotting per cent (1.73 , 3.45 and 7.34%,) at 8, 13 and 16 Days after storage was recorded, the maximum days of storage life (18.23 days) was also noticed in the same treatment and the treatment consisting of 6 ml each of Nano DAP and Urea + 75% RNP, recorded maximum number of fruits per plant (265.29)**,** average fruit weight (7.27 g), fruit yield per plant (739.16 g), fruit yield per plot (18.87 kg), fruit yield per ha (27.70 tonnes) compared to control. Finally, it can be inferred that among the treatments, treatments consisting of 6 ml each of Nano DAP and Urea + 100% RNP showed the better growth, quality and post harvest parameters and the treatment consisting of 6 ml each of Nano DAP and Urea + 75% RNP showed the better yield parameters compared to control. Hence, this can be recommended for commercial cultivation of chilli.

January, 2024

(Devaraju)
Major Advisor

Forestry

Silviculture and Agroforestry

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

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

1. RESPONSE AND ADAPTATION STRATEGIES OF IMPORTANT BAMBOO SPECIES TO DROUGHT AND SALINITY STRESSES UNDER NURSERY CONDITIONS

(ARYA, R.)

ABSTRACT

The interaction between drought and salinity was studied in three bamboo species*viz*., *Bambusa tulda*, *Dendrocalamus brandisii*, and *Thyrsostachys oliveri* at College of Forestry, Ponnampet. Rhizome cuttings were individually cultivated for four months under three salinity levels that comprised soil EC of 0.36, 8.7 and 17.68 dS m^{-1}. The irrigation levels were maintained at 80-85% and15-20% of maximum field water holding capacity. The study assessed their survival rates, growth performance, root traits, and biomass allocation under stress conditions. *T.oliveri* exhibited highest survival (81.17%) and least reduction in growth, indicating superior stress tolerance. *B. tulda* showed moderate stressresilience, with some decline in growth and biomass, while *D. brandisii*was highly sensitive, displaying significant reductions in both survival (35.80%) and growth parameters. Root traits, particularly root length and diameter, played a crucial role in water uptake efficiency, with *T. oliveri* showing the most favorable response. Physiologicalanalyses revealed species-specific responses, with *B. tulda* having highest photosynthetic rates (7.34µmol CO_2 $m^{-2}s^{-1}$), stomatal conductance (66.94mmol H_2O $m^{-2}s^{-1}$), and relative water content (68.62%), indicating a robust antioxidative and water conservation strategy. In contrast, *D. brandisii* had lowest RWC (61.27%), photosynthetic rates (5.75 µmol $CO_2m^{-2}s^{-1}$), and ion regulation capacity, suggesting limited adaptability to stress. Anatomical responses further emphasized the differences in species resilience, with *T.oliveri* exhibiting structural advantages, such as long, thin fibers (962.02 µm) for mechanical strength, while *D.brandisii* showed increased fiber wall thickness under stress (DBS3WS,3.71µm). The study concludes that *T.oliveri* is most resilient to drought and salinity, *B. tulda* demonstrates moderate tolerance, and *D. brandisii* is highly sensitive. These findings provide the foundation for future research on adaptive mechanisms and potential breeding for enhanced stress tolerance in bamboo species.

November,2024

(Ramakrishna Hegde)
Major Advisor

2. EFFECT OF ORGANIC FORMULATIONS ON GERMINATION AND GROWTH OF 3. *Swietenia macrophylla* KING.

(RAHUL, H. K.)

ABSTRACT

Organic formulations offer a promising alternative to chemical fertilizers in enhancing the growth and development of tropical timber species. In the present study effect of organic formulations on the germination and growth of *Swietenia macrophylla* King. was investigated to assess the potential of organic inputs in enhancing early growth and development of this species. This study evaluated the influence of Beejamrutha, Jeevamrutha and Panchagavya on germination, seedling growth and the physico-chemical properties of potting media. The research focused on three primary objectives: evaluating the effect of Beejamrutha on germination, studying the influence of Jeevamrutha and Panchagavya on seedling growth and analyzing changes in the physical and chemical properties of the potting media, including bulk density, porosity, water retention and nutrient availability (N, P and K). Seed germination rates and seedling development, including height, collar diameter, leaf number and root-shoot ratio, were measured across treatments. The results revealed that Beejamrutha significantly enhanced germination rates (55.93%), while Jeevamrutha and Panchagavya positively influenced seedling growth by improving nutrient availability, microbial activity and soil structure. After 120 days of treatment applications, Panchagavya-treated seedlings (B–T8) exhibited maximum plant height (47.51 cm), collar diameter (6.20 mm) and leaf number (~12). Additionally, the biomass of plant components significantly improved after treatment applications. While the organic formulations had little effect on soil physical properties, they significantly improved chemical properties, promoting healthier root development and enhancing overall seedling vigour. The findings indicate that these organic formulations have the potential to reduce reliance on chemical fertilizers by creating a more resilient growing environment. By improving both the chemical properties of the potting media, this study stresses the role of organic inputs in promoting sustainable nursery practices for *S. macrophylla*.

December, 2024

(Vasudev L)
Major Advisor

4. EVALUATION OF GROWTH PERFORMANCE IN *Meliadubia* CAV. AND CASUARINA HYBRID CLONES FOR MALNAD REGION OF KARNATAKA

(RAKSHIT)

ABSTRACT

Clonal forestry plays a pivotal role in supplying raw materials for various wood based industries.In particular *Meliadubia* and Casuarina have emerged as preferred raw materials due to their high pulp recovery rates and superior strength, making them ideal for large-scale plywood manufacturing. In order to evaluate the growth performance of *M. dubia* and Casuarina hybrid clones, an experiment was conducted at MAHRS, Iruvakki, Shivamogga, Karnataka. In the experiment, ten clones of *M. dubia* were planted in a Randomized Complete Block Design (RCBD) with a spacing of 4 m × 4 m across five replications. Casuarina hybrids (eight) were planted in a row-column design with three replications and spacing of 3 m × 2 m.**Growth performance results** showed that ***M. dubia* clone IFGTBC6** exhibited the highest growth with a height of 12.54 m, girth of 60.04 cm, and volume of 77.09 m^3, making it the most promising for timber production. **Casuarina hybrid CH2** excelled with a height of 14.50 m, girth of 42.24 cm, and volume of 161.18 m^3, indicating high biomass and timber yield potential. Qualitatively, **IFGTBC12** and **CH2**stood out for stem form and straightness, suitable for high-quality timber.**Soil analysis** revealed that ***M.dubia*** clones had higher nitrogen and phosphorus levels, while **Casuarina** showed higher potassium availability. **Casuarina** exhibited slightly higher organic carbon at the surface and higher pH values.**Economic analysis** indicated that **IFGTBC6** was the most viable ***M. dubia*** clone, with a Net Present Worth (NPW) of 112,027 INR, an Internal Rate of Return (IRR) of 44.1 per cent, and a Benefit-Cost Ratio (BCR) of 2.08. Among **Casuarina clones, CH2** was the most profitable with an NPW of 384,641 INR, an IRR of 78per cent, and a BCR of 4.23. Clones with higher biomass yields and adaptability demonstrated superior economic feasibility.

November, 2024

(Maheswarappa V)
Major Advisor

Forest Biology and Tree Improvement

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

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

1. RELATIVE ABUNDANCE AND MELISSOPALYNOLOGY OF STINGLESS BEES IN FOREST ECOSYSTEMS AND COFFEE PLANTATIONS OF KODAGU

(AKASH SANGAPPA NEELAGUND)

ABSTRACT

The present investigation entitled "Relative abundance and Melissopalynology of stingless bees in forest ecosystems and coffee plantations of Kodagu" was carried out during the year 2022-2024 at south Kodagu to study the abundance of stingless bees in sacred grove and coffee plantations under evergreen, semi-evergreen and moist deciduous forest ecosystems and also to find out the forage resources of stingless bees in these three forest ecosystems through melissopalynology. The relative abundance of honeybees assessed through roving survey technique indicated that stingless bees were most abundant in semi-evergreen ecosystem, with a higher population in the sacred grove compared to the coffee plantation followed by the evergreen ecosystem. In contrast, their numbers were significantly lower in the moist deciduous ecosystem. Overall, sacred groves consistently hosted a higher number of honeybee species. There was no consistent relationship between weather parameters and the bee abundance indicating influence of other environmental factors on this, which need to be studied further. The diversity of bee forage trees, shrubs and herbs exhibited higher species diversity, richness and evenness in sacred groves than in coffee plantations.Melissopalynological analysis of honey sample revealed that the honey collected from three ecosystems were without predominant pollen, indicating their multifloral nature.*Syzygiumcumini*(18.98%),*Cocosnucifera* (37.37%) along with *Mimosa pudica* (17.15%) and *Croton* sp. (22.88%) were secondary pollen in evergreen, semi-evergreen and moist deciduous forest ecosystems, respectively. The highest pollen diversity was found in the honey sample from the moist deciduous, followed by evergreen and semi-evergreen ecosystems. The plant families of Fabaceae, Asteraceae and Euphorbiaceae were found to be the major pollen sources for stingless bees.Among the 46 plants consisting of 19 herbs, 17 tree, and 10 shrubs in the three ecosystems stingless bees showed preference to herbs followed by trees and shrubs as forage resources.

December, 2024

(R. N. Kencharaddi.)
Major Advisor

2. ASSESSMENT OF DIVERSITY AND ECOLOGICAL NICHE MODELLING OF EPIPHYTIC ORCHIDS IN KODAGU

(BASAVANAGOWDA S. M.)

ABSTRACT

The present study investigated epiphytic orchid diversity in *circa situm* conservation areas (coffee agroforests) of Kodagu district, Karnataka. Study areas were stratified into three vegetation types such as evergreen, semi-evergreen and moist deciduous. In each vegetation type, two land use systems were assessed: *Coffea canephora* with native trees and *C. canephora* with monoculture shade trees. Belt transects of 100×5 meters were laid randomly to assess epiphytic orchids. Results revealed a total of 49 orchid species. Among these *Dendrobium herbaceum* emerged as the dominant species across all management systems. Evergreen coffee agroforests harboured higher species richness, with significant occurrences of *Oberoniaensiformis* and *O. denticulata* in native tree systems, while *Pholidota pallida* dominated in exotic systems. In semi-evergreen coffee agroforests, *D. ovatum* and *O. denticulata* were prevalent, with lower occurrences of *D. jerdonianum* and *Aeridescrispa*. In moist deciduous coffee agroforests, *Cymbidium bicolor* and *P. pallida* were dominant in both systems. Orchid species exhibited a preference for host trees with larger girth classes in the 1.00–1.50 meter range, which supported the highest orchid diversity. Dominant host trees across all agroforest types included *Careya arborea*, *Mangifera indica*, and *Syzygiumcumini*. The investigation also included ecological niche modelling of *Dendrobium barbatulum* Lindl. using MaxEnt software. Among the environmental variables studied, annual precipitation, elevation, precipitation during the driest month and isothermality were the major predictors of habitat suitability modelling. The model predicted the home range of *D. barbatulum* in Kodagu regions within elevation of 900–1200 m MSL, particularly in protected areas such as Brahmagiri, Pushpagiri and Talakaveri wildlife sanctuaries. Future projections for 2061-2080 and 2081-2100, under low and high emission scenarios, suggested potential habitat expansion and decline respectively, emphasizing the need for targeted conservation strategies to ensure the species survival in a changing climate.

October, 2024

(Jadeyegowda M.)

Major Advisor

Forest Resource Management

Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga

M. Sc. (Forestry) theses abstracts produced in

Forest Resource Management

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1. ASSESSMENT AND MODELLING OF MANGROVE BLUE CARBON IN THE WEST COAST OF KARNATAKA USING MACHINE LEARNING TECHNOLOGY

(HARSHEL SUARES)

ABSTRACT

The current study sought to examine spatiotemporal dynamics, carbon stock, and spectral models of blue carbon using a combination of ground sampling, geospatial and machine learning technology in mangroves of Kundapura forest sub-division, Udupi district, Karnataka, India. The fusion of Sentinel-2 and Sentinel-1 data with spectral indices (S2+S1+Indices) yielded the best results for classification using machine learning algorithms. The best classifier, Random Forest (RF) achieved an overall accuracy of 0.97 and a Kappa coefficient of 0.95. The mangrove cover of the study area was found to be 9.13 km^2. Over the past two decades, there have been fluctuations in mangrove cover, with an overall decline of 0.22 per cent. The biomass and carbon stocks measured for various mangrove species indicated that *Avicennia officinalis* had the highest biomass (52.89 Mg ha^{-1}) and carbon stock (23.26 Mg C ha^{-1}). The above and below-ground biomass of mangroves across the study area was 383.39 Mg ha^{-1} and 243 Mg ha^{-1}, respectively. Subsequently, the average soil organic carbon (SOC) was reported to be 41.23 Mg C ha^{-1}. The mangrove carbon stock of 320.03 Mg C ha^{-1} was estimated in the study area, with the highest carbon stock (406.58 Mg C ha^{-1}) found in Kundapura forest range. The soil physicochemical properties revealed significant correlation and very high positive correlation (0.72) was observed between electrical conductivity and organic carbon. Ordinary kriging of SOC indicated relatively better performance of prediction with 21.18 Mg C ha^{-1} RMSE. RF model for mangrove blue carbon modelling achieved a significantly higher R^2 value (0.97) compared to Support Vector Machine (SVM) (0.81). RF algorithm has outperformed SVM both in classification and modelling. Henceforth, conserving and sustainably managing Udupi's mangrove forests is essential to maintain and enhance their carbon sequestration capabilities and combat climate change.

November,2024

(B.G. Nayak)
Major Advisor