

University of Agricultural and Horticultural Sciences, Shivamogga

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

Department of Vegetable Science

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

IBAAD, M.H

ABSTRACT

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

May, 2015

(V. Srinivasa)
Major Advisor

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

SHRUTHI, H.T.

ABSTRACT

The study was conducted to find out the optimum spacing and growth regulators levels in radish cv. PusaChetki in open field condition at department of Vegetable Science, College of Horticulture, Mudigere, during 2014-15. The experiment consists of two levels of spacing (45 × 45 cm and 30 × 30 cm) and two levels of growth regulators (GA₃ and NAA) each at two concentrations (200 ppm and 250 ppm) with control in all possible combinations were assessed for vegetative, root and seed characters. Among the different spacings, S₂ (45 × 45 cm) and among the different growth regulators levels, G₂ (GA₃ 250 ppm) recorded maximum plant height, number of leaves per plant, leaf length, leaf width, spread of plant, number of branches per plant, stem diameter, fresh weight of leaves, stem and root, leaf area, chlorophyll content, absolute growth rate, dry matter accumulation in different plant parts like leaves, stem and roots, root length and root girth, number of siliqua per plant, number of seeds per pod, pod weight, length of pod and the same treatment also recorded maximum seed quality parameters. The maximum root and seed yield were obtained under closer spacing (30 × 30 cm) and GA₃ 250 ppm. Interactions of spacing and growth regulators levels were found significant with respect to morphological, root and seed quality parameters. The treatment combination S₂G₂ (45 × 45 cm + GA₃ 250 ppm) recorded significantly higher values with respect to plant height (85.53 cm), root length (36.80 cm), number of siliqua per plant (264.00), germination percentage (93.33 %) and the same treatment combination also recorded maximum benefit cost ratio (1.70) compared to other treatment combinations.

May, 2015

(V. Srinivasa)
Major advisor

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

MAMATHA, A

ABSTRACT

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

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

June, 2015

(Devaraju)
Major Advisor

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

REVATI GOUDAR

ABSTRACT

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

June, 2015

(V. Srinivasa)
Major Advisor

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

HEENA, M. S.

ABSTRACT

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

June, 2015

(Devaraju)
Major Advisor

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

LAVANYA, K. S

ABSTRACT

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

June, 2016

(V. Srinivasa)
Major Advisor

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

PRAVEEN YADAHALLI

ABSTRACT

A field experiment was conducted to study the heterosis and combining ability for yield and quality traits in bell pepper (*Capsicum annuum* L.). The experiment was conducted at Department of Vegetable Science, College of Horticulture Mudigere. Thirty F₁ hybrids were produced by crossing six parents in complete diallel mating design with reciprocals. Variance due to parents, hybrids, F₁ and reciprocals were highly significant for all the characters. In case of interaction of F₁ vs. reciprocals except plant height at 30DAT, number of primary branches and number of locules per fruit and in case of interaction of parents vs. hybrids except number of secondary branches, yield per plant and number of locules per fruit all characters showed significant differences. The diallel analysis revealed that no single parent was superior for all the traits under consideration. Significant *per se* performance and economic heterosis in desirable direction was recorded in several crosses. Maximum standard heterosis for total yield per plant was observed in the cross Yolo Wonder x California Wonder (26.91 %) followed by California Wonder x Yolo Wonder (15.90 %). In most of the characters SCA variance was greater than GCA variance. Among the parents, Yolo Wonder was good general combiner followed by California Wonder and Arka Mohini. Among the hybrids California Wonder x Yolo Wonder, Arka Mohini x Soaln Bharpur and Arka Mohini x California Wonder crosses had significant SCA effect for yield per plant. California Wonder x Yolo Wonder and Arka Mohini x Yelavigi Collection were good cross combinations for ascorbic acid content whereas, Arka Mohini x Yolo Wonder was good cross combination for shelf life. The present study reveals that heterosis breeding is useful for improvement of bell pepper crop.

July, 2016

(V. Srinivasa)
Major Advisor

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

ASHOKA M C

ABSTRACT

The present investigation on line × tester analysis in brinjal (*Solanum melongena* L.) under hill zone of Karnataka was carried out at the Department of Vegetable Science, College of Horticulture, Mudigere, during *Kharif* and *Rabi* season of the year 2015-16. Twenty seven F₁ hybrids were produced by crossing 9 lines with 3 testers by using line × tester design and they were evaluated along with parents in RCBD with two replications. The mean sum of squares due to various sources of variation showed significant differences for almost all the characters studied. The magnitude of heterosis over the standard check (Arka Anand) was high in the desirable direction for days to 50 per cent flowering (-31.40 %), fruit length (37.99 %), fruit diameter (64.78 %), number of fruits per plant (57.63 %), average fruit weight (212.28 %) and yield per plant (87.37 %). The cross IC354140 × Shyamala exhibited maximum significant positive standard heterosis (87.40 %) for yield per hectare followed by Pusa Kranti × Arka Shirish (66.02 %), Arka Neelkanth × Arka Shirish (61.43 %), IC332508 × PPL (47.76 %), IC332508 × Shyamala (41.79 %), Arka Nidhi × Shyamala (41.07 %), IC332508 × Arka Shirish (24.94 %), L-3266 × PPL (22.12 %) and L-3266 × Shyamala (20.38 %). The cross IC354140 × Shyamala exhibited the maximum significant desirable positive *sca* effect for most of the characters studied along with yield per hectare. Among the 12 parents, Pusa Kranti, IC397557, IC332508, IC281112, Arka Shirish and Shyamala were identified as good general combiners for over all characters studied. The predominance of *sca* variance over *gca* variance for most of the studied traits indicated the predominance of non additive gene action. The present study revealed that heterosis breeding is useful for the improvement of brinjal crop through exploitation of additive or non additive gene action.

August, 2016

(P. Umamaheswarappa)

Major Advisor

9. Optimization of Plant Population for Higher Productivity in Yardlong Bean under Varied Environmental Conditions

MANJESH, M.

ABSTRACT

The present investigation entitled “Optimization of plant population for higher productivity in Yardlong bean under varied environmental conditions” was carried out during *Kharif* 2016 at ZAHRS, Navile, Shivamogga. The experiment was laid out in splitplot design with three replications. There were 24 treatment combinations comprised of three different environments (polyhouse, shadenet and open field) and eight spacing treatments(45 cm x30 cm, 45 cm x45 cm, 45 cm x60 cm, 45 cm x75 cm, 60 cm x30 cm, 60 cm x45 cm, 60 cm x60 cm, 60 cm x75 cm).The obtained results showed that all the characters were markedly affected by different environments and spacing.Among different environments significantly higher plant height(325.17cm), number of primary branches(12.46), number of pods per plant (21.66), pod length (70.67 cm), pod girth (3.73 cm), pod weight per plant (31.13 g), yield per plant (458.21 g) and higher pod yield per 1000 m² (1605.99 kg) were recorded in polyhouse.Among spacing treatments significantly highernumber of primary branches (12.91), pods per plant(22.30), pod length(71.73 cm), pod girth(3.94 cm), pod weight per plant(33.11g)andpod yield per plant (547.86 g) were recorded with wider spacing of 60 cm x75 cm.Highest plant height (294.29 cm) and yield per 1000 m²(1791.68 kg) were recorded with the closer spacing of 45 cm x30 cm.The interaction of different environments and spacing were found to be statistically non-significant for all the traits. The evaluation of production economics revealed that growing of Yardlong bean in open condition with 45 cm x30 cm spacing was most remunerative option with a highest benefit: cost of 3.14.

August, 2017

(Nagarajappa Adivappar)
Major Advisor

10. Assessment of Combining Ability of Cucumber (*Cucumis sativus* L.) Germplasm for Exploiting Heterosis

PRASHANT R. NAIK

ABSTRACT

The present investigation on heterosis and combining ability studies in cucumber (*Cucumis sativus* L.) was undertaken at ZAHRS, Navile, Shivamogga, Karnataka during *kharif* and *rabi* seasons of year 2016-17. The diversified group of 12 genotypes (nine lines and three testers) of cucumber and two check cultivars (Poinsette and Malini) were used to fulfil the objective such as to estimate the general combining ability (*gca*) and specific combining ability (*sca*) magnitude and direction of heterosis for yield and yield attributing traits, to identify the highly heterotic combinations. A total of 27 crosses were developed by crossing with nine lines three testers. All the crosses were evaluated along with the parents in randomized block design with two replications. The magnitude of heterosis over the standard checks (Poinsette and Malini) for important traits *viz.*, days to first female flower appearance ranged from -7.80 to 13.65 and -1.49 to 21.43 per cent, for node at which first female flower appearance -28.83 to 46.34 and -31.82 to 36.36 per cent, for number of fruits per vine -33.64 to 48.85 and -36.52 to 40.43, for yield per vine -18.36 to 20.47 and -28.76 to 5.12 per cent. The parents Himangi, US-640, DWD and Haveri Local are the good general combiners while, DWD × Haveri Local, US-640 × Haveri Local and Sabra × Bagalkot Local exhibited the significant positive *sca* effect for yield attributing traits. The predominance of *sca* effect over *gca* effect for yield indicate the predominance of non-additive gene action. The present study revealed that heterosis breeding is useful for the improvement of cucumber for exploitation of additive or non-additive gene action.

July, 2017

(Nagarajappa Adivappar)
Major Advisor

11. Genetic Variability Studies in Potato (*Solanum tuberosum* L.) Genotypes Under Hill Zone of Karnataka

RAMACHANDRA, M. K.

ABSTRACT

An investigation on genetic variability studies in potato was carried out in the experimental block, Department of Vegetable Science, College of Horticulture, Mudigere during the year 2016-17. The experiment was laid by adopting Randomized Complete Block Design (RBD) with three replications. The experimental material consisting of sixteen genotypes of potato obtained from CPRI, Shimla and CIP, Peru. Data collected on growth, tuber yield and its components and genetic estimation was made for variance, correlation coefficient and path analysis. Analysis of variance revealed that mean sum of squares was significant for the all parameters which indicated the presence of sufficient variability among the genotypes. The phenotypic coefficient of variation (PCV) for all the parameters was found higher magnitude than genotypic coefficient of variation (GCV). Among different yield attributing characters fresh and dry weight of tuber, tuber volume, marketable and total tuber yield had the highest magnitude of GCV and PCV (>20%). The high heritability (>60%) estimates coupled with high genetic advance (>20%) was recorded for the characters *viz.*, leaf area, fresh weight of tuber, tuber volume, non-reducing sugars, marketable and total tuber yield. Therefore, additive component is predominant here. Thus, there is ample scope for improving these characters through direct selection. Studies on correlation coefficient showed highly significant and positive association of total tuber yield per plot with plant height, number of leaves, number of stems, total fresh weight of plant, total dry weight of plant, number of tubers per plant, fresh weight of tuber per plant, dry weight of tuber per plant, marketable yield per plant and marketable yield per plot. Path analysis indicated that out of thirteen characters studied, the direct effects *via* fresh weight of tuber per plant, followed by starch and dry weight of tuber per plant positively contributed towards total tuber yield per plot, indicating the possibility of simultaneous selection for these traits to improve the tuber yield.

July, 2017

(Srinivasa, V)
Major Advisor

12. Integrated Nutrient Management Studies in Chilli (*Capsicum annuum* L.)

YOGARAJU, M.

ABSTRACT

A field experiment was conducted to know the effect of integrated nutrient management in chilli (*Capsicum annuum* L.) at Department of Vegetable Science, College of Horticulture, Mudigere, during 2016-17. The experiment was laid out in randomized complete block design with fourteen treatments replicated thrice. Plants treated with *Azospirillum* + PSB + VAM + KSB + 75% RDF + MgSO₄ + Micronutrient mixture recorded significantly maximum plant height (88.61 cm), plant spread North-South and East-West (63.67 cm and 59.43 cm, respectively), number of primary branches (11.22), secondary branches (18.44), number of leaves (298.87), leaf area (10578.06 cm²), leaf area index (3.92), fresh weight of leaves (107.33 g/plant), fresh weight of stems (145.11 g/plant), fresh weight of fruits (268.89 g/plant), dry weight of leaves (35.01 g/plant), dry weight of stem (47.69 g/plant), dry weight of fruits (14.40 g/plant), total dry matter (118.48 g/plant), absolute growth rate (2.38 g/plant), crop growth rate (8.99 g/m²/day), relative growth rate (0.07 g/g/day), net assimilation rate (0.200 × 10⁻² g/dm²/day), minimum days taken for 50 per cent flower initiation (38.67), maximum fruit length (11.60 cm), fruit girth (4.80 cm), fruit yield (658.67 g/plant), fruit yield per hectare (22.92 t/ha) and its quality parameters like chlorophyll content (79.74 SPAD Units), ascorbic acid content (141.27 mg/100g), capsaicin content (0.39 %). Similarly *Azospirillum* + PSB + VAM + KSB + 75% RDF + MgSO₄ + Micronutrient mixture recorded significantly the highest available N (440.00 kg/ha), P₂O₅ (129.67 kg/ha) and K₂O (241.33 kg/ha) in soil. The economic analysis clearly indicated that application of *Azospirillum* + PSB + VAM + KSB + 75% RDF + MgSO₄ + Micronutrient mixture realized maximum net returns (Rs. 558791.2 /ha) and B: C ratio (1:4.33).

July, 2017

(Srinivasa, V)
Major Advisor

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

ANUSHA BHAGWAT

ABSTRACT

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

July, 2018

(V. Srinivasa)
Major Advisor

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

KAVYA, V. N.

ABSTRACT

The present investigation was carried to understand the extent of genetic variability, correlation and path coefficient analysis between yield and its components traits in F₂ and F₃ segregating populations of the three bi-parental crosses viz., IIHR-875 × IIHR-478, IIHR-478 × IIHR-567 and IIHR-604 × IIHR-347 at ICAR-KVK, Babbur Farm, Hiriyur (Tq), Chitradurga (Dist) during 2017-18. Magnitude of GCV and PCV values was high for number of fruits plant⁻¹ in F₂, number of fruits plant⁻¹ and total yield plant⁻¹ in F₃ population of the bi-parental cross IIHR-875 × IIHR-478. While the bi-parental cross IIHR-478 × IIHR-567 has shown high PCV and GCV for total yield plant⁻¹ in F₂ and number of fruits plant⁻¹ in F₃ population. Whereas the bi-parental cross IIHR-604 × IIHR-347 exhibited high PCV and GCV for number of fruits plant⁻¹ and total yield plant⁻¹ in both F₂ and F₃ populations. The F₂ and F₃ populations of the three bi-parental crosses showed high heritability with GAM for number of fruits plant⁻¹ and total yield plant⁻¹ indicating the involvement of additive gene action. In F₂ and F₃ populations, total yield plant⁻¹ was positively and significantly associated with number of branches plant⁻¹ and number of fruits plant⁻¹ in all the three bi-parental crosses. Number of fruits plant⁻¹ manifested maximum direct effect on total yield plant⁻¹ in all the three bi-parental crosses of F₂ and F₃ populations and thus number of fruits plant⁻¹ is the important trait for enhancing total yield plant⁻¹ in okra. Higher numbers of superior segregants with respect to total yield plant⁻¹ were more in IIHR-478 × IIHR-567 (142) followed by IIHR-604 × IIHR-347 (70) and IIHR-875 × IIHR-478 (51). The bi-parental cross IIHR-478 × IIHR-567 has shown higher level of iodine content (30 µg/100g), crude fiber (1.2 g/100g) and chlorophyll content (2.36 mg/g) than the other bi-parental crosses studied.

March, 2019

(Prakash Kerure)
Major Advisor

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

MANASA, G. D.

ABSTRACT

The present investigation entitled “Effect of boron and copper foliar spray on growth and yield of brinjal (*Solanum melongena* L.) under hill zone of Karnataka” was carried out during summer 2018 at COH, Mudigere. The experiment was laid out in Randomized Complete Block Design with three replications. The experiment consisted of nine treatments. Among nine treatments, plants treated with RDF + Borax200ppm + CuSO₄ at 0.2 per cent recorded maximum plant height, number of primary and secondary branches, leaf area, leaf area index, chlorophyll content and nutrient content in leaf such as nitrogen, phosphorus, potassium, boron and copper. Similar trend was observed for yield and quality parameters such as number of flowers per cluster, number of cluster per plant, fruit length, fruit girth, average fruit weight, number of fruits per cluster, number of fruits per plant, fruit yield per plant, fruit yield per plot, fruit yield per hectare, firmness, shelf life and TSS. Minimum number of days taken for first flowering, first fruit set, first harvest, 50 per cent flowering and 50 per cent fruiting, was observed in same treatment. Similar trend was also observed with nutrient status of soil with respect to available nitrogen, phosphorus, potassium, boron and copper. The economic analysis clearly indicates that application of RDF + Borax200ppm + CuSO₄ at 0.2 per cent realized maximum net returns and benefit cost ratio (3.15). Hence the treatment RDF + Borax200ppm + CuSO₄ at 0.2 per cent can be recommended for higher brinjal production under hill zone of Karnataka.

November, 2018

(P. Umamaheswarappa)
Major Advisor

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

SAHANA, P.

ABSTRACT

An experiment was carried out during *Kharif* 2017-18 to determine the effect of fertigation on pole bean (*Phaseolus vulgaris* L.) under naturally ventilated polyhouse at Zonal Agricultural and Horticultural Research Station (ZAHRS), Navile, Shivamogga. The experiment was conducted in a randomized block design with 12 treatments which were replicated thrice. As there is no standard recommended dose of nutrients for pole bean under fertigation, recommended dose of nutrients of French bean (63:100:75 N, P₂O₅, K₂O kg/ha) was taken as the basis. The treatment having 70 per cent of recommended dose of fertilizers with mulching and micronutrients spray recorded maximum plant height (46.02 cm & 175.83 cm) at 15 and 30 days after sowing, number of primary (5.50 & 7.79) and secondary (2.83 & 7.75) branches at 30 and 45 days after sowing, minimum days for initiation (32.53), 50 per cent (37.32) and 100 per cent (41.43) flowering, maximum number of pods per plant (29.20), higher pod length (19.87 cm), pod circumference (2.43 cm), pod weight (16.62 g), pod yield per plant (625.87 g) and pod yield per 1000 m² (2.18 t). The highest net return (₹39,217) and benefit-cost ratio (2.49) were accrued from the same treatment. The study thus revealed that 70 per cent of the recommended dose of nutrients through fertigation along with mulching (40µ, LDPE) and micronutrients spray [IIHR vegetable special (0.5%)] is ideal for the maximum growth and yield of pole bean and has an explicit role in increasing the productivity of pole bean under naturally ventilated polyhouse.

August, 2018

(Nagarajappa Adivappar)

Major Advisor

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

SHANWAZ AHMAD

ABSTRACT

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

July, 2018

(Devaraju)
Major Advisor

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

SHARAVATI, M. BAMMANAKATTI

ABSTRACT

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

July, 2018

(V. Srinivasa)
Major Advisor

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

SHUBHA, A. S.

ABSTRACT

The present investigation was undertaken to study the effect of INM on growth, yield and quality of potato at department of Vegetable Science, college of Horticulture, Mudigere during 2017-2018. The experiment was laid out in Randomized Complete Block Design (RCBD) with three replications and 14 treatments. The data clearly showed that the plants fertilized with 75% RDF + *Azotobacter* + PSB + KSB + MgSO₄ + Micronutrient mixture (T₁₃) registered the maximum values for sprouting (99.33 %), plant height (59.33 cm), number of leaves (298), plant spread (45.00 and 47.33 cm, North-South and East-West, respectively), number of stems (4.79), leaf area (6296.55 cm²), leaf area index (5.25), fresh weight of leaves (45.41 g), fresh weight of stem (74.67 g) and fresh weight of tuber (301.67 g), dry weight of leaves (9.39 g), dry weight of stem (17.90 g) and dry weight of tuber (55 g), AGR (0.75 g/plant/day), CGR (1.37 g/m²/day), RGR (0.00808 g/g/day), NAR (0.002100 × 10⁻² g/dm²/day), number of tubers per plant (2.97), yield per plant (263.12 g/plant), yield per hectare (21.50 t/ha), marketable yield per plant (171.03 g/plant), marketable yield per hectare (14.22 t/ha), total sugar (2.34 %), reducing sugar (1.27 %), non reducing sugar (1.07 %), starch (18.47 %) and tuber dry matter (22 %) content. Whereas minimum growth, yield and quality parameters were found in the control. Soil available nutrient status viz., N (400 Kg/ha), P (62.33 Kg/ha) and K (294.67 Kg/ha) were recorded maximum in the same treatment. The treatment T₁₃ recorded the highest cost benefit ratio of (2.47) and maximum net returns (Rs 303638).

August, 2018

(V. Srinivasa)
Major Advisor

20. Studies on Genetic Divergence and Variability for Yield and Quality Characters in Garden Pea (*Pisum sativum* L.)

(ASHA, A. B)

ABSTRACT

An investigation on genetic variability studies in garden pea was carried out in the experimental block of Department of Vegetable Science, College of Horticulture, Mudigere during 2018-19. The experiment was laid out in Randomized Complete Block Design. 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 plant height, number of branches per plant, node at first flower appears, days to first flowering, days to 50 per cent flowering, days taken for first picking, length, width and thickness of pod, number of seeds per pod, weight of ten pods, weight of green seeds, shelling per cent, number of pods per plant, pod yield per plant, pod yield per ha, TSS, reducing sugars and non-reducing sugar 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 pod yield per plant exhibited positive and significant phenotypic and genotypic association with number of pods per plant and weight of ten pods. Path analysis revealed that highest positive direct effect on pod yield per plant was shown by number of pods per plant followed by weight of ten pods and length of pod. Based on Mahalanobis D² analysis, 30 genotypes of garden pea were grouped into ten clusters. Among the traits studied pod yield per plant (38.16 %), plant height at 60 DAS (27.59 %), days for first picking and number of pods per plant (8.05 %) contributed maximum to the total genetic diversity. In this study five promising genotypes viz., Arka Priya, IIHR-44, GS-10, Arka Pramodh and Arka Apoorva have been identified for higher yield, which can be utilized for further crop improvement programme.

August, 2019

(Devaraju)
Major Advisor

21. Effect of Plant Geometry and Nutrition on Growth, Yield and Quality of Sweet Potato (*Ipomoea batatas* Lam.)

(CHANDINI, A. S.)

ABSTRACT

The study was conducted to find out the optimum spacing and nutrition levels in sweet potato at Department of Vegetable Science, College of Horticulture, Mudigere, during 2018-19. The experiment consists of three levels of spacing (40 × 20, 60 × 30 & 80 × 40 cm) and four levels of nutrition (50:25:50, 75:50:75, 100:75:100 & 125:100:125 kg NPK / ha) in all possible combinations were assessed for growth, yield and quality parameters. Among the different spacing and nutrition levels, S3 (80 × 40 cm) and F3(100:75:100 kg NPK / ha) recorded maximum vine length, number of auxiliary branches per plant, number of leaves per plant, vine girth, fresh and dry weight of leaves, stem and root, leaf area per plant, absolute growth rate, relative growth rate, net assimilation rate, total chlorophyll content, number of tubers per vine, tuber length, tuber girth, fresh and dry weight of tuber, tuber volume and tuber yield per plant. The maximum tuber yield per plot and tuber yield per hectare were obtained under closer spacing (40 × 20 cm) and F3 nutrition (100:75:100 kg NPK / ha) level. With respect to quality parameters, S2 (60 × 30 cm) spacing and F3 nutrition (100:75:100 kg NPK / ha) level recorded maximum values. Interactions of spacing and nutrition levels were found significant with respect to growth, yield and quality parameters. The treatment combination S3F3 (80 × 40 cm + 100:75:100 kg NPK / ha) recorded significantly higher values with respect to growth and yield. However, the maximum benefit cost ratio (3.90) was recorded in S2F3 (60 × 30 cm + 100:75:100 kg NPK / ha) treatment combination.

August, 2019

(V. Srinivasa)
Major Advisor

22. Genetic Variability Studies in F2 Segregating Population of Brinjal (*Solanum melongena* L.)

(CHITHRA, K)

ABSTRACT

The present investigation was carried out to understand the extent of genetic variability, correlation and path coefficient analysis between yield and its component traits in F2 segregating population of the two brinjal crosses viz., Surya×Harita and Swetha×Utkal Anushree at the experimental block of Department of Vegetable Science, College of Horticulture, Mudigere during the year 2018-19. The analysis of data indicated that the prevalence of sufficient genetic variation among the genotypes for all the characters. High heritability (>60 %) coupled with high GAM (>20 %) was observed for plant height, number of primary branches, plant spread from North to South, plant spread from East to West, fruit length, fruit diameter, average fruit weight, number of fruits per plant and fruit yield per plant in both the crosses indicating the involvement of additive gene action for these traits. Thus there is a ample scope for improving these traits through direct selection.

Correlation studies in both the crosses revealed that the number of fruits per plant, average fruit weight and fruit diameter had significant positive correlation with fruit yield per plant. Whereas, the characters days to first flowering and days to first picking showed negative and significant correlation. Path analysis for both the crosses for fruit yield per plant revealed that the fruit diameter, average fruit weight and the number of fruits per plant had high positive direct effect indicating the possibility of increasing fruit yield per plant by selecting these characters directly. The superior segregants identified with respect to fruit yield per plant in F2 segregating population of the cross Surya×Harita were P-10 (2.40 kg), P-15 (2.35 kg) and P-233 (2.03 kg). Whereas, in the cross Swetha×Utkal Anushree, P-16 (2.25 kg), P-19 (1.95 kg) and P-183 (1.92 kg) were identified as superior segregants, which can be utilized for further crop improvement programme.

August, 2019

(Devaraju)
Major Advisor

23. Effect of Bioregulators on Productivity of Sweet Potato (*Ipomoea batatas* Lam.) under Hill Zone of Karnataka

(SAHANA, D.)

ABSTRACT

An investigation on effect of bioregulators on productivity of sweet potato (*Ipomoea batatas* Lam.) under hill zone of Karnataka was carried out in the experimental block of department of Vegetable Science, College of Horticulture, Mudigere, Karnataka during 2018-19. The experiment was laid out in randomized complete block design with three replications consisting of different bioregulators viz., Gibberlic acid, Cycocel and Triacantanol at 250 ppm and 500 ppm. Biozyme, Biovita and Cytozyme at 0.3 % and 0.4%. The results showed significant differences among the treatments for various characters. Among different treatments, spraying of GA3 at 200 ppm recorded maximum vine length (176.00 cm), number of auxillary branches (5.73), number of leaves per plant (391.33), vine internodal length (6.03 cm), vine girth (17.80 mm), fresh weight of leaves (464.73 g), fresh weight of stem (216.10 g), fresh weight of root (1137.73 g), dry weight of leaves (77.33 g), dry weight of stem (36.21 g), dry weight of root (343.73 g), leaf area (22724.8 cm²/ plant), relative growth rate (0.02674 g / g / day), crop growth rate (39.40g / m² / day), net assimilation rate (0.515 mg / dm² / day), number of tubers per plant (6.20), tuber length (24.07 cm), tuber yield per plant (835.83 g), tuber yield per hectare (46.44 t), total sugar (2.25 %) content, crude protein (4.48 %) and β -carotene (0.43 mg / 100 g) content. Maximum total leaf chlorophyll (2.68 mg / g) content, shelf life (33.22 days) under cold storage conditions and highest benefit cost ratio (3.61) was found with application of CCC at 500 ppm.

August, 2019

(V. Srinivasa)

Major Advisor

24. Studies on Spacing and Fertigation in Pole Type French Bean (*Phaseolus vulgaris* L.) under Protected Cultivation

(NEETHU, T. M.)

ABSTRACT

The present investigation entitled “Studies on spacing and fertigation in pole type French bean (*Phaseolous vulgaris* L.) under protected cultivation” was carried out during kharif 2018 at ZAHRS, Navile, Shivamogga. The experiment was laid out in split plot design with three replications. There were 18 treatment combinations comprised of three different spacing treatments (S1:60×75cm; S2:60×60cm; S3: 60×45cm) and six fertigation treatments [T1- 44:70:53 kg ha-1 (Control); T2-55:87.5:66.25 kg ha-1 (125% control); T3-33:52.5:39.75 kg ha-1 (75% control); T4- 44:70:53 kg ha-1 (control) + mulching + micronutrient spray; T5- 55:87.5:66.25 kg ha-1 (125% control) + mulching+ micronutrient spray; T6-33:52.5:39.75 kg ha-1 (75% control) + mulching + micronutrient spray [IIHR Vegetable special 0.5 %]. The results of the experiment showed statistically significant difference among the treatments. However, highest number of primary branches (8.70), secondary branches (8.50), leaf area (6613.76 cm²), number of pods plant-1 (220.02), number of clusters plant-1 (6.50), pod length (20.66 cm), pod girth (2.95 cm), pod weight (17.69g), pod yield plant-1 (4.65 kg), maximum soil nutrients, leaf macro and micro nutrients were recorded in the plants which was grown under the wider spacing of 60×75cm with the combination of 44:70:53 kg ha-1 (N:P:K), mulching and micronutrient spray. The maximum plant height (480.5 cm), pod yield (13.06 t) 1000 m⁻² and B:C (2.48) ratio was recorded in the plants which was grown under the closer spacing (60×45cm) with the combination of 44:70:53 kg ha-1 (N:P:K), mulching and micronutrient spray. Hence, it could be concluded from the study that, the closer spacing (60×45cm) with the combination of 44:70:53 kg ha-1 (N:P:K), mulching and micronutrient spray resulted in higher pod yield of pole type French bean and found economically profitable.

September, 2019

(Nagarajappa Adivappa)
Major Advisor

