

## Abstract of Theses Accepted for the Award of Post-Graduate Degrees in the University of Agricultural Sciences, Dharwad

### DOCTOR OF PHILOSOPHY

#### AGRONOMY

##### Action Plan Preparation (Medak Nala) and Impact Assessment (Katangidda Nala) of Watersheds in Gulbarga District Using Remote Sensing and GIS Technologies

U.K.SHANWAD

2006

MAJOR ADVISOR : Dr. V.C.PATIL

Action plan preparation of Medak Nala watershed and impact assessment of Katangidda Nala watershed were carried out using remote sensing and GIS technologies. Satellite data of IRS- 1 C /1 D for two seasons representing rabi (December 8 and 10, 2000 PAN + LISS III merged) and summer (March 15, 2001 LISS III) were used for preparing thematic maps and suggesting action plans for management of natural resources in Medak Nala watershed. Impact assessment of IWDP programme in Katangidda Nala watershed was done using IRS 1C/1D data of LISS III image of December 11, 1997 (pre-treatment) and November 15, 2002 (post-treatment). The water and agriculture resources action plans of Medak Nala watershed were prepared by integrating the thematic maps such as land use/land cover, soil resource inventory, hydro-geomorphology, slope etc. The results indicated that the present land use of the watershed (5,169 ha, 42.58%) is under kharif crop followed by rabi crop area (2,814 ha, 23.18%) and land with scrub (2,280 ha, 18.78%). The 20 soil series of the watershed were classified under Inceptisols, Alfisols, Vertisols and Entisols. The hydro-geomorphology status of the watershed indicates that major area is under plateau moderately dissected (5,200 ha, 42.83%) followed by plateau slightly dissected (3,298 ha, 27.17%) and pediplain shallow (1,750 ha, 14.41 %). The drainage network of the watershed resembles a dendritic pattern with drainage

density of 2.16 km/sq. km. Based on these conditions, the watershed action plans were prepared. Water harvesting structures like boulder checks (257), check dams (62), nala bunds (10), miner irrigations tanks (2), soil conservation practices like contour farming, strip cropping and vegetative barriers were suggested. In agriculture action plan, agro-horticulture (5,575, ha, 45.93%) plays an important component followed by dryland- horticulture (2,725 ha, 22.45%) and fodder and fuel (2,290 ha, 18.86%). Impact assessment of Katangidda Nala watershed was done using Indian Remote Sensing (IRS) 1C/1D satellite data corresponding to 1997 (pre-treatment) and 2002 (post-treatment). The images were classified into different land use/land cover categories using supervised classification by maximum likelihood algorithm. They were also classified into different biomass levels using Normalized Different Vegetation Index (NDVI) approach. The results indicated that the area under agriculture crops and forest land were increased by 671 ha (5.7%) and 1,114 ha (11.94%) respectively. This is due to the fact that more areas of waste lands and fallow lands were brought into cultivation. The vegetation vigour of the area was classified into three classes using NDVI. Substantial increase in the area under high and low biomass levels was observed (502 ha and 19 ha respectively). The benefit-cost analysis indicated that the use of remote sensing and GIS was cheaper by 2.2 times than that of conventional methods.

##### Studies on Production Potential of Sweet Sorghum (*Sorghum bicolor*(L.) Moench) Genotypes for Grain and Ethanol Production as Influenced by Management Practices

SANJEEVRADDI G. REDDI

2006

MAJOR ADVISOR : Dr. A.D.JANAWADE

Two field experiments and one laboratory experiment were carried out for two years (2002-03 and 2003-04) to study the production potential of sweet sorghum genotypes for grain and ethanol production as influenced by management practices at Main Agricultural Research Station, Dharwad. The results revealed that the ethanol, green biomass, juice and sugar yield and juice quality parameters like brix, pol percentage and reducing sugar of the juice were significantly higher in

genotype NSSH-1 over rest of the genotypes. Genotypes SSV-84, SSV-74 and NSSH-1 produced significantly higher grain yield and yield components such as ear head length, grain weight ear<sup>-1</sup> and grain number ear<sup>-1</sup>. During rab~ 1st fortnight of October sowing produced significantly higher grain yield (1569 kg ha<sup>-1</sup>) and yield components, ethanol yield (211.4 l ha<sup>-1</sup>), juice yield (567.3 l ha<sup>-1</sup>), green biomass yield (191.8 t ha<sup>-1</sup>), sugar yield and quality parameters (brix and reducing sugar). Treatment combination of SSV-84,

NSSH-1 and SSV -7 4 with 1st fortnight of October recorded significantly higher net returns (Rs. 9866, 9746 and 9541, respectively). B:C ratio was maximum in treatment combination of SSV-84 and SSV-74 when sown at 1<sup>st</sup> fortnight of October (2.18 and 2.18). During kharif, sowing in 1<sup>st</sup> fortnight of June and 2<sup>nd</sup> fortnight of June produced significantly higher grain yield and yield components, ethanol yield, juice yield, green biomass yield, sugar yield and quality characteristics. Combinations of NSSH-1 and SSV-84 with 1<sup>st</sup> fortnight of June sowing recorded significantly higher net returns (Rs. 9049 and Rs. 8961, respectively). Grain yield and yield components were significantly higher in 120 + 75 kg and 120 + 50 kg NK ha<sup>-1</sup> fertility level. Ethanol yield (422.91 ha<sup>-1</sup>), sugar yield, extraction percentage were significantly higher in application of 120 + 75 kg NK ha<sup>-1</sup>. Harvesting at milk stage

produced significantly higher green biomass yield and juice yield than other stages. Ethanol yield was maximum when harvesting at milk stage and physiological maturity stage (474.1 and 446.91 ha<sup>-1</sup>, respectively). Both the genotypes and all the fertility levels with harvesting at physiological maturity stage recorded significantly higher net returns and B:C ratio over harvesting at 50 per cent flowering and milk stage. To summarize, for the transitional tract of Northern Karnataka sweet sorghum genotypes NSSH -1 (Madhura). SSV -84 and SSV -7 4 performed better in both kharif and rabi seasons with respect to grain yield, green biomass yield, juice yield and ethanol yield. Application of higher fertility level (120 + 75 kg NK ha<sup>-1</sup>) and harvesting at physiological maturity recorded maximum grain, green biomass, juice and ethanol yield. Two yeast strains (NCIM-3319 and local isolate) were significantly superior.

#### Studies on Performance of Bt Cotton Genotypes and Evaluation of Refuge Crops/ Cropping Systems

BASAVARAJ S. YENAGI

2006

MAJOR ADVISOR : Dr. V.C.PATIL

Two field experiments were conducted at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad during the years 2003-04 and 2004-05, to assess the performance of Bt transgenic genotypes and to identify, the suitable refuge crops/cropping systems in Bt cotton cultivation. The experiment entitled performance of Bt transgenic genotypes was laid out in randomized complete block design with eight cotton genotypes (MECH-12 Bt, MECH-162 Bt, MECH-184 Bt, RCH-2 Bt, RCH-20 Bt, RCH-144 Bt, DHH-II and Sahana) as treatments with three replications. Another experiment entitled "Studies on management of Bt cotton through refuge crops / cropping systems" was laid out in randomized complete block design with six cropping systems C' 00% Bt cotton, 80% Bt cotton, Bt cotton + 20% non Bt cotton, 80% Bt cotton + 20% marigold-chickpea, 80% Bt cotton + 20% Okra-chickpea, 80% Bt cotton + 20% chilli and 80% Bt cotton + 20% pigeonpea) as treatments with four replications in replacement series. Among the different Bt and non-Bt cotton genotypes, RCH-20 Bt recorded significantly higher seed cotton yield than RCH-144 Bt, MECH-162 Bt, DHH-II and Sahana. The extent of increase in RCH-20 Bt was 8.0, 13.0, 26.0, 31.0, 48.0, 92.0 and 151 per cent over MECH-184 Bt, RCH-2 Bt, MECH-12 Bt, RCH-144 Bt, MECH-162 Bt, DHH-II and Sahana, respectively.

Among the different refuge crops/cropping systems on 20 per cent refuge cropped area, Bt cotton refuge cropped with chilli (518 kg/0.2 ha), relay cropping of marigold chickpea (495 kg/0.2 ha) and bhendi-chickpea (474 kg/0.2 ha) cropping systems recorded significantly higher Bt cotton equivalent yield than Bt cotton refuge cropped with non-Bt cotton (310 kg/0.2 ha) and pigeonpea (171 kg/0.2 ha). Effect of refuge crops/cropping systems on total yield of the system was significant. Bt cotton refuge cropped. With bhendi-chickpea (1637 kg/ha), marigold-chickpea (1612 kg/ha) cropping systems and chilli (1526 kg/ha) recorded significantly higher total seed cotton yield than Bt cotton refuge cropped with non-Bt cotton (1240 kg/ha) and pigeonpea (1215 kg/ha). Two laboratory studies on assessing geographical variability in susceptibility of cotton bollworm (*H. armigera*) to Bt toxin (Dipel) and molecular diversity analysis of cotton bollworm (*H. armigera*) across northern Karnataka ecosystem through Randomly Amplified Polymorphic DNA (RAPD) marker were carried out. Geographic susceptibility of cotton bollworm to Bt toxin (Dipel) varied by having LC<sub>50</sub> values ranging from 0.149 to 0.828 mg/ml of diet. Primers used in the RAPD technique were able to differentiate cotton bollworm (*H. armigera*) populations of Dharwad, Haveri, Belgaum and Raichur from Bijapur indicating that cotton bollworm populations of Bijapur are genetically diverse from rest of the populations.

#### Response of Cotton Genotypes to Planting Pattern, Methods and Scheduling of Irrigation in GLBC Area of Karnataka

C.M. KALIBAVI

2006

MAJOR ADVISOR : Dr. R.A. SHETTY

Three field experiments were conducted to study the "Response of cotton genotypes to planting pattern, methods and scheduling of irrigation under GLBC

area in medium black soils of Agricultural Research Station, Arabhavi, Belgaum (Dist.) during 1998-99 and 1999-2000. Drip irrigation (DI) gave significantly higher seed cotton yield

## Abstract of Theses

(2787 kg ha<sup>-1</sup>) which was 12.20 per cent higher than alternate furrow irrigation (2484 kg ha<sup>-1</sup>). Among the cotton genotypes, ACP-71 (2839 kg ha<sup>-1</sup>) recorded significantly higher seed cotton yield over other genotypes viz., JK-276-8-2 (2659 kg ha<sup>-1</sup>), AH-I07 (2575 kg ha<sup>-1</sup>) and DHH-II (2470 kg ha<sup>-1</sup>). The yield increase in ACP-71 genotype was to the extent of 6.77, 10.25 and 14.94 per cent over JK-276-8-2, AH-I07 and DHH-II, respectively. Among the interaction effects, ACP-71 with drip irrigation gave significantly higher seed cotton yield (3031 kg ha<sup>-1</sup>) over other treatments. This was due to higher total dry matter production and yield parameters. The net returns in DI with ACP-71, AH-I07 and JK-276-8-2, which were 5.87, 5.62 and 4.67 per cent higher than alternate furrow

irrigation, respectively. Drip irrigation at 50% PE recorded significantly higher seed cotton yield (2644 kg ha<sup>-1</sup>) than other treatments, which gave 25.60 and 13.08 per cent higher seed cotton yield over DI at 100% PE and DI at 75% PE (TCGP). The maximum net returns and B: C ratio were recorded with DI at 50% PE (Rs. 42215 ha<sup>-1</sup> and 2.98). Significantly higher seed cotton yield obtained in paired row planting (45-135-45 x 60 cm) with drip irrigation (2349 kg ha<sup>-1</sup>), which gave 33.39 and 24.10 per cent higher yield over furrow inigation (1761 kg ha<sup>-1</sup>) and alternate furrow irrigation (1893 kg ha<sup>-1</sup>) respectively. Paired row planting recorded significantly higher net returns (Rs. 35636/ha) over surface irrigation (Rs. 25369/ha).

## GENETICS AND PLANT BREEDING

### Molecular Tagging for Fibre Strength in Cotton

SIVA PRASAD UPPUTURI

2006

MAJOR ADVISOR : Dr. S.A.PATIL

An investigation was carried out at ARS, Dharwad Farm during Kharif 2004-05 and 2005-06 with the objectives to identify recombinant lines (F<sub>7</sub> and F<sub>8</sub>) with hirsutum morphological and yield features and barbadense fibre properties from interspecific cross i.e., DS-28 x SB(YF)425 and to identify molecular marker(s) linked to fibre strength. On the basis of twelve easily distinguishable morphological traits, 1271 F<sub>7</sub> plants were made into nineteen groups which are recombinant for either one or other character of both hirsutum and barbadense type. Highest (1033) number of plants resembled hirsutum parent with halo length ranging from 18.00 to 37.33 mm have been isolated. Twenty plants varying for halo length from 18.00 to 37.33 mm were advanced to F<sub>8</sub> generation. Presence of low variability (range) in halo length within each progeny indicates the fixation of fibre length in F<sub>8</sub> generation. Progenies with

fibre strength of 17.6 to 29.9 g/t, fibre length of 21.0 to 34.1 mm and micronaire of 2.1 to 5.5 were identified in F<sub>8</sub>. Six plants could meet the requirements in five classes of spinning potential viz., 61-80, 51-60, 41-50, 31-40 and 6-12 counts. Balanced recombinants with superior fibre properties and high yielding ability identified in this study would be useful to develop long and extra long staple hirsutum varieties/hybrids. Fibre strength of 80 F<sub>2</sub> plants ranged from 18.1 to 29.1 g/tex, with a mean of 23.1 g/tex while fibre length varied from 21.5 to 35.1 mm. Only 28, out of 187 decamer primers showed consistent polymorphism between the parents. On Bulk Segregant Analysis, only one primer i.e., OPC 06 amplified 700 bp fragment in bulk DNA sample of high fibre strength as well as male parent. Linkage analysis showed the presence of the linkage between fibre strength locus and marker, with a distance of 6.25 cM.

## SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

### Characterization of Tank Silts of North Karnataka and Evaluation of its Effect on the Growth and Yield of Groundnut

N.K. BINITHA

2006

MAJOR ADVISOR : Dr. G.S.DASOG

A study was conducted on the characterization of tank silts of North Karnataka and the effect of tank silt application on the growth and yield of groundnut. The tank silts were sampled from 33 tanks spread in six districts of North Karnataka. Clay dominated the tank silt in Bellary and Bidar districts. In Bagalkot district, the samples were dominated by sand due to sandstone parent rock. The pH was slightly alkaline in all the samples. EC was around 0.2 except in Haveri, which was very low. Nitrogen content was around 0.1 % in majority of the cases, for Bagalkot

and Haveri, potassium was around 0.5 % in majority of the cases. Phosphorus content was also around 0.075 %. Among micronutrients, silt is rich in iron followed by copper, manganese and zinc. Quality of water sampled from these tanks was good. The properties of Kyasanakere tank silt was compared with its catchment. The coarse sand and fine sand content recorded similar values, silt content was higher in the catchment while clay was higher in the tank bed. Among the nutrients, the total N, P and Zn were higher in the tank bed silt than the catchment soil. The mineralogy

of the clay and silt fraction indicated presence of mica, smectite, vermiculite, quartz, K and plagioclase feldspar in both tank silt and catchment soil. Plagioclase feldspars are more dominant than K feldspars in the silt and catchment soils. The incubation study revealed that the tank silt at 20 t ha<sup>-1</sup> was significantly superior over 10 t ha<sup>-1</sup> and no silt with respect to ammoniacal and nitrate N, available

phosphorus sulphur and micronutrients. The field experiment was carried out at Muradi in Koppal district during rabi season of 2004-05 using silt from Ramdurga tank nearby. Tank silt at 20 t ha<sup>-1</sup> recorded significantly highest growth parameters, pod yield, haulm yield, yield attributes, major and micronutrient concentration, uptake and residual status in soil at all the crop growth stages.

## **PLANT PATHOLOGY**

### **Studies on Serodiagnosis, Epidemiology and Management of Sunflower Necrosis Viral Disease in Northern Karnataka**

ANAND V. HALAKERI

2006

MAJOR ADVISOR : Dr. A.S. BYADGI

Sunflower necrosis is a major virus disease of sunflower caused by Tobacco Streak Virus. It was first reported from Kolar district of Karnataka State during 1997. The roving survey for disease incidence in Northern Karnataka was undertaken and disease map was developed, which revealed the presence of disease in all the three seasons. The disease was severe in Bijapur, Raichur and Koppal districts showing 15-20 per cent incidence. Infected plants showed mosaic, marginal necrosis and malformation of leaves, calyx and earhead, early infected plants showed partial seed filling. TSV -S had wide host range and its Thermal Inactivation Point was 45°C. Dilution End Point 10<sup>-4</sup> and Longevity in vitro of 8 h. The epidemiological studies indicated positive correlation of disease with thrips population and also with maximum temperature. The virus was purified by extraction in Phosphate buffer, PEG precipitation, density gradient centrifugation and ultra centrifugation. Electron microscopic

observations revealed isometric shaped particles in decoration method. Immunizing rabbit with purified TSV -S produced the antiserum. SDS-P AGE revealed 30 Kda Protein band when stained with coomassie brilliant blue. Direct Antigen Coating Enzyme Linked Immuno Sorbant Assay indicated presence of virus particles in samples of sunflower, cowpea, peas, green gram, tomato, soybean, black gram and red gram but not in seeds of diseased plant. In Immunodiffusion test precipitation line appeared around wells containing diseased samples. RT-PCR yielded 800 bp length coat protein gene. The disease had a drastic effect on yield parameters of sunflower. Germplasm lines GMU-209, GMU-244, GMU-249, and GMU-259 exhibited some degree of tolerance properties with less than 10 per cent disease incidence. Crop could be protected from heavy loss due to virus infection by Imidacloprid seed treatment (@ 5 g/kg) + spray (@ 0.25 ml) at 30, 45 and 60 days after sowing and sorghum as border crop.

## **AGRICULTURAL EXTENSION EDUCATION**

### **A Study on Management of Eco - friendly Practices by Vegetable Growers of North Karnataka**

K.K. SHASHIDHARA

2006

MAJOR ADVISOR : Dr. L. MANJUNATH

A study on management of eco-friendly practices by vegetable growers of north Karnataka was undertaken in Dharwad and Belgaum districts of Karnataka in the year of 2005-06 with 160 vegetable growers and 60 consumers. The data was collected by personal interview method. The results revealed that medium knowledge level about environmental hazards (65.00%) and eco-friendly management practices (51.87%). Medium adoption of eco-friendly technologies by 68.75 per cent. Majority of the respondents were practicing cultural management and weed management practices. Majority of the respondents were not practicing applying of organic manures, selection of crops and cropping pattern, mixed cropping, inter cultivation practices, application of biofertilizers to soil and use of limited inorganic fertilizers. In case of socio-economic characteristics middle age, pre-university education, medium level of income, higher achievement

motivation, medium innovative proneness (52.50%), medium scientific orientation (55.00%), medium cosmopolitaness (58.13%) and medium economic motivation categories, (59.38%), deferred gratification (64.38%), medium attitude towards chemical fertilizers (70.63%) and medium risk orientation (71.25%). More than fifty per cent of respondents were members of cooperative society (51.87%) and majority (61.44%) of them participated in various activities regularly. Radio and T.V were possessed by 89.38 per cent and 80.63 per cent of the respondents, respectively. Two-third of the consumer respondents had medium level of awareness about eco-friendly grown vegetables. Nearly two-third of the respondents (63.33%) felt consumption of vegetables provides nutrients to body. Majority of the respondents suggested for making availability of pest resistant varieties (83.12%), followed by nearly two-third of respondents said organizing training programmes on eco-friendly practices (73.75%).

## Abstract of Theses

### **A Study on Indigenous Technical Knowledge About Rice Cultivation and Bovine Health Management Practices in Konkan Region of Maharashtra**

AMOLASHOK NIRBAN

2006

MAJOR ADVISOR : Dr.S.N. HANCHINAL

The study was conducted in the Konkan region of Maharashtra, in the year 2004, to document farmers' innovations and traditional wisdom. Seventy one farmers in 57 villages of 13 taluks across four districts were contacted based on the suggestions of extension personnel and snowball approach. Selection of respondents was done both on random and purposive basis. Traditional rice cultivation involved appropriate and rational package of practices. All the technologies were organic based and ecofriendly. In this package of practice wise use of natural processes like pest predator relationship, use of nitrogen fixing legumes in rotations was found. Holistic in nature, such farming has made wise use of byproducts of other allied enterprises on the farm. As far as bovine health management practices are concerned various traditional and indigenously developed practices have been documented for all the 39 diseases. These diseases have been classified under 13 systems' headings. Various herbal, non-herbal materials were used

for curing the diseases. Farmers were following oral, intraocular, nasal, anal administration and external application of drugs. Most of the herbal and non-herbal materials' use was justified by referring the books on medicinal plants and material medica. Required properties identified in the drug were grouped as major or supplementary depending upon their degree of effectiveness. Farmers also freely spoke about the constraints encountered by them, now-a-days while adopting the ITKs and gave their valuable suggestions to overcome them, as well. In general, the farmers following indigenous technologies were male, old aged, less educated, had large families, small land holdings with low annual income were less exposed to modern means of communication and extension personnel. The respondents' performance on management orientation, coordination ability, risk orientation and self confidence was better and had medium degree of self reliance. However, these characteristics' association with adoption of indigenous technologies was statistically non-significant.

## **HORTICULTURE**

### **Studies on Induced Mutagenesis and *in vitro* Regeneration in Turmeric (*Curcuma longa* L.)**

RAMAKRISHNA V. HEGDE

2006

MAJOR ADVISOR : Dr.A.N. MOKASHI

Turmeric is an important rhizomatous spice, combining properties of colourant, cosmetic and drug. Sterile triploid nature of turmeric is one of the bottlenecks in crop improvement. Being a vegetatively propagated crop, mutation breeding is an important tool in turmeric improvement. Studies were conducted to standardize the optimum dose of mutagen i.e., gamma irradiation for *in vivo* and chemical mutagens for *in vitro* raised plants, to standardize the protocol for *in vitro* clonal propagation and to study the variability in the induced mutants. Among the two cultivars evaluated, Salem was more sensitive to gamma irradiation with a LD<sub>50</sub> dose of 1.135 kR compared to Cuddappah (2.69 kR). Mutant spectrum showed predominance of striata type and dwarf types in chlorophyll and morphological mutants respectively. The study on vegetative characters indicated that lower doses of 0.5 and 1.0 kR did not affect the characters significantly. The vegetative characters and crop duration was drastically reduced at 5.0 kR and as a result, plants did not form the

rhizomes. Higher degree of variability was observed for characters such as number of tillers, number of leaves, leaf area, weight of mother and finger rhizomes. The highest GCV and PCV was observed for weight of finger rhizomes. C-1.0 - 10/4 (546.9g) and S-0.5-9/3 (487.48) were selected for higher rhizome yield, S-0.5 - 9/9 (24.7%) for recovery and 50.5-6/1(5.42) for higher curcumin content after evaluating evaluation of M<sub>1</sub>V<sub>2</sub> progenies. *In vitro* studies for clonal propagation of turmeric indicated that the highest number of multiple shoots in turmeric was obtained in MS medium supplemented with 2.0 mg/l BAP and 0.2 mg/l NAA whereas, better rooting was obtained with 0.5 mg/l IBA. The *in vitro* mutation studies in cv. Salem with chemical mutagens indicated that the LD<sub>50</sub> for EMS was 114.58 µM and DES was 28.80 µM. Both mutagens increased the variability in vegetative and reproductive characters. Mutants D-1-3 (318.25g) and E-200-4 (285.83g) gave the highest rhizome yield whereas, D-10-3 recorded the highest curcumin content.

### **Genetic Variability, Divergence, Heterosis and Combining Ability Studies in Cucumber (*Cucumis sativus* L.)**

CHANDRASHEKHAR N. HANCHINAMANI

2006

MAJOR ADVISOR : Dr.M.G. PATIL

An investigation was taken up to assess variability, diversity and combining ability in cucumber during the period from October, 2004 to March, 2006 at Horticulture

farm of Agricultural College, Bheemaranagudi, Gulbarga. To assess genetic variability and diversity 45 genotypes were evaluated. Out of 20 characters studied genotypic

and phenotypic variation were high for marketable fruits per vine. High heritability coupled with genetic advance over mean were recorded for total fruit yield per vine. Fruit yield had positive and highly significant association phenotypically and genotypically with vine length, internodal length, number of branches per vine, number of nodes per vine, fruit length, fruit diameter, average fruit weight, number of marketable fruits per vine and total number of fruits per vine. Average fruit weight had positive and direct genotypic and phenotypic effect on fruit yield per vine. Using estimated  $D^2$  values 45 genotypes were grouped into 8 clusters. The highest inter cluster distance was noticed between IV and V clusters. The intra cluster distance was highest in VII cluster. To determine heterosis and combining ability five

lines and seven testers were selected and subjected to line x tester analysis. BGDL x Hot Season, BGDL x White Long, BGDL x Hyderabad cucumber were superior performers owing to the high total fruit yield per vine and total number of fruits per vine. Among 35 hybrids maximum positive heterosis over mid and better parent were noticed in the hybrids BGDL x Hot Season and BGDL x White Long respectively, for total fruit yield per vine. Variance due to SCA was higher than GCA for most of the characters studied indicating involvement of dominant gene action than additive gene action. The hybrids GBGL x Hyderabad Cucumber and BGDL x Hyderabad Cucumber were most stable for yield and well adopted to all three environments.

## **HUMAN DEVELOPMENT**

### **Instructional Strategies to Accelerate Science Learning Among Slow Learners**

LATA L. PUJAR

2006

MAJOR ADVISOR : Dr. V. GAONKAR

A study on 'Instructional strategies to accelerate science learning among slow learners' was carried out in Dharwad during 2003-04. The objectives of the study were to know the prevalence of low achievers in schools, to develop instructional strategies based on the prescribed syllabus to teach science subject, to know the influence of gender, ordinal position, type and size of the family, parent's education, occupation and per capita income of the family on the rate of learning science among slow learners, to study the impact of various instructional strategies developed in learning science among slow learners and to know the teacher's opinion towards the different instructional strategies. The slow learners were identified from both Government and Private Kannada medium primary schools using four screening methods viz., academic achievement, teacher's assessment, intelligence test and achievement test. The sample for the study comprised of 122 slow learners. Correlation coefficient, t-test and chi square tests were used to

analyze the data. The results revealed that, the prevalence of low achievers was higher in Government school studying in third standard compared to Private and Aided schools. Gender, ordinal position, type and size of the family did not influence the rate of learning among slow learners. Whereas, parent's education, occupation and per capita income of the family had positive and significant influence on the rate of learning science among slow learners. Teaching using the different instructional strategies was found better than conventional method. Teaching through model was found to be the most effective instructional, strategy followed by charts, picture book, individual instruction and peer tutoring. However, statistically non-significant difference was found between the post test and retention test mean scores of both experimental and control group students. Teacher's assessment revealed that all most all of them had very good opinion towards using the picture book in teaching followed by models, charts, individualized instruction and peer tutoring.

\* \* \* \* \*

## MASTER OF SCIENCE

### AGRONOMY

#### Response of Cotton Genotypes to Different Sources of Organic Manures Under Organic Production System

SANGSHETTY

2006

MAJOR ADVISOR : Dr. H.B. BABALAD

A field experiment was conducted to study the "Response of cotton genotypes to different sources of organic manures under organic production system" at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad during 2004-05. The experiment was laid out in split plot design with varieties as main plots and organic nutrient management treatments as sub plots with three replications. Bio-pesticides were used as combative measures against pest and diseases. Among the varieties evaluated under organic production system, Jayadhar recorded significantly higher (TDMP) (137.50 g/plant) and drymatter accumulation in leaves (17.66 g/plant), stem (85.50 g/plant) and squares (4.82 g/plant) as compared to Sahana. Jayadhar also recorded significantly higher LAI (0.54 dm/m<sup>2</sup>), number of monopodial and sympodial branches (5.10 and 14.75/plant) and number of bolls (36.38/plant) at 180 DAS as compared to Sahana. Kapas yield (1172 kg / ha), net return (Rs.10,992/-) and B:C ratio (2:2) were also significantly higher with Jayadhar. Sahana recorded significantly higher fibre length, fibre fineness, fibre strength and maturity ratio as compared to Jayadhar. Among manurial treatments, integrated application of RDF

(40:25:25 N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O kg / ha) with FYM 7.5 t/ha recorded significantly higher TDMP production (142.16 g/plant), plant height (108.33 cm), leaf weight (18.74 g/plant), stem weight (83.54 g/plant), boll weight (39.10), number of monopodial and sympodial branches (4.33 and 15.56/plant) and number of green bolls (30.05 / plant) at 180 DAS as compared to rest of the treatment. Seed cotton yield (1142.35 kg / ha) was also higher with integrated manurial treatment. However, there was no significant difference with respect to quality parameter among all the treatments. Organic manurial treatments, FYM and VC equivalent to 100% RDN, FYM 100% + VC 100%, FYM 100% + glyricidia 100%, FYM 100%+ VC 50% + neem cake 50%, FYM 100% + glyricidia 50% + neem cake 50%, FYM 50%+ glyricidia 50%, FYM 50%+ VC 25%+ neem cake 25% and FYM 50%+ glyricidia 25%+ neem cake 25% were found on par with that of RDF (40:25:25 N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O kg/ha). Integrated manurial treatment (RDF+FYM) recorded significantly higher N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O content after harvest of the crop (264.27, 34.22 and 480.97 kg/ha NPK). Organic carbon content in soil was higher with RDF + FYM and FYM 100% + glyricidia 100% and also recorded significantly higher population of bacterial, fungal and actinomycetes.

#### Effect of Plant Density on Growth and Yield of Sesame Cultivars During Summer

K.N. HARSHA

2006

MAJOR ADVISOR : Dr. LOKANATH H. MALLIGAWAD

Field experiment was conducted to study the effect of plant density on growth and yield of sesame cultivars during summer at Main Agricultural Research Station, Dharwad in black clayey soil during summer season of 2004-05. In the experiment, two sesame cultivars E-8 and DS-1 were grown at five plant densities of 2,96,296, 3,33,333, 4,44,444, 5,55,555 and 6,66,666 plants ha<sup>-1</sup>. Sesame cultivar DS-1 produced higher seed yield (1760 kg ha<sup>-1</sup>) than cv. E-8 (1494 kg ha<sup>-1</sup>). The yield components, harvest index, threshing percentage and DME were greater in cv. DS-1 than in cv. E-8. Total dry matter (TDM) production plant<sup>-1</sup> at harvest was 12.46 per cent higher in cv. DS-1 than in cv. E-8. Dry matter production and its proportional distribution in reproductive parts were greater in cv. DS-1 than in cv. E-8. Cultivar DS-1 recorded higher N, P and K uptake and oil content than cv. E-8. Seed yield increased

from 1564 to 1743 kg ha<sup>-1</sup> with increase in plant density from 2,96,296 to 6,66,666 plants ha<sup>-1</sup>. Performance of individual plants with respect to growth, morphological, yield and yield components was better at lower plant density. Total dry matter plant<sup>-1</sup> was reduced by 15.65 per cent due to increasing plant density from 2,96,296 to 6,66,666 plants ha<sup>-1</sup>. Leaf area plant<sup>-1</sup>, number of branches plant<sup>-1</sup> and number of capsules plant<sup>-1</sup> decreased with increase in plant density from 2,96,296 to 6,66,666 plants ha<sup>-1</sup> whereas leaf area index, harvest index and uptake of plant nutrients N, P and K increased with increase in plant density from 2,96,296 to 6,66,666 plants ha<sup>-1</sup>. Higher seed yield (1743 kg ha<sup>-1</sup>) and net returns (Rs. 39,735) were obtained at higher plant density of 6,66,666 plants ha<sup>-1</sup>. Cultivar DS-1 and E-8 maximized their seed yield and net returns (Rs. ha<sup>-1</sup>) at higher plant density of 6,66,666 plants ha<sup>-1</sup>.

**Response of Baby Corn to Planting Methods and Irrigation Schedules Under Drip**

ANIL KUMAR S. MUGALKHOD

2006

MAJOR ADVISOR : Dr. A.D. JANAWADE

A field experiment was conducted at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad during early summer 2004 on clay loam soils to evaluate the planting methods and irrigation schedules under drip for baby corn. The experiment was laid out in a Randomized Block Design with factorial concept with three replications. The experiments comprised of two planting methods (P1 - 37.5 x 24 cm (normal row), P2 - 25-50-25 x 20 cm (paired row)) and four irrigation schedules (T1 - drip at 100% PE, T2 - Drip at 75% PE, T3 - drip at 50% PE and T4 - surface irrigation). The results indicated that both the planting methods viz. normal row and paired row planting did not influence the growth, yield parameters and quality parameters. However, paired row planting recorded significantly higher husked baby corn (86.39 q) and green fodder yield (56.45 Mg) over normal row planting (71.34 q and 46.20 Mg). The husked baby corn yield increase was to the extent of 22 per cent. Among the irrigation schedules, drip at 100% PE recorded significantly higher growth and yield parameters like number of leaves, dry matter

production, husked baby corn length, girth and number of babies per plant over drip at 75% PE, 50% PE and surface irrigation. Significantly higher husked baby corn yield (85.53 q/ha) and green fodder yield (65.14 Mg/ha) was recorded at 100% PE over rest of the irrigation schedules. The quality parameters, crude protein content (%) was highest in drip irrigation scheduled at 100% PE, but crude fibre and reducing sugars were significantly higher in drip at 50% PE over other irrigation schedules. Significantly higher leaf water potential and relative leaf water content was found in irrigation scheduled at 100% PE. It (100% PE) also recorded higher gross returns (Rs. 112987 /ha) and net returns (Rs. 91101/ha) over other irrigation schedules. The interaction effects were not significant for all growth, yield and quality parameters. For the Northern Transitional Tract, the baby corn can be planted in paired row system and irrigation scheduled at 100% PE. Drip irrigation realizing higher husked baby corn, green fodder yield, net returns and benefit:cost ratio. The drip was saved 26 per cent irrigation water over surface irrigation on clay loam soil.

**Phosphorus and Sulphur Management Studies in Castor (*Ricinus communis* L.)**

MANJUNATH B. JAMBAGI

2006

MAJOR ADVISOR : Dr. B. T. PUJARI

A field experiment was conducted at Agriculture College, Farm, Raichur during kharif 2005-06 to study the response of castor (*Ricinus Communis* L.) to different phosphorous and sulphur levels. The treatments comprised of four levels of phosphorus and three levels of sulphur were laid out in a split plot design with three replications. Different phosphorus levels had a significant effect on the growth and yield of castor. The application of 150 per cent RDP recorded significantly the higher seed yield (25.23 q ha<sup>-1</sup>) as compared to the application of 50 per cent RDP (20.62 q ha<sup>-1</sup>) and control (18.84 q ha<sup>-1</sup>) and was on par with the application of 100 per cent RDP (24.53 q ha<sup>-1</sup>). The application of 40 kg S ha<sup>-1</sup> recorded significantly higher seed yield (24.51 q ha<sup>-1</sup>) than the application of 20 kg S ha<sup>-1</sup> (21.46 q ha<sup>-1</sup>) and control (20.94 q ha<sup>-1</sup>). Phosphorus and

sulphur levels have significantly improved the quality of castor. Among the different levels of phosphorus 150 per cent RDP recorded significantly higher oil (50.82 %) content and oil yield (12.86 q ha<sup>-1</sup>) as compared to rest of the treatments except with the application of 100 per cent RDP. The application of 40 kg S ha<sup>-1</sup> recorded significantly higher oil (50.37%) contents and oil yield (12.43 q ha<sup>-1</sup>) when compared to the application of 20 kg S ha<sup>-1</sup> and control. Significantly higher net returns (Rs. 27143 ha<sup>-1</sup>) and BC ratio (3.42) was recorded with the application of 100 per cent RDP when compared to rest of the treatment except with the application of 150 per cent RDP. Among the sulphur levels, application of 40 kg S ha<sup>-1</sup> recorded significantly higher net returns (Rs. 26664 ha<sup>-1</sup>) and BC ratio (3.46) than other sulphur levels.

**Response of Baby corn (*Zea mays* L.) to Zinc and Iron and their Residual Effect on Succeeding Chickpea (*Cicer arietinum* L.)**

P. ASHOKA

2006

MAJOR ADVISOR : Dr. MUDALAGIRIYAPPA

A field experiment was conducted at Regional Agricultural Research Station, Raichur during 2005-2006 to study the response of Baby corn to zinc and Iron and their residual effect on succeeding chickpea. There were 10 treatments combinations consisting of RDF with micronutrients and organics (FYM and Vermicompost). The

treatments were replicated thrice in a Randomized Block Design. Application of RDF along with micronutrients and vermicompost exerted significant influence on growth and yield of Baby corn and also on succeeding chickpea. Application of RDF+25kg ZnSO<sub>4</sub>+10kg FeSO<sub>4</sub>+35 kg vermicompost recorded Significantly higher Baby corn yield



## Abstract of Theses

(64.43qha<sup>-1</sup>) and fodder yield (232.33qha<sup>-1</sup>) and it was on par with the application of RDF along with the micronutrients and 35 kg FYM. The higher Baby corn yield and fodder yield was attributed to higher growth (plant height, number of leaves, LA, LAL etc.) and yield components (ear length, ear weight, ear girth, number of ear per plant, etc) and also residual effect of RDF +25kg ZnSO<sub>4</sub> +10kg FeSO<sub>4</sub> + 35kg VC+50% RDF to chickpea recorded significantly higher yield (15.46 qha<sup>-1</sup>) and yield components (pods per plant and test weight) and it was on par with residual effect of RDF along with micronutrients and 35kg FYM+50% RDF to chickpea. The uptake of N, P, K, Zn and Fe were

significantly higher in RDF+25kg ZnSO<sub>4</sub>+10kg FeSO<sub>4</sub>+35kg VC or FYM. Application of RDF+25kg ZnSO<sub>4</sub> + 10kg FeSO<sub>4</sub>+ 35 kg VC to Baby corn and residual effect with 50% RDF to chickpea recorded higher gross return (Rs.96.838 ha<sup>-1</sup>) net returns (Rs.76.889 ha<sup>-1</sup>) and B:C ratio (3.85) when compared to all other treatments. Baby corn chickpea sequence resulted in the improvement of soil health and carryover benefit of applied residual micronutrients along with organics to succeeding chickpea. Application of RDF along with micronutrients and organics resulted in high quality and better consumer acceptable Baby corn ears.

### Integrated Nutrient Management in Maize (*Zea mays* L.)

PRASANNA KUMAR

2006

MAJOR ADVISOR : Dr. A.S. HALEPYATI

A field experiment was conducted at the Agricultural College Farm, Raichur during Kharif, 2005 to study the effect of integrated nutrient management in maize (*Zea mays* L.). There were 18 treatments comprising combinations of six organic manure and three inorganic fertilizer levels. The experiment was laid out in a split-plot design with three replication. Application of vermicompost @ 2.5 t ha<sup>-1</sup> recorded significantly higher grain (53.05 q ha<sup>-1</sup>) and stover yield (84.57 q ha<sup>-1</sup>) when compared to control (38.32 and 66.13 q ha<sup>-1</sup>) and incorporation of residues of sorghum @ 5 t ha<sup>-1</sup> (39.01 and 71.98 q ha<sup>-1</sup>). The higher grain and straw yield of maize with the application of organic manure was attributed to significantly higher growth and yield components. Application of 100 per cent RDF recorded significantly higher grain yield (53.63 q ha<sup>-1</sup>) when

compared to 50 per cent RDF (37.76 q ha<sup>-1</sup>) and it was on par with 75 per cent RDF. Application of vermicompost @ 2.5 t ha<sup>-1</sup> recorded significantly higher uptake of nitrogen (169.34 kg ha<sup>-1</sup>), phosphorus (53.37kg ha<sup>-1</sup>) and potassium (64.69 kg ha<sup>-1</sup>) when compared to control (116.96, 31.32 and 41.78 kg N, P and K ha<sup>-1</sup>, respectively) and incorporation of residues of sorghum @ 5 t ha<sup>-1</sup> (122.39, 34.91 and 46.32 kg N, P and K ha<sup>-1</sup>, respectively) and it was found to be on par with the rest of the treatments. Interaction effects caused due to the application of organic manures and inorganic fertilizer levels were found to be non significant. Application of vermicompost @ 2.5 t ha<sup>-1</sup> recorded maximum cost of cultivation (Rs.11,352 ha<sup>-1</sup>) and gross returns (Rs.29,592 ha<sup>-1</sup>) but, significantly higher net returns (Rs.21,045 ha<sup>-1</sup>) and B:C (3.06) was with the application of poultry manure @ 1 t ha<sup>-1</sup>.

### Response of Rajmash Genotypes to Time of Sowing During Rabi in the Northern Transitional Zone of Karnataka

SUREKHA

2006

MAJOR ADVISOR : Dr. T. SUDHA

A field experiment was conducted during rabi 2005-06 to study the performance of rajmash genotypes under different time of sowing at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad, Karnataka. Genotypes Arka Komal, Contender, HPR-35 and Waghya (in sub-plots) were sown during first and second fortnight of October and November (in main plots) using a split plot design with three replications on black clay soil. Sowing during first and second fortnight of October recorded higher seed yield (1999 and 1930 kg ha<sup>-1</sup>, respectively) compared to crop sown in November. The values of various growth (plant height, number of trifoliate leaves, number of branches plant<sup>-1</sup>, leaf area, leaf area index and total dry matter) and yield components (number of pods plant<sup>-1</sup>, number of seeds pod<sup>-1</sup>, seed weight plant<sup>-1</sup> and test weight) of rajmash were significantly higher with October sown crop than with November sown crop. Rajmash genotypes also differed significantly with one

another HPR-35 recorded higher seed yield (1829 kg ha<sup>-1</sup>) followed by Waghya (1774 kg ha<sup>-1</sup>), Arka Komal (1448 kg ha<sup>-1</sup>) and Contender (1407 kg ha<sup>-1</sup>). Yield variations were mainly due to variation in seed weight per plant and 100-seed weight. Protein content in seed did not differ significantly due to time of sowing. However, among genotypes HPR-35 recorded significantly higher protein content (22.75%) over Waghya, Arka Komal and Contender. Some of the interaction effects involving time of sowing and genotypes were found significant. When sowing were delayed from October first fortnight to November second fortnight significant reduction in seed yield of genotypes Waghya, Contender and Arka Komal but the yield reduction was comparatively less in HPR-35. The study revealed higher gross returns (Rs.58,000 ha<sup>-1</sup>), net returns (Rs.48,270 ha<sup>-1</sup>) and B:C (4.23) with October first fortnight sowing of Waghya, closely followed by HPR-35 sown during second fortnight of October.

**Effect of Organic Manures and Nitrogen Levels on Growth and Yield of Rabi Sorghum**

K.B. SANDEEP

2006

MAJOR ADVISOR : Dr.B.K. DESAI

A field experiment was conducted at Agriculture College Farm, Raichur, during rabi 2005 to study the effect of organic manures and nitrogen levels on growth and yield of rabi sorghum, there was 12 treatment combinations comprising of 4 organics and 3 nitrogen levels on the experiment was laid out in split plot design with 3 replications. Different organic manures had significant effect on the growth and yield of sorghum. Addition of poultry manure @ 3.5 t ha<sup>-1</sup> recorded significantly higher grain yield (1823.11 kg ha<sup>-1</sup>) as compared to application of vermicompost @ 1.5 t ha<sup>-1</sup> (1635.33 kg ha<sup>-1</sup>), FYM @ 6.5 t ha<sup>-1</sup> (1603.77 kg ha<sup>-1</sup>) and green leaf manure @ 1.5 t ha<sup>-1</sup> (1347.88 kg ha<sup>-1</sup>). The higher grain yield of sorghum due to poultry manure application was attributed to significantly higher weed components viz., earhead length, ear girth, number of grains per ear, grain weight per ear and test

weight and higher nutrients uptake (N, P and K) than the other sources of organic manures. The significant increase in grain yield of sorghum due to application of 50 per cent RDN (1751.16 kg ha<sup>-1</sup>) over 25 per cent RDN (1584.66 kg ha<sup>-1</sup>) and control (1471.75 kg ha<sup>-1</sup>) was attributed to significant increase in growth and yield components. Application of poultry manure recorded higher gross return (Rs. 15217 ha<sup>-1</sup>) and net returns (Rs. 10140 ha<sup>-1</sup>) when compared to other organic manures treatment. Among the inorganic nitrogen levels application of 50 per cent RDN was found economically superior, which was recorded significantly higher gross returns (Rs. 14695 ha<sup>-1</sup>) and net returns (Rs. 9606 ha<sup>-1</sup>) than other inorganic nitrogen levels. Application of organic and inorganic nitrogen levels influenced the available N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O content of soil after the harvest of sorghum significantly.

**CROP PHYSIOLOGY**

**Influence of Salicylic Acid and Mepiquat Chloride on Physiology of Disease Resistance in Groundnut (*Arachis hypogaea* L.)**

TAFSIRA NAZ

2006

MAJOR ADVISOR : Dr.S.M. HIREMATH

A field experiment was conducted to find out the influence of salicylic acid and mepiquat chloride on various morphological, physiological, biochemical, growth and yield and yield components in groundnut cv. JL-24 during kharif 2005 at MARS, University of Agricultural Sciences, Dharwad. The experiment consisted of 15 treatments with 3 replications and was laid out in randomized block design. The incidence of late leaf spot was severe in control as compared to other treatments and it was least in salicylic acid (500 ppm) + mepiquat chloride (1000 ppm) at all the stages. The plant height and number of branches increased significantly due to the application of salicylic acid. The leaf area increased with increasing concentration of salicylic acid. The important parameters like leaf dry weight, stem dry weight, dry weight of reproductive parts and total dry weight increased with the increasing concentration of salicylic acid, however, the effect was more pronounced when salicylic acid was applied in

combination with mepiquat chloride. The growth parameters like AGR, CGR, NAR and BMD recorded maximum values with salicylic acid (500 ppm) + mepiquat chloride. LAI, LAR and LAD were found minimum with mepiquat chloride treatments. The contents of chlorophyll-a, chlorophyll-b, total chlorophyll, phenol contents and tannin contents were significantly higher with application of salicylic acid (500 ppm) + mepiquat chloride (1000 ppm). However, the total sugar content decreased with the application of salicylic acid. NRA activity was more with the application of mepiquat chloride. The activity of peroxidase and polyphenol oxidase enzymes decreased with increase in disease severity. Pod yield, harvest index, shelling percentage and test weight were maximum with the application of salicylic acid and mepiquat chloride. However, oil content was more in treatments with mepiquat chloride. The B:C ratio was found higher with salicylic acid (500 ppm) + mepiquat chloride (1000 ppm).

**Effects of Seed Priming with Plant Growth regulators and Micronutrients on Growth and Yield of Cotton (*Gossypium herbaceum* L.) Under Salinity Stress**

S. SURESH BABU

2006

MAJOR ADVISOR : Dr.B. S. JANAGUDAR

An investigation was made with an objective to mitigate salt stress by soaking cotton seeds of *Gossypium herbaceum* var. RAHS14 with growth regulators (IAA and GA) and micronutrients (Na<sub>2</sub>SO<sub>4</sub> and Ca(NO<sub>3</sub>)<sub>2</sub>) and tested under natural soil salinity levels of <2, 6 and 12 dS m<sup>-1</sup> during 2005-06 at Agricultural Research Station,

Gangavati. Seed priming treatments IAA and Ca(NO<sub>3</sub>)<sub>2</sub> increased the yield and its components compared to other treatments under all salinity levels tested. The major contributing factors for enhanced yields are decrease in sodium content and Na/Ca ratio with increase in salinity and increase in potassium, calcium and K/Na ratio

## Abstract of Theses

especially at higher salinity levels. The K/Na ratio was maintained in seed priming treatments IAA and  $\text{Ca}(\text{NO}_3)_2$  by restricting the  $\text{Na}^+$  uptake and increased  $\text{K}^+$  uptake in shoot indicating the induced mechanism of salt tolerance in these treatments. Among the biochemical parameters, chlorophyll 'a' and 'b' and total contents decreased with increase in salinity level. However, these contents increased in seed priming treatments with IAA and  $\text{Ca}(\text{NO}_3)_2$  compared to rest of the treatments. Similarly, the enzyme activity of nitrate reductase decreased with increase in salinity, whereas,

free proline content increased. However, seed priming with PGR's and micro nutrients increased the NR activity and free proline content under salinity stress considerably. Based on the investigations, it could be concluded that among the plant growth regulators, IAA (200 ppm) and among the micronutrients,  $\text{Ca}(\text{NO}_3)_2$  (3%) were found to be better in overcoming the effects of salinity stress through maintenance of higher chlorophyll, proline, nitrate reductase activity, potassium, calcium, K/Na ratio and reduced sodium content and Na/Ca ratio in leaf even at higher salinity levels.

### Physiological Basis of Extending Post Harvest Shelf Life in Tomato

K.C. BABITHA

2006

MAJOR ADVISOR : Dr. B.T. NINGANUR

A laboratory experiment was conducted at the Department of Crop Physiology, University of Agricultural Sciences, Dharwad to study the influence of various post harvest treatments and storage conditions on various physico-chemical changes associated with ripening during the storage of tomato hybrid Lakshmi. The experiment was laid out in factorial completely randomized design with three replications. The treatments consisted of modified atmosphere packaging (MAP), HDPE packaging, LDPE packaging, paper packaging, calcium chloride dip, hot water dip and hot air treatments kept in two storage conditions, VIZ., ambient and cold storage. Significant differences were observed among the physico-chemical parameters due to various post harvest treatments and storage conditions. The tomato fruits kept in modified atmosphere

packaging (MAP) had a significantly low physiological loss in weight, total soluble solids, polygalacturonase activity and lycopene content and respiration rate. Modified atmosphere packed fruits followed by HDPE packaging had a higher titratable acidity, ascorbic acid content and organoleptic rating and thus extended the shelf life of tomato fruits by two weeks. Among the storage conditions, cold storage maintained significantly higher quality of fruits over ambient storage but, chilling injury symptoms were observed at the end of storage period. However, modified atmosphere packed fruits kept under cold storage significantly reduced the chilling injury symptoms and the fruits had a better quality as compared to other treatments combination.

### Influence of Plant Growth Regulators and Nitrogen on Regulation of Flowering in Stevia

C.N. KUMUDA

2006

MAJOR ADVISOR : Dr.A.S. NALINI PRABHAKAR

A field experiment was conducted at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad during summer 2005 to study influence of different growth regulators and nitrogen on reduction of flowering in stevia. The experiment was laid out in randomized block design with three replications. Significant differences were observed among the morphological parameters due to the application of growth regulators and nitrogen. The plant height and internodal length increased significantly in the treatment  $\text{GA}_3$  (500 ppm). Lowest length recorded in the treatment MH (1000 ppm). Maximum number of leaves and branches were recorded in the treatments MH (1000 ppm) and its interaction with nitrogen. Number of flowers and number of inflorescences were found maximum in control. But, there was delay in

flowering for 30 days in the treatment MH (1000 ppm) and its interaction with nitrogen. The treatments MH (1000 ppm), nitrogen and its interactions recorded maximum leaf dry weight, stem dry weight and total dry weight. The highest leaf area, LAI, LAD, LAR, SLW, AGR, CGR and NAR were recorded in the treatment MH (1000 ppm) among growth regulator treatments, 100 per cent nitrogen among nitrogen treatments and their interactions. Significant differences were also observed among biochemical parameters. The maximum total chlorophyll, Chl. a and Chl. b contents were recorded in the treatment MH (1000 ppm). The results on herbage yield increased significantly in the treatments MH (1000 ppm) followed by 100 per cent nitrogen and their interactions.

### A Comparative Assessment of Productivity of Compact and Robust Cotton Genotypes (*Gossypium hirsutum* L.) Under Rainfed Condition

VINAYAK D. LAXANI

2006

MAJOR ADVISOR : Dr. B. C. PATIL

A field experiment was conducted during 2005-06 under rainfed conditions at the Agricultural Research Station, Dharwad to study the productivity potential,

physiological and biophysical basis of yield variation of compact and robust plant types in cotton genotypes. The experiment consisted six genotypes laid out in a randomized

block design with three replications on medium black soil. Compact and robust genotypes. were selected based on growth and morphological characters like plant height, number. of leaves, number of nodes, sympodia and monopodia. Robust genotypes produced higher seed cotton yield as compared to compact genotypes. Among the genotypes Sahana produced significantly higher seed cotton yield (911.6 kg/ha) under spacing 90 x 30 cm. In compact genotypes SC-21 produced higher seed cotton yield (804 kg/ha) compared to other. This was mainly attributed to its close association with yield components such as number of bolls/m<sup>2</sup> ( $r = 0.901$ ) and harvest index.

Genotypes showed significant differences in their growth pattern, morphological characters and phenological. Among the genotypes SC-68 possessed higher dry matter at stages mainly because of higher NAR, CGR, and leaf area index as compared to other genotypes. In robust RAH 101 possessed higher TDM compared to other genotypes. Correlation studies indicated highly significant positive association of yield with TDFM ( $r = 0.474$ ), boll weight ( $r = 0.876$ ) and number of boll/plant ( $r = 0.901$ ). Among the genotypes SC-68 was comparatively early in phenological character. In robust GSHV 97/612 early compared to other genotypes. However, the spacing did not influenced the phenology.

#### Evaluation of Groundnut Genotypes for Lime Induced Chlorosis Tolerance

R. NAGARATHNAMMA

2006

MAJOR ADVISOR : Dr. R. V. KOTI

A pot culture experiment was conducted during rabi-summer, 2006 to evaluate the groundnut genotypes for lime induced chlorosis tolerance at College of Agriculture, University of Agricultural Sciences, Dharwad. The experiment was laidout in Completely Randomized Design with nine genotypes (viz., TMV2, JL-24, DERM-5-1, GPBDM 4/25, GPBD-4, DERM (VLS) , GPBDM 4/6, DERM15T and DERM14T) in three replications. The calcareous soil (9.5% lime) was used with recommended dose of nitrogen, phosphorus and potassium. The morphological, physiological and biochemical parameters of groundnut genotypes differed significantly due to lime induced iron chlorosis. The genotypes DERM and GPBDM had higher values of morphological and physiological parameters with higher ferrous iron content at all the stages. The genotypes TMV2, JL-24 and GPBD4 recorded significantly higher visual scores on 1 to 5 scale with higher per cent chlorosis and it was least in the DERM and GPBDM genotypes. SPAD readings of younger leaves

were higher in DERM and GPBDM genotypes. While SPAD values were least in TMV2, JL24 and GPBD4. The leaf ferrous content varied significantly among the genotypes and maximum Fe<sub>2+</sub> content was recorded in the DERM and GPBDM genotypes with higher chlorophyll content. The DERM and GPBDM genotypes recorded higher TDM, growth parameters, yield and yield parameters as compared to TMV2, JL24 and GPBD4, which had higher per cent chlorosis. The leaf peroxidase activity also differed significantly among genotypes. There was a strong and positive correlation between peroxidase activity and leaf ferrous iron content. The genotypes DERM VLS, DERM14T, DERM15T had higher leaf peroxidase activity with higher leaf ferrous content. Among the genotypes studied, DERM VLS, DERM14T, DERM15T and GPBDM were found to be relatively more chlorosis tolerant. In DERM genotypes, DERM (VLS) had higher peroxidase activity, higher ferrous iron, chlorophyll content and was more iron efficient groundnut genotype as compared to all the genotype, however, the shelling per cent was least in this genotype.

#### GENETICS AND PLANT BREEDING

##### Genotypic Variation for Root Traits in Relation to Phosphorus Nutrition in Groundnut (*Arachis hypogaea* L.)

K.A. KRISHNA

2006

MAJOR ADVISOR : Dr.P.M. SALIMATH

Groundnut (*Arachis hypogaea* L.) one of the major and important oil seed crops of the world is largely grown as a small hold crop with low nutrition conditions. Phosphorus is one of the most important nutrients and a major portion of P is fixed in the soil. Roots are here by have a major role in acquiring the available P; in this regard the experiment has been carried out and the genotypic variation for root traits in relation to phosphorus nutrition in groundnut (*Arachis hypogaea* L.) was studied in sixteen cultivars of Karnataka. The analysis of variance for all the traits indicated highly significant differences among genotypes under 100 % P and 50 % P. Genetic advance in 100% P and 50% P revealed good scope for selection. Mean performance of genotypes indicated increased expression for most of the root traits at 50% P than in

100% P. The mean performance of the individual genotypes was found to be low for all the root traits in 0 per cent when compared to 100% P and 50% P. Genotypes viz., JL 24, Dh 3-30, Dh 8, TAG 24, ICGV86590 and Spanish improved were tested for phosphorus uptake efficiency at 30, 45 and 60 DAS. ICGV 86590 was distinctly superior for P related traits in both sufficient and insufficient conditions. The superiority of ICGV 86590 in P sufficient conditions could be due to conversion of organic P in soil to inorganic P aided by phosphatase enzyme where as under reduced P conditions was mainly due to larger root system and/or production root exudates, which enhance solubility of soil P close to roots. Production of good root system under limited P supply and trying to acquire more P in sufficient condition with less investment on roots should make a genotype more efficient.

## Abstract of Theses

### Genetic Investigations in Soybean (*Glycine max* (L.) Merrill)

PARAMESHWAR M. GADDE

2006

MAJOR ADVISOR : Dr. G.T. BASAVARAJA

A field experiment was conducted during kharif 2004 to study the genetic variability, association analysis and genetic diversity for productivity traits. Further, screening for resistance to pod shattering, rust and yellow mosaic diseases was carried out to identify the resistant sources. The experiment comprising of 84 genotypes of which, most of them are released cultivars in India, along with some indigenous and exotic lines. The experiment was laid out in randomized block design with three replications. The observations were recorded on 11 productivity traits viz., plant height, number of branches, days to flowering, days to maturity, nodes per plant, pods per plant, seeds per pod, pod weight, 100 seed weight, oil content and seed yield per plant. The highest GCV and PCV values were observed for plant height, while oil content recorded lowest values. Days to flowering, oil content, pod weight, nodes per plant and seed yield per plant

recorded high heritability. High heritability coupled with high genetic advance was recorded for plant height, number of branches, pods per plant, pod weight, 100 seed weight and seed yield per plant. Association analysis studies revealed significant association of seed yield with pods per plant, pod weight, 100 seed weight and oil content. The maximum positive direct effect on seed yield per plant was exhibited by pod weight followed by 100 seed weight. Genetic divergence using Mahalanobis  $D_2$  analysis led to grouping of 84 genotypes into five clusters. The cluster-II is largest with 75 genotypes. The highest intracluster  $D_2$  value was observed in cluster-II and highest intercluster distance was observed between cluster-I and V. Screening studies revealed that 12 genotypes for yellow mosaic and two genotypes EC-241778 and EC-241780 for rust were resistant. However, none of the genotypes were resistant for pod shattering.

### Genetic Studies on Compact and Robust Plant Types of Cotton (*Gossypium hirsutum* L.)

GURURAJ

2006

MAJOR ADVISOR : Dr. RAJESH S. PATIL

Thirty two genotypes belonging to compact and robust plant types of cotton were evaluated in three different spacing situations at Raichur. The three different environmental situations included  $E_1$  (60 cm x 15 cm spacing),  $E_2$  (90 cm x 15 cm spacing) and  $E_3$  (60 cm x 30 cm spacing). The detailed objectives covered evaluation of genetic variability, characterization of plant type, comparison of species, path of productivity analysis, association analysis, path coefficient analysis in different environments and estimating stability parameters. High variability, heritability and GAM were observed for number of monopodia per plant, seed cotton yield per hectare, number of bolls per plant and seed cotton yield per plant in all the three environments. Characterization of plant type was done in thirty two genotypes. Eleven genotypes turned out to be robust and twenty one genotypes were categorized as compact. Comparison of plant types

revealed high potentiality of compact genotypes as compared to robust genotypes across the three spacing situations. The path of productivity analysis indicated the existence of genetic diversity among potential genotypes with respect to traits contributing to high productivity and this information was used in identifying parents for hybridization. Association analysis indicated significant positive association of seed cotton yield per plant with number of bolls per plant and GOT in all the three environments while, five boll weight recorded significant positive correlation in two environments,  $E_1$  and  $E_3$ . The path analysis revealed high positive direct effect on seed cotton yield through plant height in  $E_1$ , GOT in  $E_2$  and boll weight in  $E_3$ . Stability analysis for seed cotton yield per plant and number of bolls per plant revealed that the compact genotypes RAH-223 and RACH-16CC and a robust genotype RACH-II-5 were most stable and suitable for cultivation across diverse situations.

### Genetic Analysis of Yield and Oil Quality Traits in Sunflower (*Helianthus annuus* L.)

P. GOWTHAM

2006

MAJOR ADVISOR : Dr. H. L. NADAF

An investigation was taken up to decipher the magnitude of heterosis and combining ability for yield, yield components and oil quality traits in sunflower. The base material for this experiment consisted of 35  $F_1$ S involving five cytoplasmic male sterile (CMS) and seven diverse restorer lines of both native and exotic origin in line x tester mating design. A total of 12 parents and 35 hybrids along with KBSH-I, RSFH-I and KBSH-44 check hybrids were

evaluated in Randomized Block Design (RBD) with three replications during summer 2005-2006. Heterosis over mid parent, better parent and standard checks revealed that experimental hybrids had higher heterotic effect for all the characters under study. However, highest magnitude of average heterosis was observed for seed yield (kg/ha) (42.83%) followed by oil yield (kg/ha) (38.13%) and seed yield (g/plant) (21.99%). Majority of hybrids exhibited

negative heterosis for days to 50 per cent flowering and days to maturity. With respect to oil quality parameters oleic acid (18: 1) is considered to be very important, because of its nutritional superiority and also as component for enhancing shelf life of the oil. In this direction the heterosis for oleic acid content was ranged from -62.04 per cent to 50.76 per cent. Variance due to SCA was higher than GCA for all the traits, indicating predominance of non-additive gene action. None of the parental lines

combined superior GCA for all the traits. However, the hybrids involving parents VRF x NDOL-2, 4546A x NDOL-3, 6-D-I P#1, 6-D-I P#2 and RHA-857 were found to be better for majority of the traits including oil quality parameters. In majority of the crosses, high SCA was due to high x low or low x low GCA status of parents. It is suggested to evaluate the identified hybrids viz., (VRF x NDOL-2) x 6-D-I P#2, CMS234A x RHA-857 and (4546A x NDOL-3) x RHA-265 over locations and seasons to confirm their potentiality for exploitation of heterosis and their use in commercial cultivation.

#### Studies on Diversity, Heterosis and Combining Ability in Cotton

B. A. SANJAYA

2006

MAJOR ADVISOR : Dr. S. T. KAJJIDONI

An investigation was taken to decipher the magnitude of diversity, heterosis and combining ability in cotton. The material for Experiment-I consisted of 16 commercial tetraploid hybrids including three checks, which were evaluated in randomized block design with three replications during kharif 2005-06 to study the standard heterosis and diversity for seed cotton yield and fibre quality traits. Another experiment was conducted to study the magnitude of heterosis and combining ability in desi cotton using line x tester analysis. The study on standard heterosis revealed that two hybrids (PCH-205 and JK-Indra) exhibited significant positive heterosis for seed cotton yield over RAHH-95 and PCH-205 over DHH-II. None of the hybrids exhibited significant positive heterosis over popular commercial check Bunny. All 13 hybrids exhibited significant positive heterosis over DHH-II and RAHH-95 for 2.5 per cent span length, while over Bunny, these exhibited

non-significant heterosis. Two hybrids (Varun-I0 and Ankur-II02) were superior over Bunny and RAHH-95 for fibre strength. Genetic diversity studies for yield and yield contributing traits involving 16 hybrids were grouped into seven clusters indicating the presence of appreciable amount of diversity. Out of nine characters, seed cotton yield contributed maximum to the divergence. The 16 hybrids were grouped into three clusters based on  $D_2$  values for quality traits and among 2.5 per cent span length has contributed maximum towards divergence. Heterosis over mid parent, better parent and standard check in desi interspecific hybrids indicated that higher heterotic effect for all the characters under study. Four hybrids viz., DD-8NLF x MDL-2582, DD-8NLF x MDL-260 1, KS-16 x MDL-2582 and DD-8NLF x DLSA-17 were best cross combinations for seed cotton yield and its components. It is suggested to evaluate the identified hybrids in large-scale trial to confirm their superiority.

#### Genetic Variability and Correlation Studies in Niger (*Guizotia abyssinica* cass.) for Export Quality Traits

C. MITHUN KIMAWAT

2006

MAJOR ADVISOR : Dr. R. LOKESHA

A field experiment was conducted at Regional Agricultural Research Station, Raichur during kharif 2005 in randomized complete block design with three replications using 40 genotypes of niger (Bidar local) to study the genetic variability for yield contributing characters in general and export quality parameters in particular, character association and path analysis for 17 characters. A wide range of phenotypic genotypic coefficients of variability was observed for harvest index, seed lustre and number of seeds per plant. While it was moderate for number of branches per plant, number curved seeds and protein content. The heritability estimates ranged between 17.8 per cent for seed density to 98.6 per cent for protein content. High heritability was observed for oil content,

seed yield, seed luster, harvest index, number of seeds per plant, number of capitulum per plant and number of branches per plant. Seed yield per plant positively correlated with plant, number of branches per plant, number of capitula per plant, number of seeds per capitulum, seed length, seed breath, volume weight, seed oil, protein content, test weight and harvest index of capitulum per plant was the single major character which exhibited highest positive direct effect on seed yield per plant followed by harvest index and plant height. Among the quality parameters Bidar local-3 and Bidar local-4 showed highest oil and protein content respectively. Bidar local was found best with combination of all the quality parameters for export trait.

#### Genetic Studies of Yield and Quality Parameters in Okra (*Abelmoschus esculentus* (L.) Moench)

D. WEERASEKARA

2006

MAJOR ADVISOR : Dr.R.C. JAGADEESHA

A study was conducted to assess the magnitude of heterosis and combining ability in the line x tester cross material involving 24 hybrids generated by crossing 8 lines

with three testers and one commercial hybrid check (mahyco-10) in okra during 2005-06 at University of Agricultural Sciences, Dharwad. The analysis of variance

## Abstract of Theses

indicated significant amount of variability among the genotypes for yield and yield contributing traits. Among the hybrids KAO-25 x KAO-23, KAO-17 x KAO-AA, KAO-25 x KAO-AA and KAO-35 x KAO-AA were found to be the best cross combinations for fruit yield and its components. Analysis of combining ability variance revealed that the SCA variance was higher than GCA variance indicating predominance or non-additivity for all the characters except for fruit diameter. Evaluation of parents for all the 14 characters, indicated KAO-25, KAO-51, KAO-23 and KAO-

AA (Arka Anamika) are the good general combiners. Similarly evaluation of hybrids for all the 14 traits revealed KAO-16 x KAO-AA, KAO-25 x KAO-18, KAO-25 x KAO-23, KAO-25 x KAO-AA, KAO-51 x KAO-18, KAO-51 x KAO-23, KAO-51 x KAO-AA, KAO-61 x KAO-23 and KAO-61 x KAO-AA as the best specific combine. It is proposed to evaluate the hybrids KAO-25 x KAO-23, KAO-17 x KAO-AA, KAO-25 x KAO-AA and KAO-35 x KAO-AA over locations and seasons to confirm other potentiality for exploitation of heterosis in okra.

### Combining Ability and Heterosis Analysis for Grain Yield Components in Single Cross Hybrids of Maize (*Zea mays* L.)

MAHANTESH

2006

MAJOR ADVISOR : Dr.M. C. WALI

A study was conducted to assess the magnitude of heterosis and combining ability in the diallel cross material involving 45 hybrids. 10 parents and 5 commercial checks (DMH-2, Cargill-900M, Pro-Agro-4642, All Rounder, and Bio-9681) in maize during 2004-05 at Agricultural Research Station, AICMIP, ARS, Arabhavi, University of Agricultural Sciences, Dharwad. An attempt was made to have an idea of nature of gene action and extent of heterosis in respect to grain yield and other yield contributing traits. The analysis of variance indicated significant amount of variability among the genotypes for all the 13 traits studied. Significant and standard heterosis in desirable direction was recorded by two crosses for grain yield per ha. The present study revealed direct relationship between sca effects, heterosis and per se performance of hybrids for several characters. Among the hybrids studied, ARBMH-

43 and ARBMH -44 were found to be the best cross combinations for yield per ha and its components. Analysis of combining ability variance revealed that GCA variance was significant for 8 and SCA variance was significant for 13 characters. This indicated the importance of both additivity to non-additivity in these characters. Evaluation of parents for all the 13 traits studied, indicated P4 and P5 are the good general combiners. Similarly, evaluation of hybrids for all the 13 traits revealed ARBMH-43 and ARBMH-44 are the best specific combiners for grain yield. From this investigation, it is suggested to evaluate top five hybrids viz., ARBMH-43 and ARBMH-44, ARBMH-35, ARBMH-26 and ARBMH-24 for commercial utilization for yield and these can be directly used as hybrids, after evaluating at different locations for stability.

## PLANT BIOTECHNOLOGY

### Characterization of *CRYIIA* and *CRYIIB* From Native *Bacillus Thuringiensis* Isolates

MARY SUCHITA XALXO

2006

MAJOR ADVISOR : Dr.M.S. KURUVINASHETTI

*Bacillus thuringiensis* is a gram-positive spore forming bacterium that is a valuable source of *cry* genes that encoding delta endotoxins, active against a wide range of insect pests. In the present study, an attempt was made to clone and express *cryIIa* and *cryIIe* from native *Bacillus thuringiensis* isolates. Amplicons of 2.1kb obtained on PCR amplification of *B. thuringiensis* YESP3 and SW-18 total DNA using *cryIIa* and *cryIIe* specific primers. Was cloned into linear pTZ57RjT. the recombinant clones pSKK2010 and pSKK1401 obtained were positive for restriction analysis and specific amplification of *cryIIa* and *cryIIe*. Further, the *cryIIa* and *cryIIe* gene was sub cloned into prokaryotic expression vectors pET28+ and expressed in

*E.coli* BL21 (DE3) plysS. The recombinant clones pSKK2001 and pSKK2002 were positive for PCR amplification and restriction analysis. The SDS-PAGE and bioassay studies showed expression of 77.7kDa protein and the protein expressed was toxic to *Plutella xylostella*. Sequencing of full-length 2.1 kb *cryIIa* and *cryIIe* amplicon present in pSKK2010 and pSKK1401 by using M-13 forward and reverse primers revealed that the cloned gene has 99% homology with reported gene sequence. Further, the *cryIIa* and *cryIIe* was subcloned into plant transformation vector pHS100. The recombinants obtained were named as pSKK2402 and pSKK2602 these constructs will be resource for plant transformation studies.

## SEED SCIENCE AND TECHNOLOGY

### Studies on Nutrition, Growth Regulators and Post Harvest Fruit Handling on Seed Yield and Quality and RAPD Analysis of Pumpkin Genotypes

C.T.MANJUNATH PRASAD

2006

MAJOR ADVISOR : Dr. ASHOK S. SAJJAN

Three experiments were carried out at University of Agricultural Sciences, Dharwad. In first experiment, the growth regulators Ethrel 200 ppm, GA<sub>3</sub> 25 ppm and NAA 100 ppm along with control were combined with three fertilizer levels of 100:40:40, 125:50:50 and 150:60:60 kg NPK per ha to study growth, seed yield and quality. Maximum number of leaves per vine (70.80) at harvest and seed yield (722.48 kg per ha) was observed at Ethrel 200 ppm in combination with 150:60:60 kg NPK per ha. The seed quality parameters like hundred seed weight (9.67 g), germination percent (94.00) and reduced electrical conductivity (0.586 dSm<sup>-1</sup>) were recorded with NAA 100 ppm combined with 150:60:60 kg NPK per ha. In second experiment, fruit size of large (> 2.00 kg), medium (1.00 1.99 kg) and small (<0.99 kg) were combined with four seed extraction intervals i.e.

extraction of seed immediately, one month, two month and three month after harvest to study the seed yield and quality. Maximum seed weight per fruit (43.57 g) was observed in large fruits in combination with extraction of seed one month after harvest. Seed quality parameters like germination (97.13 %), seed vigour index (5101) and reduced electrical conductivity (0.648 dSm<sup>-1</sup>) were recorded with large fruits combined with seed extraction one month after harvest which was on par with large fruits and seed extraction two month after harvest. In third experiment, pumpkin genotypes viz., Arka Chandan, Arka Suryamuki, local collections (L<sub>1</sub>, L<sub>2</sub> and L<sub>3</sub>) were identified through RAPD markers. RAPD analysis were tried with six primers namely OPA-06, OPA-11, OPA-20, OPK-09, OPK-14 and OPL-16 which resulted with polymorphic bands identifying each varieties uniquely.

### Influence of Mulching and Seed Treatments on Storability of Rabi / Summer Groundnut (*Arachis hypogaea* Gaertn.)

Y.D. USHA

2006

MAJOR ADVISOR : Dr. A. S. CHANNAVEERSWAMI

The laboratory experiments to study the influence of mulching, storage conditions, seed treatment with chemicals and plant products and methods of storage on storability of rabi summer groundnut were conducted in the Department of Seed Science and Technology, University of Agricultural Sciences, Dharwad during June 2005 to March 2006. TAG-24 pods produced under without polymulch condition retained satisfactory germination of 70 per cent (MSCS) upto six months after storage and recorded better quality parameter throughout the storage period while it was upto four months only in seed produced under poly mulch conditions. Among the storage conditions seeds stored in PLGB with either of the desiccants (silicagel or CaCl<sub>2</sub> or CaCO<sub>3</sub>) maintained germination above MSCS

upto eight months of storage. Interaction of mulching and storage conditions, pod produced under mulching and stored in PLGB with desiccants recorded higher values for all the quality parameters viz., speed of germination, germination, seedling length, seedling dry weight and seedling vigour index. In the second experiment, TMV-2 pods treated with chlorpyrifos and stored in sprayed HDPE bag performed better throughout the storage period by recording better quality parameters. The seeds treated with chlorpyrifos @ 2 ml per kg of pods maintained germination above MSCS upto six months of storage. The pods stored in sprayed HDPE bag with treatment retained satisfactory germination of 70 per cent upto eight months of storage period with higher values for all the quality parameters.

### Influence of Post Harvest Handling Techniques on Seed Quality and Storability of Muskmelon (*Cucumis melo* L.)

V. ROOPA

2006

MAJOR ADVISOR : Dr. RAJESH S. PATIL

Muskmelon is a most popular desert fruit grown in both garden lands and river beds in the warmer region of the world. Present investigations were carried out with the objects of studying the influence of post-harvest handling techniques on seed quality and storability of muskmelon in the Department of Seed Science and Technology, College of Agriculture, University of Agricultural Sciences, Dharwad during March 2005 to March 2006. The performance of big size fruit was better compared to other size fruits for fruit physical parameters and seed quality parameters which recorded higher fruit

weight (1493 g), fruit length (25.12 cm), fruit diameter (14.41 cm), seed weight per fruit (16.14 g), filled seeds per fruit (527) and filled seeds percentage (93.61%) with less number of unfilled seeds per fruit (36) and unfilled seeds percentage (6.39%). Among different drying methods, seeds dried in oven at 40°C temperature recorded lowest drying time of 21.58 hours with significantly higher germination (63.70%) and vigour index (1421) compared to sun drying on metal sheet and on cement floor but was on par with shade drying and both maintained germination percentage above the minimum standard of seed



## Abstract of Theses

certification (60%) upto ten months of storage. Among different seed treatments tested, seeds treated with chlorax recorded higher values of germination (63.40%), seedling dry weight (186 mg/10 seedlings) and vigour index (1585) with less moisture content (9.22%) at the end of ten months of storage period which was followed by seeds treated with fenvalertae, sweet flag rhizome

powder, malathion and neem oil and these maintained germination percentage above the minimum standard of seed certification (60%) upto ten months of storage. In the interactions, seeds of big size fruits dried in oven at 40°C temperature and seeds of big size fruits treated with chlorax recorded higher values for all the seed quality parameters throughout the storage period.

### **Effect of Pinching, Plant Nutrition and Growth Retardant Sprays on Seed Yield, Quality and Storage Studies in China Aster (*Callistephus chinensis* (L.) Nees)**

B. GNYANDEV

2006

MAJOR ADVISOR : Dr. M. B. KURDIKERI

The field experiment was conducted to ascertain the influence of pinching, fertilizer levels and growth retardant sprays on seed yield and quality. Storage studies in four china aster varieties stored in four containers was also conducted in the department of Seed Science and Technology, UAS, Dharwad during 2005-06. The results of the field experiment revealed that pinching at 25 DAT showed significant decrease in plant height and increase in number of flower bearing branches, number of flowers per plant, number of seeds per flower, test weight and seed yield per ha (308 kg) with better seed quality parameters. Among fertilizer levels, higher fertilizer level (270: 180: 150 kg NPK/ha) resulted in more number of branches, flowers, seeds per flower and higher seed yield (342.3 kg/ha) with better seed quality parameters. Among growth retardants, foliar spray at 25 DAT with MH 500 ppm followed by CCC 200 ppm also resulted in more number of branches, flowers, seeds per flower, seed yield per ha (362.28 and 316.85 kg, respectively) and higher

seed quality parameters. The interaction between pinching and fertilizer level (PxF), pinching and growth retardant sprays (PxS), fertilizer levels and growth retardant sprays (FxS) and pinching, fertilizer levels and growth retardants sprays (PxFxS) showed non-significant differences on plant growth, seed yield and seed quality parameters. However, relatively more yield and seed quality parameters were noticed with pinching, higher level of fertilizer and spray of MH 500 ppm. The storage experiment involving four varieties of china aster and four containers revealed that, among varieties, Kamini followed by Phule Ganesh Voilet found relatively better in storability with high germination and seedling vigour with low EC up to six months of storage. Among containers, seeds stored in aluminium foil and polythene bags were found better in storage with high germination and seedling vigour parameters compared to seeds stored in paper and cloth bags.

### **Effect of Pre-harvest Sanitation Spray on Seed Yield, Quality and Post-Harvest Seed Storability in Greengram (*Vigna radiata* (L.) Wilczek)**

J. DIVYASHRI

2006

MAJOR ADVISOR : Dr. M. N. MERWADE

First field experiment was conducted to know effect of five insecticides and three stages of insecticidal sprays on seed yield and quality of greengram during kharif 2005 at Agriculture College farm. Among five insecticides, spraying of malathion recorded significantly maximum pods per plant, pod weight, seed yield per plant and hectare (961 kg), 100-seed weight, seed germination (%), seedling vigour index and dry weight with less percentage of infected pods and seeds per plant at harvest followed by nimbecidine and methyl parathion as against untreated plants. Similar results were recorded in spraying of insecticides at 20 and 10 DBH compare to 20 or 10 DBH. Interaction effect between insecticides and stages of insecticidal spraying (IxS) were found non-significant for most of the seed yield and quality parameters. Second laboratory experiment was conducted under ambient

conditions for 10 months period with eleven seed treatments and two storage containers. Seed quantitative parameters like seed infestation, loss in seed weight, seed moisture and EC showed consistently increasing trend while seed quality parameters like 100-seed weight, germination, seedling vigour index and seedling dry weight exhibited significantly decreasing trend with advancement of storage period upto 10 months. Seeds treated with castor oil, neem oil, malathion and sweet flag rhizome powder retained higher seed quality with less quantitative losses as against control seeds during 10 months period. Similar results were also seen in seeds stored in polythene bag over cloth bag during entire storage period. In general, seeds treated with castor oil and stored in polythene bag retained higher seed quality well above MSCS with minimum quantitative losses as against untreated seeds stored in cloth bag for ten months period.

*Karnataka Journal of Agricultural Sciences, 19(4): 2006*

**Effect of Fertilizer, Biofertilizer and Micronutrients on Seed Yield and Quality of Brinjal (*Solanum melongena* L.)**

J. KIRAN

2006 MAJOR ADVISOR : Dr. B.S. VYAKARANAHAL

A field experiment was carried out at Saidapur Farm of Main Agricultural Research Station. University of Agricultural Sciences, Dharwad during rabi season of 2005-06 to find out suitable levels of fertilizer, biofertilizer and micronutrients on seed yield and quality of brinjal cv. Malapur Local. The experiment consisted of 16 treatment combinations comprising of four levels of fertilizers viz., 125: 100:50 kg NPK/ha (RDF), 100: 100:50 kg NPK/ha + *Azospirillum* at 250 g/ha (root dipping), 125: 100:50 kg NPK/ha + PSB at 250 g/ha (root dipping) and 100: 100: 50 kg NPK/ha + *Azospirillum* and phosphate solubilizing bacteria each at 125 g/ha (root dipping) and four types of micronutrient spray viz., zinc sulphate (0.2%), ferrous sulphate (0.5%), borax (0.2%) and a control. The experiment was laid out in randomized block design adopting factorial concept with three replications. The results indicated that significantly higher growth components such as plant height, number of leaves and branches per plant and higher yield components like number of fruits per plant (16.72), fruit weight (145.70 g), fruit length (12.16 cm), fruit girth (7.90 cm), fruit yield per ha (22.88 t), number of

seeds per fruit (1904), seed weight per fruit (12.67 g), 1000-seed weight (6.52 g) and seed yield per ha (445.74 kg) and higher seed quality components viz., germination percentage (93.50), root length (9.47 cm), shoot length (7.32 cm), seedling vigour index (1576), field emergence percentage (86.75) and seedling dry weight (45.54 mg) were recorded at 100: 100:50 kg NPK/ha + *Azospirillum* and PSB (root dipping) treatment. Among the micronutrient spray, zinc sulphate (0.2%) recorded higher growth components viz. plant height, number of leaves and branches per plant and higher yield components viz., number of fruits per plant (17.18), fruit weight (134.41 g), fruit length (11.42 cm), fruit girth (8.16 cm), fruit yield per ha (21.52 t), number of seeds per fruit (1859), seed weight per fruit (11.85 g), 1000-seed weight (6.43 g) and seed yield per ha (434.84 kg). and higher seed quality components viz., germination percentage (92.72), root length (9.26 cm), shoot length (7.10 cm). seedling vigour index (1529), field emergence percentage (84.00) and seedling dry weight (41.95 mg). The combination of  $F_4S_2$  treatment was found to be maximum for growth, yield and seed quality parameters.

**Correlation studies Between Seed, Seedling, Growth and Yield Characters on Yield of Sunflower Hybrids (*Helianthus annuus* L.)**

SHARNKUMAR

2006

MAJOR ADVISOR : Dr. BASAVEGOWDA

A field experiment was conducted at Main Agricultural Research Station, College of Agriculture, Dharwad during kharif 2005-06 to study the correlation studies between seed, seedling, growth and yield characters on yield of sunflower hybrids. The experiment consisted of eight sunflower hybrids and was laid out in randomized block design with three replications. Among the hybrids studied, KBSH-44 hybrid recorded more seed density (1.0 g/cc) hundred seed weight (5.86 g), kernel weight (76.47%) and kernel to hull ratio (3.3). Germination percentage (88.3), rate of germination (29.0), root length (14.5 cm), shoot length (15.9 cm), seedling vigour index (2687), seedling dry weight (123.0 mg), plant height (180.0 cm), number of leaves (23.6), leaf dry matter (34.9g),

stem dry matter (45.8 g), total dry matter (80.7 g), head dry matter (30 g) head diameter (16.8 cm), number of seeds per head (1345) number of filled seeds per head (1196), seed yield per plant (74.5 g) and seed yield per hectare (17.16 q). Among the hybrids the characters like seed, seedling, growth and yield recorded highly significant positive correlation with respect to hundred seed weight (0.749), seed density (0.831), kernel to hull ratio (0.592), root length (0.592), shoot length (0.810), seedling vigour index (0.716), plant height (0.538), number of leaves (0.718) at 60 DAS, leaf dry matter (0.549), stem dry matter (0.748), total dry matter (0.758), head diameter (0.804), number of seeds (per head (0.589), number of filled seeds per head (0.645), Seed filling percentage (0.615) and hundred seed weight (0.546) with yield.

**Effect of Seed Invigouration on Synchrony and Storage Potentiality of Parental Lines of Sunflower Hybrid RSFH-1**

CHANDRAKANTH N. PAWAR

2006

MAJOR ADVISOR : Dr. S.N. VASUDEVAN

Field and laboratory experiments were conducted to study the effect of seed invigouration on synchrony and storage potentiality of parental lines of sunflower hybrid RSFH -1 at the Main Agricultural

Research Station and Laboratory studies in the Department of Seed Science and Technology, College of Agriculture, University of Agricultural Sciences, Dharwad - 580 005 during kharif season of 2005-06. The results of the field

## Abstract of Theses

experiment revealed that, (RH64NB) male parental seeds invigorated with GA<sub>3</sub> 50 ppm showed significantly higher field emergence, plant height, leaf area index, lesser number of days to initiation of flowering, days to 50 per cent flowering, maximum capitulum diameter, higher seed set, seed yield per plant and seed yield per ha (802.0 kg) in female parent (CMS 103A). but no significant differences were noticed among seed quality parameters. The urea (2%) spray at button initiation stage resulted in maximum plant height, leaf area index, lesser number of days to initiation of flowering, days to 50 per cent flowering, maximum capitulum diameter, higher seed set, seed yield per plant and seed yield per ha (794.0 kg) but seed quality parameters were non-significant. The interaction between

seed invigoration and urea spray showed non-significant difference on plant growth, seed yield and seed quality parameters. However, pedicel synchrony between parental lines and more hybrid seed yield were noticed with male seed invigorated with GA<sub>3</sub> 50 ppm followed by spraying of urea (2%) to the restorer line at button stage. The storage experiment involving female (CMS-103A) and male (R-64NB) parental seeds of sunflower hybrid RSFH -1, revealed that among seed invigoration treatment α-tocopherol (2%) found relatively better in maintaining higher germination and seedling vigour with low EC and lower lipid peroxidation value up to eight months of storage in both parental line.

### Studies on Hybrid Seed Production of Bhendi (*Abelmoschus esculentus* (L.) Moench)

BASAVARAJ MALLIKARJUN

2006

MAJOR ADVISOR : Dr. B.S. VYAKARNAHAL

The field investigations were carried out for standardization of hybrid seed production techniques in bhendi at Main Agricultural Research Station, College of Agriculture, University of Agricultural Sciences, Dharwad during kharif 2006 to study the effect of pollination time, crossing ratio fruit retention and growth regulators on seed yield and quality. In the hybrid seed production experiment pollination of emasculated buds of Arka Anamika at 9.00 am gave higher fruit set (38.75%), fruit length (25.03 cm), fruit girth (6.06 cm), seed weight per fruit (3.20 g), number of seeds per fruit (57.91), 100 seed weight (6.54 g), hybrid seed yield per plant (20.23 g), germination (88.55%), shoot length (21.99 cm), root length (12.20 cm), seedling vigour index (3035), field emergence (82.19%) compared to pollination at 8.00 am, 10.00 am, 11.00 am, 3.00 pm and

4.00 pm. The similar results were also recorded with crossing ratio of 4: 1 female to male compared to 6: 1, 8: 1 and 10: 1 ratio. In the parental seed production, six fruits retention per plant recorded significantly higher seed weight per fruit (3.34 g), number of seeds per fruit (60.41), 100 seed weight (6.66 g), germination (91.16%), seedling vigour index (3438) and field emergence (85.89%), where as seed yield (34.16 g) per plant was significantly higher with all fruits retention per plant. Among the growth regulators, GA<sub>3</sub> 100 ppm sprayed at fruit initiation stage recorded higher seed weight (3.29 g), number of seeds per fruit (60.68), seed yield (29.15) per plant, 100 seed weight (6.72), germination (90.89%), seedling vigour index (3436) and field emergence (85.35%) compared to NAA 10 ppm and control (without spray).

### Studies on Integrated Nutrient Management on Seed Yield and Quality of Chilli

SIDDESH H. KODALLI

2006

MAJOR ADVISOR : Dr. D.S. UPPAR

A field experiment was conducted at the University of Agricultural Sciences, Dharwad during kharif season of 2005, to study the effect of organics, biofertilizers and plant growth regulators on seed yield and quality in two chilli cultivars (Byadagi kaddi and Byadagi dabbi) under rain fed condition. The experiment consisted of 14 treatments laid out in randomized block design with three replications. Results of field experiment (kharif 2005) revealed that, the application of FYM 25 t per ha + RDF (100:50:50 kg NPK/ha) gave higher seed yield (209 kg/ha) followed by vermicompost 5 t per ha + RDF (192 kg/ha) over without organics (162 kg/ha). The seed yield was significantly higher with the application of FYM 25 t per ha

along with RDF was attributed to higher number of branches (31.1), number of fruits per plant (105.3), number of seeds per fruit (93.8) and 1000 seed weight (4.31 g). Among the treatments, application of FYM 25 t per ha along with RDF recorded significantly higher germination (83.75%), root length (6.0 cm), shoot length (5.6 cm), seedling vigour index (976), seedling dry weight (4.60 mg), field emergence (81.80%) and ascorbic acid content (114 mg/100 g fruit) followed by RDF + vermicompost 5 t per ha over control. Among the genotypes, byadagi kaddi excelled in all the parameters except fruit diameter, pericarp weight and ascorbic acid content over byadagi dabbi.

**Characterization of Sesame Genotypes Through Morphological, Chemical and RAPD Markers**

K. S. SUHASINI

2006

MAJOR ADVISOR : Dr. N. K. BIRADAR PATIL

The experiment was conducted at the Main Agricultural Research Station, UAS, Oharwad during kharif, 2005 for identification of sesamum genotypes through morphological characters, chemical and molecular tests were carried out at Seed Research Laboratory of National Seed Project. The 22-sesamum genotypes were grouped into different groups based on morphological characteristics such as plant height, number of primary branches per plant, number of nodes per plant, internodal length and stem pigmentation, number of leaves per plant, leaf length and leaf shape, leaf colour, and leaf petiole pigmentation. The flower characteristics such as 50 per cent flowering, flower petal colour, flower hairiness and pod characteristics viz., number of pods per axil, number of pods per plant, pod length, pod shape, pod beak, pod dehiscence, number of locules per pod were used for grouping the genotypes. Based on the seed characteristic

such as seed colour, thousand seed weight, oil content percentage, and the seedling characteristics the genotypes were classified into different groups. The seeds were subjected to NaOH and KOH test for differentiating the genotypes. Based on the colour of the solution, the genotypes were grouped as light brown, brown and dark brown in NaOH test and light yellow, yellow, light brown, brown and dark brown in KOH test. Based on the coleoptile growth response to GA<sub>3</sub>, the genotypes were grouped as very low response, low response and moderate response and based on the coleoptile growth response to 2,4-D genotypes were grouped as susceptible and highly susceptible. RAPD profile for all the 10 genotypes were generated with 10 random decamer primers. Between Paiyar and Kanak genotypes minimum similarity and maximum similarity between Usha and VS-9701 was noticed at molecular level.

**Effect of Fumigation on Seed Quality During Storage of Groundnut (*Arachis hypogaea* Gaertn.)**

S. V. VIJAYANNA

2006

MAJOR ADVISOR : Dr. A.S. CHANNAVEERSWAMI

The two laboratory experiments were conducted in Department of seed Science and Technology, University of Agricultural Sciences, Dharwad during June 2005 to March 2006 rabi season to study effect of fumigation on groundnut. Seeds fumigated with both fumigants (aluminium phosphide and ethylenedibromide) retained satisfactory germination of 70 per cent (MSCS) upto four months after storage period. Among the exposure period, groundnut seeds fumigated with an exposure period upto 96 hours maintained the germination per cent above minimum seed certification standard (70%) upto six months whereas, groundnut seeds fumigated with an exposure period beyond 96 hours, could retain 70 per cent germination upto six months only. Interaction of fumigants and exposure period groundnut seeds fumigated with ethylenedibromide for 24 hours exposure period (F<sub>2</sub>Pd) was found to be superior by recording highest, test weight (38.50 g), germination (62.50%), speed of germination (26.00),

seedling length, seedling dry weight (3.30 g/ten seedlings) and seedlings vigour index (645). besides this treatment recorded lower moisture content (8.98%). electrical conductivity of seed leachate (0.810 dS/m) less per cent reduction in test weight (1.02%) and germination (33.51%) at the end of tenth months of storage. Second experiment, groundnut seeds fumigated with ethylenedibromide performed better seed quality parameters. germination (52.34%). seedling vigour index (606). tester (37.76 g). speed of germination (18.93) at the end of tenth month of storage. The seeds fumigated once at 30, 90 and 150 days after harvest maintained germination above MSCS upto eight months of storage. Interaction between fumigants and number of fumigants, groundnut seeds fumigated with ethylenedibromide once at 30, 90 and 150 days after harvest retained satisfactory germination of 70 per cent upto eight months of storage period with higher values for all the seed quality parameters.

**Effect of Plant Population, Nutrition, Pinching and Growth Regulators on Plant Growth, Seed Yield and Quality of African Marigold (*Tagetes erecta* L.)**

H. M. SUNITHA

2006

MAJOR ADVISOR : Dr. RAVI HUNJE

Two field experiments were conducted to study the influence of plant population, nutrition, pinching and growth regulators on plant growth, seed yield and quality of African marigold at Water and Land Use

Management Institute (W ALMI) Farm, Dharwad during 2004-05 and Laboratory studies were carried out at National Seed Project, University of Agricultural Sciences, Dharwad. The application of vermicompost as 50% RDN

## Abstract of Theses

along with 50% RDF recorded significantly higher plant height (100.32 cm), number of primary branches per plant (13.13), number of flowers per plant (66.19), seed yield per plant (18.65 g) and seed yield per ha (499.05 kg) and also recorded higher 1000 seed weight (3.36 g), germination percentage (89.10), field emergence percentage (81.48), root length (6.22 cm), shoot length (5.55 cm), seedling dry weight (11.53 mg) and vigour index (1047) compared to application of recommended dose of fertilizer (RDF). While wider spacing of 60 x 60 cm recorded more number of primary branches per plant (11.59), number of flowers per plant (59.65), seed yield per plant (15.37 g) compared to closer spacing of 60 x 40 cm. However seed yield per ha (453.47 kg) was significantly higher at closer spacing of

60 x 40 cm. Significantly higher plant height (95.93 cm) was recorded in unpinched plants, while pinched plants recorded significantly higher number of primary branches per plant (12.00), number of flowers per plant (61.88), seed yield per plant (18.22 g) and seed yield per ha (473.71 kg). Among the growth regulator, GA<sub>3</sub> 200 ppm spray recorded significantly higher plant height (101.21 cm), number of primary branches per plant (14.47), number of flowers per plant (68.66), seed yield per plant (20.63 g) and seed yield per ha (531.54 kg) and also recorded significantly higher 1000 seed weight (3.34 g), germination percentage (90.13), field emergence percentage (77.10), root length (6.34 cm), shoot length (5.41 cm), seedling dry weight (11.44 mg) and vigour index (1059) compared to ethrel 750 ppm.

## SOIL SCIENCE AND AGRICULTURE CHEMISTRY

### Effect of Organic and Inorganic Sources of Nitrogen on Yield and Quality of Onion (*Allium cepa* L.) and Soil Properties in Alfisols

H. N. MAMATHA

2006

MAJOR ADVISOR : Dr. N. A. YELEDHALLI

The field experiment on Effect of organic and inorganic sources of nitrogen on yield and quality of onion (*Allium cepa* L.) and soil properties in alfisols was conducted during kharif 2005 at the Raichur campus of UAS, Oharwad on red sandy loam soil. The experiment comprising of 9 treatments with 3 replications in a randomized block design was conducted. The application of organic manures either FYM or vermicompost in different proportions to supplement nitrogen significantly influenced the bulb yield of onion. Among the various organic manure treatment combination treatments with 100 per cent RDN through FYM and 100 per cent RDN through vermicompost recorded higher yield, dry matter accumulation (leaf and bulb), higher % TSS and results were on par with 75 per cent RDN through FYM and 75 per cent RDN through vermicompost. Significantly higher N, P, K and S content

and uptake by onion crop was noticed in treatments receiving 75 and 100 per cent RDN through FYM and vermicompost. There was significant improvement in physico-chemical properties of soil after harvest of crop. Further DC and MWHC of soil were enhanced due to supplementation of different levels of RDN through organics. Similarly the available nutrient status of soil (N, P, K and S) significantly enhanced due to supplementation of RDN through FYM and vermicompost. Supplementation of 75 and 10 per cent RDN through FYM resulted in higher TC, GR, NR and high BC ratio compared to all other treatment combinations. The beneficial effect of integrating organics and inorganics in obtaining enhanced yield of quality attributes may be attributed for favorable soil condition and enhanced nutrient use efficiency.

### Response of Chilli to Drip Irrigation and Fertigation on a Vertisol of Malaprabha Command Area

K. G. SHASHIDHARA

2006

MAJOR ADVISOR : Dr. B. M. RADDAR

A field experiment was conducted on a Vertisol at Water Management Research Centre, Belvatagi in Malaprabha command during kharif 2005-06 to study the response of chilli to drip irrigation and fertigation on a Vertisol of Malaprabha command area. The moisture regimes are I<sub>1</sub> - 80 per cent PE level, I<sub>2</sub> - 60 per cent PE level, I<sub>3</sub> - 40 per cent PE level and the fertilizer levels are F<sub>1</sub> - 100 per cent, F<sub>2</sub> - 75 per cent and F<sub>3</sub> - 50 per cent recommended dose of fertilizer (RDF) with nine treatment combinations. replicated thrice and laid out in Split Plot Design. No significant differences on chilli yield were observed when crop received irrigation levels between 40 to 80 per cent of potential evaporation with discharge rate of 8 lph. Whereas, the application of 100 per cent RDF significantly increased the yield of chilli compared to lower levels of fertilizers.

Moisture regimes had no significant effect on uptake of N, P and K at all stages of crop growth. Regarding fertilizer levels, 100 per cent RDF has shown highest uptake of these nutrients at all stages of crop growth than at lower level of fertilizer. The interaction effect of moisture regimes and levels of fertilizer did not yield significant difference in uptake of N, P and K by chilli crop. Available nitrogen, phosphorus and potassium of soil at harvest of crop was non-significant due to variation in the moisture regimes, whereas nutrition with 100 per cent RDF has recorded highest available N, P and K as compared to lower levels. Chilli crop receiving irrigation supply at 40 per cent PE with a discharge rate of 8 lph and 100 per cent RDF application was assumed to be good enough to realize highest gross income, net income and B:C ratio than in other treatment combinations.

**Long Term Residual Effect of Application of Organic and Inorganic Sources of Nutrients on Growth and Yield of Greengram (*Vigna radiate*, wilzeck)**

SHRINIVAS S. PATIL

2005

MAJOR ADVISOR : Dr.S. N. UPPERI

A Long- term field experiment was initiated during 1988 at Agricultural Research Station, Bheemarayanagudi on cropping system under rain fed conditions on typic chromusterts, the experiment was continued till 2004-05. The present study was carried out to assess the effect of long term application of different organic and inorganic sources of nutrients on crop yield, nutrient uptake and soil properties. The experiment was laid out in randomized block design with three replication and 10 treatments. The green gram crop was grown as test crop during kharif season as residue crop. The results revealed that combined application FYM and fertilizer recorded lower bulk density ( $1.23 \text{ mg/m}^3$ ) as compared to fertilizer alone ( $1.25 \text{ mg/m}^3$ ). No significant difference in pH and electrical conductivity of soil were observed among different treatments the combined application of fertilizer and FYM carried significant increase in available N (235

kg/ha), P (32.8 kg /ha), K (456.6 kg /ha) and DTPA extractable Fe (0.451 g/ha), Zn (0.251 g/ha). The growth and yield of greengram differed significantly due to combined application of FYM along with inorganic fertilizer. Significantly the highest grain yield (954.5 kg /ha) of green gram was obtained with 100% RDF+ 10t FYM. Similar being the result of haulm yield. The uptake of both major and micronutrients by green gram leaf, stem and grain were increased significantly. The highest B: C ratio 3.76 was recorded with the treatment of 100% RDF+ 10 t FYM followed by 50% RDF + 5 t FYM. Which was about 3.69. The result indicated that judicious use of organic manures and fertilizers can help to maintain soil fertility and sustain higher level of productivity in long run, long term application of organic sources not. only sustained the yield and quality but also alleviate the negative energies of soil, arised due to intensive cultivation with chemical fertilizers.

**Performance of Groundnut Genotypes for Iron Nutrition in Calcareous Soil**

B. P. GURUPRASAD

2006

MAJOR ADVISOR: DR. V.B. KULIGOD

A field experiment was conducted at Agricultural Research Station, Bheemarayangudi of Gulbarga district during rabi 2005-2006 to study the performance of different groundnut genotypes as influenced by soil and foliar application of iron sulphate in a calcareous soil. Among the different groundnut genotypes tested TMV-2 and R-925 I recorded significantly higher growth parameters viz., plant height, number of branches per plant and dry matter production, iron ( $\text{Fe}^{2+}$ ) content and lower percent chlorosis than the other two genotypes (KRG-I and GPBD-4) at all the stages of crop growth. The yield parameters studied such as number of filled and unfilled pod per plant, test

weight, shelling percentage and pod yield of groundnut were also significantly higher in the genotypes TMV-2 ( $23.38 \text{ q ha}^{-1}$ ) and R-925 I ( $21.92 \text{ q ha}^{-1}$ ) than the other two genotypes. The lowest yield was recorded with the genotype GPBD-4 ( $18.62 \text{ q ha}^{-1}$ ). Application of iron sulphate either through soil or foliar spray resulted in significantly higher growth, yield and uptake of nutrients by the different groundnut genotypes studied. Between the soil and foliar application, foliar application resulted in significantly highest growth and yield parameters and lower percent chlorosis. Nutrient status after the harvest revealed non-significant difference among genotypes as well as among iron management practices.

**AGRICULTURAL ENTOMOLOGY**

**Management of Cotton Sucking Pests Using Biorationals**

R. MANU

2006

MAJOR ADVISOR : Dr. R. S. GIRADDI

Field investigations were carried out to study the effect of organic amendments, with two regimes of nitrogen (100% and 50%) and botanical pesticides against sucking pests of cotton viz., leafhoppers, thrips, aphids and whiteflies during kharif 2004 at the Main Agricultural Research Station, University of Agricultural Sciences, Dharwad. Application of split dose of neem cake @ 500 kg/ha (250 kg/ha each at sowing and 30 days later) with 100% NPK and 50% N & 100% PK regime was found to be a promising organic amendment in the management of cotton

sucking pests, which resulted in to significantly lower pest activity, optimal plant growth and higher kapas yield (6.28 and 6.12 q/ha). This was followed by one time application of neem cake @ 500 kg and neem cake (250 kg) + vermicompost (1250 kg) per ha at sowing. However, the crop that received chemical interventions (check) registered significantly lowest density of sucking pests and highest kapas yield (7.20 and 7.19 q/ha). Comparatively, lower activity of sucking pests was observed on the crop receiving organics with 50% N,

## Abstract of Theses

100% PK vis-a-vis 100% NPK and organics. Soil application of neem cake @ 500 kg/ha, 100% RDF superimposed with nimbecidine sprays on the crop @ 5 mill emerged as the best treatment which recorded significantly lower activity of sucking pests and higher kapas yield (8.16 q/ha), followed by vermicompost @ 2500 kg/ha and sprays of nimbecidine @ 5 mill. While, the organics with NSKE 5%

and *Vitex negundo* leaf extract 5% were found to be moderate in their efficacy against sucking pests. Various organics and botanicals were found to be quite safe to predatry coccinellids and chrysopids in cotton ecosystem, as evidenced by the normal activity, being comparable to untreated crop. The chemical interventions significantly affected the activity of these beneficials

### Studies on Storability of Indigenous Materials and Their Utilization on Okra Sucking Pests

D.N. DHANALAKSHMI

2006

MAJOR ADVISOR: DR. C.P. MALLAPUR

Investigations were carried out on the influence of storage period of botanical extracts on their efficacy against sucking pests of okra both under laboratory and field conditions. Investigations were also made on the efficacy of indigenous materials and new molecules against pests of okra under field conditions at Main Agricultural Research Station, Dharwad during kharif 2005-06. Laboratory studies revealed that fresh NSKE (5%), GCK (0.5%) and 1 day old GCK were the effective treatments causing 90 per cent mortality of both aphids and leafhoppers at 7 DAT. The next best treatments included 1 day old NSKE, 2 and 7 days old GCK and NSKE. Field studies revealed that fresh GCK (0.5%) was the effective treatment in reducing aphids (66.24%), leafhopper (70.95%) and thrips (77.79%) population with the highest good fruit yield (35.89 q/ha). The next best treatments included 2 days old GCK, fresh and 2 days old NSKE. Further, the stored botanical extracts were found safe to natural enemies. Among different indigenous materials evaluated, NSKE

(5%) + GCK (0.5%) + CD (5%) combination treatment was comparable to that of oxydemeton methyl 25 EC (1.5 ml/l) in reducing aphids, leafhoppers and thrips population. The highest good fruit yield was obtained in NSKE + GCK + CD (41.55 q/ha). The next best treatments included GCK + CD + CD, GCK + CD and GCE + CD + CD. The higher IBC ratio was recorded in all the effective indigenolls materials and the indigenous materials were also found safe to natural enemies. Among different new molecules tested. imidac10prid 200 SL @ 0.5 ml/l and acetamiprid 20 SP @ 0.2 g/l were the effective molecules against aphids and leafhoppers (>90% reduction). On the contrary, spinosad 45 SC @ 0.1 ml/l was found effective against thrips (93.85% reduction). However, the least fruit borer damage with highest good fruit yield was recorded in emamectin benzoate 5 SG @ 0.2 g/l (7.82% and 47.02 q/ha) and spinosad (9.19% and 45.94 q/ha) with higher IBC ratio. Emamectin benzoate, spinosad and acetamiprid were found safe to natural enemies.

### Biology, Crop loss Estimation and Management of SpHINGID, *Agrius convolvuli* L. (Lepidoptera: Sphingidae) on Greengram

B.D. JAYARAM

2006

MAJOR ADVISOR: Dr. P.S. HUGAR

Studies on the survey, biology, crop loss estimation and management of *Agrius convolvuli* L. (Lepidoptera: Sphingidae) on green gram was carried out during 2005-06. Results of fixed plot survey on sphingid status on greengram in Kushtagi of Koppal district, Lingasugur of Raichur district and Bheemarayanagudi and Yadgir of Gulbarga district revealed the sphingid activity was started from last week of July and continued till second week of August. The heavy population (2.24 larvae/meter row) was noticed in Yadgir with lowest population (1.0 larvae/meter row) was observed in Lingasugur. The results of roving survey in different locations of Koppal, Raichur and Gulbarga districts revealed the larval population was low (Raichur district) during last week of July. The larval population was highest (Gulbarga district) during first week of August. Efforts to study biology of *A. convolvuli* revealed the development of egg, larva, pre-pupa and pupa was completed in 7.05, 25.65, 2.40 and

14.25 days, respectively. The longevity of adult with food ranged from 10 to 12 and 13 to 16 days in case of male and female, respectively. Longevity of male and female without food ranged from 8 to 10 and 8 to 12 days, respectively. Pre-oviposition and oviposition period lasted for 2.6 and 7.7 days, respectively with an average fecundity of 142.7 eggs per female. The total life cycle lasted for 49.35 days. The loss caused by *A. convolvuli* at different stages of crop growth revealed the highest yield (6.13 q/ha) was obtained from caging treatment. Among the different insecticides tested, spinosad 45 SC (94.60%) and indoxacarb 14.5 SC (91.51 %) were effective in suppressing the larval load of *A. convolvuli* followed by chlorpyrifos 20 EC (88.14%) and fenvalerate 20 EC (82.90%) in reducing larval population. Cost economics analysis showed, chlorpyrifos 20 EC is effective chemical against *A. convolvuli* on greengram with Rs. 7,276 and 1.07 of net profit and benefit cost ratio, respectively.

**Role of Vermicompost, Vermiwash and Other Organics in the Management of Thrips and Mites in Chilli**

SAUMYAGEORGE

2006

MAJOR ADVISOR: Dr.R.S. GIRADDI

Field investigations were carried out for the evaluation of organic soil amendments viz., vermicompost and neem cake, botanicals and vermiwash in the management of thrips, *Scirtothrips dorsalis* Hood and mite, *Polyphagotarsonemus latus* Banks on chilli (cv. Byadagi) and its effect on the natural enemy fauna in chilli ecosystem, during kharif, 2005, at MARS, UAS, Dharwad. Application of organic amendments to soil in nursery significantly influenced the seedling vigour index (SVI). Vermicompost @ 500 g/m<sup>2</sup> and neem cake @ 100 g/m<sup>2</sup> proved best treatments resulting in higher SVI (941.19 and 927.10), comparable to check receiving FYM + 100% RDF + RPP (964.77). In the main field, application of vermicompost @ 2.5 t/ha followed by NSKE 5% and neemazal at 2, 5, 7, 11 weeks after transplanting alternatively and neem cake @ 0.5 t/ha followed by NSKE 5% and neemazal sprays, recorded significantly less population of thrips, mite and

leaf curl index and higher growth and yield parameters (2.49 and 2.39 q/ha), being comparable to the standard check (3.66 q/ha). The seedlings raised by applying vermicompost @ 500 g/m<sup>2</sup> and neem cake @ 100 g/m<sup>2</sup> performed significantly better in the main field amended with organics by recording significantly lower population of thrips, mite and leaf curl index, better growth parameters and yields (2.92 and 2.71 q/ha). Vermiwash foliar spray at 1:1 dilution proved better than 1:2 and 1:4 dilutions. Vermicompost @ 2.5 t/ha at planting, vermiwash 1:1 seedling dip and foliar spray was most effective, it registered significantly lower population of thrips, mites and leaf curl index, comparable to standard check. This treatment also promoted higher plant height, number of branches, number of fruits per plant and yield (2.98 q/ha) being on par with check (3.90 q/ha). All the organic amendments used were found to be quite safe to the natural enemies.

**Abundance of Pests and Their Natural Enemies on Bt and Non Bt Cotton**

A. C. MANJU

2006

MAJOR ADVISOR: Dr. B.V. PATIL

Studies on the abundance of pests and their natural enemies on Bt and non Bt cotton was undertaken at college of Agriculture and Regional Agricultural Research Station, Raichur (unprotected condition) and also in farmer's field (protected condition) at Nelahal village, Raichur district, Karnataka during 2005-06 season using RCH-2 Bt and RCH-2 non Bt cotton hybrids. Incidence of sucking pests in different cotton hybrid plots were more or less same at both Research station and in farmer's field. The number of boll worm eggs laid on central top growing shoot did not differ between the two cotton hybrids. Presence of Cry IAc protein in RCH-2Bt resulted in significantly lower *H. armigera*, *E. vittella* larval population and incidence of pink boll worm larvae as rosette flowers compared to RCH-2 non Bt cotton. Fruiting bodies damage was negligible on Bt cotton compared to non Bt cotton. Similarly, the predatory population was more or

less same in unprotected condition. Where as, predatory population were slightly higher in RCH-2 Bt compared to RCH-2 non Bt cotton in farmer's field. There was no difference in the *Chrysoperla carnea* larval, pupal and total developmental duration when grubs fed on aphids which were reared on Bt and non Bt cotton leaves. Similarly, there was no difference in fecundity and percent fertile eggs when eggs of *Chrysoperla carnea* collected from Bt and non Bt cotton plants. The parasitoid, *Campoletis chloridaeae* completed its life cycle on second instar *Helicoverpa* larvae fed on non Bt cotton leaves, squares and artificial diet. Where as, parasitized *Helicoverpa* larvae fed on Bt cotton leaves, squares and discriminate dose of Bt toxin, both the host and parasitoid did not survive. Over all, Bt cotton had no influence on predatory population where as it indirectly affected the development of parasitoid population on *Helicoverpa* larvae.

**Studies on Pest Complex, Thier Natural Enemies and Evaluation of Modules in Bt and Non Bt cotton**

G. R. BHAVYA RANI

2006

MAJOR ADVISOR: Dr.SHEKHRAPPA

Studies on the survey of pest complex, their natural enemies and evaluation of bio-intensive pest management (BIPM) and recommended package of practices (RPP) for Bt and non-Bt cotton under rainfed condition were undertaken at MARS, UAS, Dharwad Karnataka during 2005-06. Results indicated that there

was no significant difference among Bt and non-Bt cotton hybrids with regard to sucking pests viz., leafhoppers, thrips, aphids, red cotton bugs and dusky cotton bugs. However, Bt hybrids recorded slightly higher populations of sucking pests. MECH -184 Bt and MECH-184 non-Bt hybrids recorded low population of sucking pests. Similarly,



## Abstract of Theses

there was no much difference with respect to predatory population and parasitization, which appeared more or less same in all the hybrids. However, predatory population and egg parasitization was highest on MECH184 non-Bt. The bollworms larval population was significantly less in Bt cotton hybrids as compared to their non-Bt versions and popular hybrid. The effect of Bt gene was much convincing in terms of damage caused to fruiting bodies, locule damage and flower rosetting. Among the different Bt hybrids the seed cotton yield was higher in RCH-2 Bt (8.17 q/ha) followed by MECH184 Bt (6.77 q/ha). RPP module irrespective of Bt and non-Bt cotton hybrids were

significantly superior in recording lower incidence of leafhoppers, thrips, red cotton bug and ducky cotton bug population. While, with respect to aphids BIPM with Bt and non-Bt cotton performed better. Similarly the natural enemy population appeared significantly higher in BIPM treatment (RCH-2 Bt and RCH-2 non-Bt). As bollworm management is concerned RCH-2 Bt with RPP and BIPM performed better with regard to bollworm population and their damage. RPP + RCH-2 Bt recorded highest yield 17.50 q/ha followed by BIPM + RCH-2 Bt (15.25 q/ha). Among modules RPP + RCH-2 Bt was superior in registering higher seed cotton yield and net profit of Rs. 18045 with minimum interventions.

## PLANT PATHOLOGY

### Investigations on seed Mycoflora of Greengram and Blackgram

PARASAPPA R. SAABALE

2006

MAJOR ADVISOR: Dr. Y.D. NARAYANA

Greengram and blackgram varieties were collected from different locations of northern Karnataka to assess seed mycoflora by different methods. Dry seed examination revealed that, field sample from Bimarayanagudi showed the highest percentage of diseased/dicoloured seeds (14%) in greengram. Similarly in blackgram Gulbarga sample recorded highest percentage of diseased/dicoloured seeds (12%). Seed mycoflora were assessed from greengram and blackgram seeds by agar and blotter method. Among them *Alternaria alternata*, *Aspergillus niger*, *A.lavus*, *Rhizoctonia bataticola*, *Macrophomina phaseolina*, *Fusarium oxysporum* and *F.roseum*, were frequently encountered, whereas *F.solani*, *F.moniliformae*, *Phoma* spp. and *Colletotrichum* spp. were less frequent. Raichur storage and market showed the highest mycoflora (>38%) as compared to field harvested sample (35%) from different districts, and showed less (70%) germination. Nine fungi were isolated from seed coat, embryo and endosperm *Fusarium* spp. was isolated from all the parts. *A.alternata*, *A.niger*, *R.bataticola*, *F.oxysporum* and *M.phaseolina* were recovered from seed coat (55%) and cotyledon (22%).

Seed priming with fungicides revealed that, mancozeb (5% mycoflora) was effective against all fungi except *A.niger*, Benomyl and carbendazim were effective against *A.niger*, *In vitro* evaluation of fungicides mancozeb (100%) was effective against *A.alternata*, Benomyl (100%), carbendazim (100%) and captan (96.66%) were effective against *A.niger* and metalaxyl MZ, carbendazim, thiophanate methyl showed complete inhibition against *R.bataticola* and *M.phaseolina*. *In vivo* evaluation of fungicides, captan recorded the highest percentage of germination (94%), shoot length (17.56 cm), root length (10.25 cm) and dry weight (364.2mg) in greengram whereas in blackgram thiram showed highest percentage of germination (96%), shoot length (16.88cm) and dry weight (372.5 mg). *In vitro* and *in vivo* evaluation of botanicals, multineem was found effective followed by tricure with more than 85 per cent of inhibition. Among bio agents, *Trichoderma viride*-32 (73.33%) was effective against *A.alternata* whereas *Bacillus subtilis* (c) (83.33%) against *A.niger* and *T.viride*-16 isolated against *R.bataticola*, (69.22%) and *M.phaseolina* (71.85%).

### Studies on Root Rot of Chilli Caused by *Sclerotium rolfsii* Sacc.

VINOD DANGE

2006

MAJOR ADVISOR: Dr. K. S. NAIK

Chilli (*Capsicum annum* L.) is one of the most important commercial vegetables cultivated in Northern Karnataka. Root rot of chilli caused by *Sclerotium rolfsii* Sacco is exerting a major threat on chilli growers in Karnataka. A pure culture of *S. rolfsii* was obtained from chilli plants showing typical root rot symptoms and pathogenicity was successfully proved. A survey was conducted in potential chilli growing, areas of Byadgi, Dharwad, Hubli, Gadag and Haveri taluks, during Kharif 2004, to know the root rot incidence. Maximum root rot incidence of three per cent was recorded in Mantur village of Hubli taluka. Maximum of 88.10 per cent colonization of *S. rolfsii* was noticed on par boiled sorghum seed as bait

kept in soil at so per cent moisture holding capacity of soil. Among the botanicals, bio-agents and fungicides tested in vitro, sorghum leaf extract at 10 per cent, *Trichoderma harzianum* and Carboxin at 0.1% respectively, were found effective in reducing mycelial growth of *S. rolfsii*. FYM was found the most effective against the root rot of chilli caused by *S.rolfsii* and recorded the least disease (19.34%) incidence of all the organic amendments tested. Among the different treatment combinations tested the combination of FYM + Sorghum leaf + *T. harzianum* + Carboxin was found to be the most effective in reducing the disease and recorded the least percent disease incidence of 19.00.

### Management of Post Harvest Diseases of Chilli

A. P. SHIVAKUMARA

2006

MAJOR ADVISOR: Dr. V.B. NARGUND

Survey conducted in major districts of chilli growing areas of northern Karnataka revealed that maximum incidence of post-harvest diseases were recorded at Gulbarga (20.55%) followed by Raichur (17.33%). Among the fungi associated with the disease, *Colletotrichum* spp. and *Alternaria alternata* showed maximum frequency of occurrence. These two fungi showed maximum growth and sporulation on potato dextrose agar medium on 15 and 11 days after incubation respectively at 30°C with 95 per cent relative humidity. Considerable variations were recorded among the 14 isolates of *Colletotrichum* spp. and 12 isolates of *A. alternata* with respect to mycelial colour, growth pattern, type of margin, sporulation and spore morphology. Based on spore morphology, isolates of *Colletotrichum* spp. were grouped into *Colletotrichum gloeosporioides* and *C. capsici*. The molecular variability studies using microsatellite primers indicated that all isolates of *Colletotrichum* spp. shared a

minimum of 34.8% genetic similarity. Infected chilli seeds showed 97.73% mycoflora contamination after 120 hr. of incubation. Prochloraz (0.1 %) and fenarimol (0.1%) were found effective in inhibiting the spore germination and mycelial growth of *C. gloeosporioides* and *A. alternata* respectively. Among the eight plant extracts tested, ashwagandha root extract and garlic bulb extract were effective against *C. gloeosporioides* and *A. alternata* respectively. *Trichoderma harzianum* recorded maximum inhibition of mycelial growth of both the pathogens. Prochloraz at 0.1 % as seed treatment recorded highest seed germination and least seed mycoflora. Prochloraz (0.2%) as pre-harvest fungicidal spray and Prochloraz (0.1 %) as post-harvest treatment recorded least percent disease incidence and showed maximum retention of ascorbic acid, oleoresin and capsanthin content in dry chilli fruits. *In vitro* screening of 61 chilli genotypes revealed that, P-14 recorded resistant reaction to both the pathogens.

### Morphological and Molecular Variability of Rice Blast Pathogen *Pyricularia grisea* (Cooke) Sacc.

B.S. MEENA

2006

MAJOR ADVISOR: Dr. S. K. PRASHANTHI

Rice blast caused by *Pyricularia grisea* (Cooke) Sacc. [ *Magnaportha grisea* (Hebert) Barr ] a filamentous ascomycetes fungus is a major threat to rice production. Twelve blast infected rice samples were collected from different agroclimatic regions of Karnataka viz., Shriguppa, Bheemarayanagudi, Raichur, Sirsi, Mundagod, Shimoga, Mugad, Haveri and Khanapur. During survey, the highest per cent disease incidence was noticed in Mugad (66.00%) and least disease incidence was observed in Khanapur (20.00%). Cultural and morphological studies on host extract + 2% sucrose agar, oat meal agar, potato dextrose agar + biotin + thiamine and Richards's agar revealed considerable variation among the isolates. The isolates of Sirsi, Mundagod, Mugad, Khanapur and Neck blast Mugad showed maximum growth on 10<sup>th</sup> day after inoculation whereas remaining isolates showed maximum growth on 12<sup>th</sup> day after inoculation. The isolates of Sirsi, Mundagod and Nodal blast Mugad preferred 25°C and remaining

isolates preferred 30°C. The pH 6.5 was found to be best for all the isolates. The isolates of Neck blast Mugad and Neck blast Sirsi preferred both sucrose and dextrose carbon sources equally. Dextrose alone was preferred by the isolates of Raichur, Sirsi, Shimoga and Khanapur whereas remaining isolates preferred sucrose. The Sirsi isolates preferred urea as nitrogen source whereas the isolates of Shimoga and Khanapur preferred both asparagine and urea equally. The remaining isolates preferred asparagine. Disease reaction on international differentials revealed the prevalence of four groups viz., IA, IB, IC and IH in rice growing regions of Northern Karnataka. Isozyme analysis viz., peroxidase and polyphenol oxidase confirmed the existence of variability in the collected blast isolates. RAPD data distinguished the isolates into two major clusters A and B, whereas the isolates belonging to same geographical location have not come in the same cluster, reflecting the fact that the variation was independent of geographical locations.

### Studies on *Fusarium oxysporum* Schlecht Fr f. sp. *gladioli* (Massey) Snyd. and Hans. Causing Wilt of *Gladiolus*

SUMITHAPATIL KULKARNI

2006

MAJOR ADVISOR: Dr. YASHODAR. HEGDE

*Gladiolus* (*Gladiolus hybridus* Hort.), Queen of bulbous flower crops is severely affected by wilt disease caused by *Fusarium oxysporum* f. sp. *gladioli* leading to death of plant and rotting of corms. The pathogen was isolated from infected corm and on the basis of

morphological and cultural studies, identified as *F. oxysporum* f. sp. *gladioli*. The per cent disease incidence was noticed in all the locations surveyed with a range of 20.00 to 61.53 per cent. The maximum disease incidence was noticed in Dharwad district (42.81%) followed by

## Abstract of Theses

Belgaum district (27.46%) and least in Bangalore district (22.41 %). The fungus produced microconidia, macroconidia and chlamydospores. Potato dextrose agar supported maximum radial growth and potato dextrose broth supported maximum dry mycelial weight on 10<sup>th</sup> day of incubation. The temperature of 30°C, pH 6.5 and 12 h light and 12 h darkness were found to be best for fungal growth. Glucose and potassium nitrate were found to be best carbon and nitrogen sources for the growth of fungus, respectively. Survival studies showed that pathogen could survive for 42 weeks in sterile soil. Morphological and cultural variation could not help to group among the isolates

of pathogen. RAPD data distinguished the six isolates into two major clusters A and B, which is in accordance with their geographical locations. Under *in vitro* conditions, neem seed kernel extract at 10 per cent concentration and *Trichoderma harzianum* (Dwd isolate) were able to reduce the growth of pathogen to a remarkable extent. Among fungicides, carbendazim at 0.025 and mancozeb at 0.3 per cent were found effective against the pathogen. Under *in vivo* studies, carbendazim @ 0.2 per cent was very effective in inhibiting the disease completely and gave maximum plant height, number of flowers per spike and corn yield. In screening of varieties, American beauty was found resistant to wilt.

### Biochemical and Molecular Basis of Interaction Between *Fusarium udum* Butler and *Heterodera cajani* Koshy on Pigeonpea

G. R. NAGABHUSHANA

2006

MAJOR ADVISOR: Dr. S. LINGARAJU

The present investigation deals with the identification of biochemical factors of wilt resistance as influenced by *F. udum* and *H. cajani* in wilt-resistant and susceptible genotypes and also the characterization of such resistant and susceptible genotypes of pigeonpea through RAPD technique. Biochemical factors studied included assessing the activities of peroxidase, polyphenol oxidase, phenylalanine ammonia lyase, total phenol and total sugars in both diseased and healthy plants at 60 days after sowing. In this study, an attempt was also made to assess the genetic diversity among the resistant and susceptible genotypes having resistance and susceptibility to pigeonpea wilt disease. The study revealed that the wilt resistance holding genotype, i.e. WRP-I when inoculated with both the pathogens recorded higher increase in the activities of peroxidase, polyphenol oxidase and phenylalanine ammonia lyase than that of wilt-resistant genotype, ICP-8863 which becomes wilt-

susceptible in an interaction. The study on phenol content indicated that the wilt resistance breaking genotype ICP-8863, inoculated with both the pathogens showed increased phenol content than that of susceptible genotypes. As far as sugars are concerned, the susceptible genotype GS-1 had more quantity of total sugars as compared to resistant genotypes. Whereas, in both fungus and nematode inoculated genotypes, there was a decrease in quantity of total sugars than healthy genotypes. The per cent reduction was more in susceptible genotype than resistant genotypes. RAPD technique was used to demonstrate the polymorphism in nine pigeon pea genotypes that were used in the present investigation. GS-I and C-11 had maximum similarity, whereas Gulyal Red and GS-1 showed least similarity. The study also revealed that out of nine genotypes, eight genotypes (differing in reactions to wilt fungus as well as interaction) were in group I with a single wilt susceptible genotype (Gulyal Red) in group II.

### Towards Promoting Disease Resistance and Biological Control of *Fusarium* Wilt of Chilli

G.S. DEVIKARANI

2006

MAJOR ADVISOR: Dr. M. K. NAIK

Severity of wilt was more in Gulbarga district followed by Raichur. Highest inoculum density (1500-1800cfu/g) was recorded in Madraki and least in Jeratagi-2 soil (Gulbarga). The identity of all the 52 isolates was confirmed and deposited at NCFT, New Delhi. The *Fusarium solani* grew well on PDA and PDB on 13<sup>th</sup> day after incubation at 35°C. Variation existed among 52 isolates, in rate and type of growth, margin, colour, mycelial growth pattern, mycelial width, sporulation and septation of macroconidia, chlamydospore formation etc. Inoculation of standard differentials with representative isolates showed higher virulence without much demarcation except F29 isolate in pathogenic variability. RAPD-PCR analysis using OPA-I8 primer showed variations in terms of polymorphism among the various geographical isolates,

with dendrogram showing 4 clusters. Among chilli genotypes, F-112-5-83 and PC-6 showed resistant, Ajeet-6 and ACS-20 I were moderately resistant when screened using root-dip-transplanting and sick soil techniques. Among the bioagents evaluated *Trichoderma viride* (I), *T. viride*-I6 and *Pseudomonas fluorescens* (I) were very effective in inhibiting the growth of *F. solani* both in dual culture and seed coating test. The culture filtrate of *T. harzianum*-10 inhibited maximum spore germination of *F. solani*. The bioagents when seed treated on Byadagi Kaddi and Guntur cvs, highest number of propagules of bio-agent was recovered in *T. viride* (I) with maximum reduction of pathogen propagule at 60DAA. Among the systemic resistance inducing bio-agents, *P. fluorescens* (I) was found to be effective. The bioagents, when tested for

shelf life, on four carriers under two environmental conditions, highest population of bio-agent was recorded in *T. viride* (I) in FYM and vermicompost at room temperature whereas liquid broth for *P.fluorescens*. The formulated products can be stored at room temperature up to 60 days with out loosing the bio-agent population

and viability. Soil application of formulated products in sick pot, showed the highest population of bio agent, *T. viride* (I) while reducing the pathogen propagules to 'zero' at 60 DAA in vermicompost. Of the different application methods, 7DPA of the bio-agents was effective.

#### Morphological and Molecular Variability Among the Isolates of *Sclerotium rolfsii* Sacc. From Different Host Plants

K.C. JYOTHI

2006

MAJOR ADVISOR : Dr. SRIKANT KULKARNI

*Sclerotium rolfsii* Sacco is a soil inhabitant, non-target, polyphagous and an ubiquitous facultative parasite. Ten pathogenic isolates of *S. rolfsii* obtained from potato, groundnut, tomato, chilli, sunflower, soybean, onion, lucerne and wheat plants were collected from Main Agricultural Research Station, University of Agricultural Sciences, Dharwad. Morphological character studied on potato dextrose agar revealed that, considerable variation among the isolates. The colony diameter varied from 52.00 to 89.83 mm at 72 h of incubation. The colour of sclerotia was light to dark brown size of sclerotia varied from 1.30 to 3.40 mm and they were spherical to round in shape. The test weight of 100 sclerotial bodies was recorded between 53.00 to 383.30 mg and number of sclerotia per cm were ranged between 1.14 to 6.55. Groundnut isolate recorded the highest dry mycelial weight (280.70 mg), while wheat isolate recorded the lowest (132.70 mg) in potato dextrose

broth. The cross inoculation studies on different hosts revealed that, isolates of *S. rolfsii* on potato, tomato and chilli were found to be highly virulent. Groundnut, sunflower, cotton and onion were found to be moderately virulent whereas wheat, lucerne and isolates were less virulent. Isozyme studies revealed that, potato and tomato isolates exhibited extra bands in case of peroxidase studies and onion isolate produced only one band in case of polyphenoloxidase studies. RAPD data distinguished the ten isolates into two major clusters A and B. Major cluster A composed of isolates viz., WT, CN, CL, LN TO, PO, SF and GN. The results revealed that, isolates of solanaceous and oil seed crops were closely related. Hence, the results obtained from the cluster analysis revealed that, sub cluster group composed of isolates which showed very less variability. Carboxin fungicide affected the growth of all the isolates at the concentrations (0.01, 0.1, 0.15 and 0.2%) under *in vitro* conditions.

#### Studies on Bacterial Leaf Blight of Paddy (*Xanthomonas oryzae* pv. *oryzae*)

P. R. THIMMEGOWDA

2006

MAJOR ADVISOR: Dr. ARUN R. SATARADDI

Bacterial leaf blight of paddy (BLB) is one of the most serious diseases of rice causing severe yield losses up to 20-30 per cent. During Kharif 2005, the maximum disease incidence was recorded at Raichur taluk (61.27 %) and at Sindhanur taluk (74.69 %) in summer 2006. All isolates were found negative for Gram staining as well as spore staining, positive for capsule staining with monotrichous flagellum. Yeast extract glucose agar and potato sucrose agar (PSA) supported the good growth with milky white to dark colonies with colony diameter of 3.9 to 4.9 mm respectively. All the isolates showed positive reaction for gelatin liquefaction, protein digestion, ammonia production and hydrogen sulphide production. Isolates Xoo 1, 2 and 3 found positive for starch hydrolysis. All isolates found negative for indole production, voges Proskauer test, nitrate reduction, methyl red test and production of

fluorescent pigment on King's B medium. Bacterium was viable for upto seven months in potato sucrose broth under refrigerated condition. Incubation period of 96 h was found best for maximum growth and sucrose was the best carbon source. pH of 7 to 7.5 and temperature of 30 to 35 °C was most preferred. Relative humidity of 75 to 85 was found best. Although bioagents, *Pseudomonas fluorescens* (Pfl), *Bacillus subtilis* (BS 1, BS5) and streptomycin, streptomycin + CUSO<sub>4</sub> were effective under *in vitro*. None of the plant extracts were found effective. Least bacterial leaf blight incidence was observed in basmati and streptomycin + CUSO<sub>4</sub> under *in vivo*. In field, seventy one genotypes were screened against BLB, none of the genotypes found immune, Ajaya, TKM-6, IR-8 were found resistant, IR-72, Tetep, PR-III, Zenith, CRMAS 2231-23 and Govind were moderately resistant, twenty three were moderately susceptible, twenty four were susceptible and fifteen were highly susceptible.

#### Investigations on Multiple Disease Resistance in Soybean

B. MAHESHA

2006

MAJOR ADVISOR: Dr. P.V. PATIL

Soybean [*Glycine max* (L.) Merrill] is one of the important oilseeds crops of the world, belongs to the family Leguminaceae. It is rich in protein (40%) and oil (20%). It is

being used for nutritional, industrial, medicinal and culinary purposes. On the contrary to this foliar diseases are threatening the crop. As a management strategies of these

## Abstract of Theses

diseases, multiple disease resistant genotypes plays a major role; because of its economically sound and eco-friendly nature. Keeping these points in view present investigation was carried out at Main Agricultural Research Station, College of Agriculture, University of Agricultural Sciences, Dharwad during the year 2004 - 05 and 2005 - 06 to screen 204 soybean genotypes for their multiple disease resistance both under field and glass house conditions. Totally 204 soybean genotypes, which were collected from different AICRP (Soybean) Centers were subjected for screening against 10 major diseases. Out of which none of the genotypes showed resistant reaction against all the diseases, but few genotypes have, shown resistance to two or more than two diseases. These were categorized as multiple disease resistant genotypes. The investigation yielded only one genotype [EC-241780] against rust and powdery mildew, two genotypes [Birsasoya- 1

and JS(SH)98-22 ] against anthracnose, powdery mildew and purple seed stain, one genotype [JS(SH)98-22] against anthracnose, powdery mildew and bud blight, one genotype [Lee] against anthracnose, purple seed stain and bacterial pustule, seven genotypes [DS 98-14, DS-2001, EC-325100, KHSb-2, MACS-708, PS-564 and VLS-64] against powdery mildew, purple seed stain and bud blight, 24 genotypes against powdery mildew and purple seed stain, two genotypes [Himso-1597 and PK-472] against powdery mildew, bacterial pustule and bud blight, four genotypes [EC-245988, Himso-1597, NRC-12 and PK-472] against powdery mildew and bacterial pustule, 47 genotypes against powdery mildew and bud blight, four genotypes [EC-245988, Hardee, Lee and PS-1347] against purple seed stain and bacterial pustule, 12 genotypes against purple seed stain and bud blight and three genotypes [MACS-450, MAUS-681 and PS-I092] against bacterial pustule and bud blight as resistant.

### Isolation, Screening and Selection of Efficient Poly $\alpha$ - Hydroxybutyrate (PHB) Synthesizing Bacteria

P.S. CHANDRASHEKHARIAH

2006

MAJOR ADVISOR: Dr.K. S. JAGADEESH

In the present study, an attempt was made to isolate efficient PHB producing bacteria from different environmental samples. A total of eight samples were collected and 656 bacteria were isolated and 24 bacteria were collected from the Departmental culture collection. Out of these, 101 were found to be PHB positive based on viable colony staining method using Sudan Black B. All the 125 PHB positive isolates were subjected to quantitative estimation of PHB production. PHB yields varied from 0.010 to 0.160 g/100 ml. Ten promising bacterial isolates were selected based on their PHB yields. They were EJC2, EJC5, KJC7, NJC3, FJC4, MJCI0, TJC 1, BJC7, B25 and DJC6. The culture parameters were optimized for all the 10 isolates, Glucose was found to be the best carbon source for maximum PHB production by all the isolates. Ammonium sulphate supplementation at 0.1 per cent was found to be optimum. Maintaining the C:N ratio of 20: 1 using the best C and N source was found to be optimum. Maintaining the pH of the medium at 7.0 was found optimum. In order to reduce the cost of PHB production, whey and waste water

of a soft drink industry were tested as cheaper substrates. Although they supported PHB production, the yields were rather low when compared to those on standard media. However, the yields could be improved to some extent, by supplementation with glucose at 1 per cent level. But, the advantage is that the biowastes can not only be disposed off but also value added product like PHB can be obtained. DJC6 reduced COD of whey by 43 per cent, thus functioning as a bioremediating agent. Out of ten natural promising isolates, DJC6 and BJC7 were found to be the most efficient PHB producers. Under optimized conditions, DJC6 produced a PHB yield of 1.100 g/100 ml while BJC7 produced 0.85-90 g/100 ml. DJC6 performed better than the reference strain *R. eutropha* in PHB production. DJC6 and BJC7 were tentatively identified as *Bacillus* spp. and *Pseudomonas* spp., respectively based on the morphological and biochemical tests. Scale up studies in 3 litre bottle fermenters were conducted under the optimized conditions. *Pseudomonas* sp. DJC6 produced a PHB yield of 1.100 g/ 100 ml which is marginally higher than 1.033 g/ 100 ml produced by *R. eutropha*.

## AGRICULTURAL MICRO-BIOLOGY

### Value Addition to Minor Millets by Fungal Fermentation (*Rhizopus oligosporus*)

M. RAVEENDRA REDDY

2006

MAJOR ADVISOR: Dr.VEENA SAVALGI

An experiment was carried out for the preparation of millet tempeh by supplementation of soybean and horse gram with millets (foxtail, little and finger millet). *Rhizopus microsporus* var *oligosporus* was grown satisfactorily on the substrates at 30°C & 35°C. The fermentation was faster at 35°C and completed within 39.50 hours. The Acid protease activity was more at 35°C (68.70 µg of tyrosine liberated/hr/mg of protein) when supplemented with 100%

soybean ( $T_1$ ). pH during fermentation rises progressively upto 48 hrs of incubation period to above 7.1 to 7.3 which was maintained constantly. Acid protease activity was found to be increased with increased in time intervals upto 36 hrs beyond which, it decreased significantly. Nutritional analysis of millet tempeh prepared by supplementation of soybean and horse gram with millets indicated that protein content was decreased in millet tempeh with increased

proportion of millets. T<sub>1</sub> (100% soybean) recorded highest protein content (43.05g). Increased trend was observed in the carbohydrate content of treatments with the decreased proportion of soybean and horse gram supplementation. Protein, fat and total phenol content of millet tempeh was more at 35°C compared to 30°C. The carbohydrate content, total minerals, Ca & P did not differ

significantly for their effect of incubation temperature. Millet tempeh after fermentation did not show any trypsin inhibitor and less tannin content (0.80) was recorded in T<sub>13</sub> (100% finger millet). The organoleptic evaluation of millet tempeh for colour, texture, odour, appearance and overall acceptability of millet tempeh was highest in T<sub>8</sub>, T<sub>9</sub>, T<sub>20</sub> (5.00); T<sub>9</sub>, T<sub>8</sub> (5.00); T<sub>1</sub>, T<sub>6</sub>, T<sub>8</sub>, T<sub>21</sub> (4.11); T<sub>15</sub> (4.27) respectively.

## **AGRICULTURAL ECONOMICS**

### **An Economic Analysis of Paddy Based Farming Systems in Southern Karnataka - A Case Study of Mandya District**

TANVEERAHMED

2006

MAJOR ADVISOR: Dr.VILAS S. KULKARNI

The study was conducted in Mandya district of southern Karnataka with an overall objective of identifying and analyzing the optimality and sustainability of different paddy based farming systems. The relevant data were collected from both primary and secondary sources and were analyzed using tabular, functional and linear programming techniques. Major farming systems identified in the study area were FS-I (crop production and poultry enterprises), FS-II (crop production and sericulture enterprises) FS-III (crop production and dairy enterprises) and FS-VI (only crop production enterprises). The gross returns in FS-I was Rs.940879.80 while total cost was Rs.768945.99 with a net returns of Rs.171933.81, which was found to be most profitable one. Higher net returns were due to the rearing of poultry birds in the FS-I, followed by FS-III, FS-VI, FS-II, with net returns of Rs.83658.40, Rs.57739.53 and Rs.54720.59, respectively. Three different linear programming models for optimization, viz; under

existing resource base and technology, under reallocation of resources and under relaxation of labour and capital were developed. The analysis revealed that present net farm returns would range from Rs.171933.81 to Rs.187555.00, Rs.54720.59 to Rs.62330.67, Rs.83658.40 to Rs.106867.10 and Rs.57739.53 to Rs.85919.80 in FS-I, FS-II, FS-III, and FS-VI, respectively. The farmers were operating closer to optimality under existing resource levels as indicated by marginal increases in net farm returns. However, with the reallocation of resources and relaxation of labour and capital, the net farm returns increased in the range of 0.33 to 48.81 per cent over existing plan across different farming systems. The major constraints as expressed by the farmers-respondents in the study area were high cost of farm inputs, fluctuation in the prices of the produce, shortage of organic manures / FYM, lack of transportation, marketing facilities, scarcity of funds. Based on the findings of the study, suitable suggestion have been made.

### **Women Empowerment Through Microfinance in Dindigul District of Tamil Nadu - An Economic Analysis**

JOSILY SAMUEL

2006

MAJOR ADVISOR : DR. L. B. KUNNAL

This study was undertaken to assess the empowerment of women through microfinance. The study was conducted in Kodaikanal taluk of Dindigul district. From the taluk, Six villages were selected based on highest number of SHGs. From each of the selected villages, five groups were selected based on income generating activity. And from each of the groups three members were selected. Thus a total of 90 members from 30 groups formed the sample size. To assess the impact of SHGs on the women empowerment paired t-test, impact index and multiple linear regression analysis were done. Findings of the study revealed that majority of the members were middle aged, married, educated from nuclear family belonging to backward class. The average amount of loan from SHG since inception was Rs.1972.20 per member and from bank was Rs.14,517 per member and savings per year was Rs.1,332.40 per member. The major factor motivating the members to joining SHG was NGOs

intervention. About 93.34% of the groups belonged to model-I which were formed by NGOs and linked to banks. A number of income generating activities were undertaken by the SHGs. The percentage change in income (45.99%), investment (20.09%), assets (53.43%), consumption (25.850/0), employment days (112.48%) and savings (264.70%) of the members after joining the SHG was calculated. The t-value calculated for the above were found to be significant and assets at 1% level. Investment, savings employment and assets were the major factors influencing the income level of the SHG members. The R<sub>2</sub> value was 0.84 which indicated that explanatory variables explained 84% of variation in income generation of the members. The gain index of social empowerment was 30.61 and economic empowerment was 39.09. Majority of members (84.44%) opined that banks / NGO made it easy to get loan collectively and SHGs charged lower interest rate with timely credit.

## Abstract of Theses

### Economic Perspective of Farmers Suicides - A Symbol of Agrarian Crisis in Karnataka

SHRISHAIL D. NAGATHAN

2006

MAJOR ADVISOR: Dr. R.S. PODDAR

Growing number of farmers' suicide cases in India and Karnataka points to a deeper crisis in Indian agriculture. In Karnataka, 10,959 farmers committed suicide during 1996-2000 and another 3000 during 2000-03 and the death toll is continues unabated. Therefore different economic dimensions of suicide were probed in the present study involving 30 farmers who had committed suicide and 30 farmers who had not committed suicide. Data pertaining to various farm business aspects of deceased farmers during 2003-04 were collected. Findings of the study revealed that 90 per cent of the victim farmers were practicing dry farming. Majority of the farmer victims were male farmers (90%). About 60 per cent of farmers suffered from psychological stress/mental duress arising out of the agrarian distress. Debt burden, *inter alia*, was the major cause for the farmers' suicide as almost all the farmers in the study borrowed from one or the other source or from

more than one source. While the amount borrowed per suicide farmer was Rs. 1, 07,961 and that by the non-suicide farmer was Rs. 42,063. High proportion of (73 %) farmers depended on moneylenders for loans reflecting the limited reach of public financial agencies among farmers. Farm financial ratio analyses like net capital ratio (NCR), Debt Asset Ratio (DAR) brought forth the fact of agrarian crisis arising out of poor returns and heavy indebtedness. Most of the non-institutional loans were diverted for non-agricultural, consumptive, distress spending. The study suggests formulation of ~ comprehensive agrarian policy for the study area as well as for similar agrarian regions. A multidisciplinary expert committee should be constituted to study the problem of suicides and farm indebtedness; especially where private moneylenders prevail. There is a need to prevent farmers' suicides by social institutions such as Ryot Jagruti Vedike rather than to undertake ad-hoc measures.

### An Economic Analysis of Woolly Aphid Infestation on Sugarcane in Mandya District of Karnataka

PRADEEP

2006

MAJOR ADVISOR: Dr. B.L. PATIL

Sugarcane has been identified as an important commercial crop and sugar constitutes a staple input of the Indian household. Recently, sugarcane production has been greatly hampered due to the incidence of sugarcane woolly aphid. The overall objective of the study was to analyse the economic impact of woolly aphid infestation on sugarcane in Mandya district during the agricultural year 2005-06. A multistage purposive random sampling procedure was adopted in selection of the study area, involving the total sample size of 90 farmers. Tabular presentation technique, two-way ANOVA, one-way ANOVA and relevancy coefficients were employed. The results revealed that the infestation was highest in October month. The mean score infestation was more in CO-8371 (3.87) followed by CO-86032 (3.58) and CO-62175 (3.46). Relative humidity (3.56) and fertilizer (2.94) were the factors influencing infestation. The mean per cent economic loss

was 22.89 per cent with plant protection and 51.52 per cent without plant protection. Farmers opined that the highest infestation was observed through wind having mean score of 0.92, followed by self spreading (0.28) and through planting material (0.14). The per cent reduction of sugar recovery was found in Mysugar Company (38.71%) and Indian Cement Limited Company (16.07%). Among several management practices, the combination of cultural + biological + chemical practice found effective with the lowest per cent economic loss and net loss of 9.55 (Rs. 19,949/ha) followed by chemical (9.84%) (Rs. 20,449/ha), chemical + biological (10.45%) (Rs. 21,372/ha), cultural + chemical (11.60%) (Rs. 25,873/ha), biological (23.86%) (Rs. 37,050/ha) and cultural + biological (25.93%) (Rs. 42,523/ha), respectively. More emphasize needs to be given to farmers education on sugarcane woolly aphid infestation and its management practices on mass and simultaneous scale.

## AGRICULTURAL EXTENSION EDUCATION

### Decision Making Process of Krishi Vigyan Kendras (KVKs) in Northern Karnataka

V. JYOTHI

2006

MAJOR ADVISOR: Dr. S. N. HANCHINAL

The study was conducted during the year 2005-2006 in the purposively selected northern part of Karnataka state. Based on the years of service four KVKs workmg

under UAS, Dharwad viz., KVK-Hanumanamatti, KVK-Raichur, KVK-Sirsi, KVK-Bijapur and two KVKs working under NGOs viz., KVK-Hulkoti, KVK-Tukkanatti. Out of the

total number of technical staff 30 from university managed KVKs and 14 from NGO managed KVKs formed the number of respondents for the study. The data was collected through questionnaire developed for the study. The data thus collected was analysed using appropriate statistical tools. The salient findings of the study were-majority of the respondents were found to be in 'medium' category with respect to psychological characteristics viz., Organizational climate, Organizational stress, Job autonomy, Job-stress, Organizational commitment and Job satisfaction. Field investigation, discussion with staff at various levels using past experience and scheduling actions and setting

up bench marks for monitoring were the dominant methods used from problem identification to feed back, stages of decision making in university KVKs. In addition to the methods followed in university KVKs, NGO managed KVKs also consulted community, considered time and information available while making discussions. In both University and NGO managed KVKs in most all the stages of decision-making process Training Associate play major role, followed by Training organizer and Training Assistant. Nature of participation of staff working at different levels of various decision making stages was consultation style in university managed KVKs while it was joint decision making in NGO managed KVKs.

#### **A Study on Livestock Production Systems of Rural and Peri - Urban Livestock Owners**

P. PUSHPA

2006

MAJOR ADVISOR : Dr. S. N. HANCHINAL

A study on livestock production systems of rural and peri-urban livestock owners was carried out during 2005-06 by following proportionate random sampling procedure. Totally 160 farmers were selected and data was collected by personal interview method. The important findings of the study were; typology with 17 types was developed to classify the livestock owners based on land holding, mean herd size, fodder management and income level. Most of the respondents (27) belonged to type 10 of the typology developed. Most of the respondents (41.25%) belonged to good performing units when classified based on economic performance. In fodder management, most of the rural (51.25%) and peri-urban (46.25%) respondents belonged to good management category. Benefit-cost ratio was highest (2.354) for rural livestock production system as compared to peri-urban livestock production system

(1.0%). Percentage deficiency of digestible crude protein (DCP) was 36.8 per cent in rural and no deficiency of the same was found in peri-urban livestock production system. The percentage deficiency of total digestible nutrients (kg) for milch animals was 68.94 per cent in rural and 41.83 per cent in peri-urban livestock production systems. Out of 10 researchers, 8 researchers suggested that intercultivation of improved perennial grasses and improved perennial legumes was appropriate method in irrigated livestock production system. However, 7 researchers suggested intercultivation of high yielding dryland grass and legumes together and growing dryland improved grass, legumes and fodder trees as appropriate technological option for rainfed areas. Majority of the respondents (40%) expressed lack of knowledge on fodder cultivation as major constraint in fodder management.

#### **Study on Entrepreneurial Behaviour of Pomegranate Growers in Bagalkot District of Karnataka**

NAGESH

2006

MAJOR ADVISOR: Dr.SUNIL V. HALAKATTI

Study on entrepreneurial behaviour of pomegranate growing farmers in Bagalkot district of Karnataka was carried out during 2005-06. By following proportionate random sampling procedure 120 farmers were selected and data was collected by personal interview method. The important findings of the study were : majority (70.83%) of farmers had medium entrepreneurial behaviour. Majority of farmers (48.33%) belonged to middle age category, 25.83 per cent of farmers were educated upto high school, majority (60.00%) of respondents were dependent only on agriculture, 73.33 per cent of farmers were in medium mass media participation category, while 65.83 per cent farmers had medium extension participation. Majority (54.16%) of farmers belonged to medium extension contact category, 58.33 per cent of respondents had medium level of scientific orientation. A positive and significant relationship

was observed between entrepreneurial behaviour of farmers and their socio-economic characteristics such as education, land holding, annual income, mass media participation, extension participation and scientific orientation. The relative importance of the different components of the entrepreneurial behaviour was found that all the components of the entrepreneurial behaviour were highly significant. All the farmers opined that they were facing the problem of lack of storage facility for storing of pomegranate fruits. Majority of the respondents (90.83%) were facing problem of high incidence of pests and diseases. Majority of the respondents (96.66%) were facing marketing problems like high cost of packaging material high transportation charges (85.00%). Majority of the pomegranate growers (91.66%) had sold their produce through middleman or retailer at the farm, followed by district market, taluk market and local market.



## *Abstract of Theses*

### **A study on Knowledge Level of Gram Panchayat Members About Sampoorna Grameena Rozgar Yojana in Raichur District of Karnataka**

BHEEMAPPA

2006

MAJOR ADVISOR : Dr. S. K. METI

The study was conducted in Raichur district of Karnataka during 2005-06 involving 120 Gram Panchayat members from 12 Gram Panchayats. The important findings of the study were : Majority (65.83%) of the respondents had medium knowledge level. Majority (65.84%) of the respondents had medium extent of participation. The activities like selection of beneficiaries for SGRY (57.00%), selection of work pertaining to rural development (70.00%), deciding wages of employees (59.00%) and meeting with local bodies (48.00%). More than half (57.50%) of the Gram Panchayat members were from middle age group, 19.16 per cent of Gram Panchayat members were educated up to middle school. Farming was the main occupation of 91.66 per cent respondents. More than half (54.16%) of the respondents were medium mass media participation.

extension contact had a two-third (60.84%) of the respondents, while more than half of the respondents (62.50%) had medium leadership ability and 68.34 per cent respondents belonged to medium level of achievement motivation. A positive and significant relationship was observed between knowledge level of Gram Panchayat members and their socio-economic characteristics such as age, education, position of the Gram Panchayat, mass media participation, extension participation and extension contact. The major problems faced by the Gram Panchayat members Were delaying in sanction of fund (86.66%), lack of training facilities (75.83%), less honorarium to the panchayat members (74.17%), lack of co-operation from the villagers (68.33%) and non-availability of proper building to panchayat (65.00%).

### **Beneficiaries Attitude and Project Facilitation Services of Sujala Watershed Project**

S. MUNI KISHORE

2006

MAJOR ADVISOR : Dr. D. M. CHANDARGI

A study on beneficiaries' attitude and project facilitation services of Sujala Watershed Project (SWP) was carried out during 2005-06. Proportionate random sampling procedure was followed, 120 farmers were selected and data were collected by personal interview method. A scale was developed with fourteen statements to measure the attitude of beneficiaries towards Sujala Watershed Project. The important findings of the study were : most of the respondents (46.66%) belonged to more favourable attitude category followed by 27.50 per cent of the respondents belonging to less favourable category. Regarding facilitation services, 95.00 per cent of the respondents perceived that creating awareness and rapport-building process and nearly three-fourth (74.16%) of beneficiaries perceived institution building

being facilitated by NGO officials. Almost all respondents perceived that capacity building (94.17%) and material and financial assistance (99.10%) was facilitated partly by both KWDD and NGO officials. Over three-fourth (79.16%) of respondents were benefited by earthen bunds, 45.83 per cent of the respondents expressed that the main constraint in SWP was the lands being wrongly selected by project officials for land treatment activities. Except age, all other variables selected for study as education, farm size, location of farm, annual income, organizational participation, mass media participation, extension contact, extension participation and management orientation showed positive and significant relationship with both attitude of beneficiaries towards SWP and benefits obtained by beneficiaries from SWP.

### **A Study on Organizational Climate Perception by Veterinary Officers (VOs) and Veterinary Livestock Inspectors (VLIs) of Department of Animal Husbandry and Veterinary Service, Karnataka**

A. L. SANDIKA

2006

MAJOR ADVISOR: Dr. J. G. ANGADI

This study was conducted during 2005-06 in Belgaum district of North Karnataka to assess the organizational climate perception by VOs and VLIs of Karnataka state Department of Animal Husbandry and Veterinary Service (AH & VS). Organizational climate perception was measured by using a scale, which consisted of 28 items representing seven dimensions of organizational climate viz., communication, decision making, programme planning and implementation, supervision and guidance, organizational structure and personnel

management. The VOs and VLIs were selected in proportion to their number in the field to form a sample of 100. The data were collected by using personal interview. The collected data were analyzed using frequencies and percentages, t-test and simple correlation. Majority of VOs (55.0%) and 45.0 per cent of VLIs perceived the organizational climate as favourable. Whereas, the most favourable perception was observed with only 15.0 per cent VLIs and 34.0 per cent VOs. On the contrary, less favourable perception was noticed with more number of

VLI (40.0 %) as compared to VO (11.0%). Further, there existed a significant difference between means of organizational climate perception of VO and VLI. Age, job experience, job involvement and job satisfaction had positive and significant association with organizational climate perception of Department of AH & VS by both VO and VLI whereas, job stress had a negative and significant relationship with organizational climate perception. The variables such as information seeking behaviour, perceived work load and availability of facilities and resources had shown non significant relationship in case of VO while, education, training and perceived work load had a non-

significant relationship with the level of organizational climate perception of VLI. Provide adequate facilities, implement appropriate promotion scheme, increase the salary and salary increments were major suggestions expressed by both VO and VLI to improve the organizational climate of the department. In addition, VO have suggested to fill the vacancies and introduce the appropriate trainings to upgrade the knowledge and skill to improve the organizational climate. The other suggestion expressed by VLI was consider the subordinate suggestions while developing and implementing the programmes.

**Knowledge and adoption of Integrated Pest Management Practices Among Vegetable Growers of Gadag District in North Karnataka**

VENKATA SHIVA REDDY

2006

MAJOR ADVISOR: Dr.A. BHEEMAPPA

The present study on knowledge and extent of adoption of IPM practices was carried out during 2005-06 in selected two taluks of Gadag district. By following simple random sampling 120 vegetable growers were selected and data were collected by personal interview method. The important findings of the study were that majority of vegetable growers had medium level of knowledge in both tomato (66.67%) and cabbage crop (61.66%). In case of adoption of IPM practices more number of vegetable growers were noticed in medium category of adoption in both tomato (63.33%) and cabbage (59.17%). All the vegetable growers possessed the knowledge of summer ploughing, regular destruction of damaged fruits at each harvest of crop followed by practice of crop rotation with pulses (90.00%) and trimming of the field bunds (83.33%). In case of adoption of IPM practices cent percent of

respondents were found to practice summer deep ploughing, the destruction of damaged fruits at each harvest in tomato crop, followed by practice of crop rotation with pulses (88.33%) and destruction of damaged fruits at each harvest of cabbage crop (86.67%). All the selected entrepreneurial characteristics of vegetable growers were positively and significantly related with the adoption of IPM practices in both the crops. Majority of respondents were belonged to medium level of entrepreneurial behaviour. The calculated B:C ratio of IPM method (1:1 :74) found to be more than chemical method (1 :1.43). The major constraints faced by the respondent in adoption of IPM practices were lack of technical knowledge regarding use of NSKE, pheromone traps and bio-agents (97.50%), followed by non-availability of skilled labours (93.33%) and the lack of knowledge about preparation of NSKE (87.50%).

**A Study on Management Efficiency of Sericulturists in North Karnataka**

K.P. RAJASHEKAR REDDY

2006

MAJOR ADVISOR : Dr. S. N. HANCHINAL

A study on management efficiency of sericulturists in North Karnataka was conducted during 2005-06 involving 120 sericulturists from 12 villages of Athani, Chikodi and Hukkeri taluks in Belgaum district. The findings of the study were: Majority (71.66%) of the respondents had medium level of management efficiency. The components of management efficiency like knowledge about improved sericulture, skills acquired, ability to mobilize resources, efficient use of resources, timely adoption, ability rational marketing and competence in evaluation in all these aspects majority of sericulturists were belonged to medium level of category . Majority (62.50%) of the sericulturists were middle aged, educated upto, primary and middle school (43.34%). Nearly 90 per cent of sericulturists had experience of more than five years in sericulture, fifty eight per cent of them had medium risk

orientation and possessed medium land holding (60.83%). Almost all the sericulturists possessed sericultural equipments, rearing stands, leaf cutting knives, rearing trays and mountages. Sixty per cent of sericulturists were rearing in separate room in dwelling house. Thirty seven per cent of sericulturists are participated in training programme, majority of them contact with sericultural demonstrator, sixty two per cent of sericulturists were participating in Krishimela. Radio (50.80%), television (57.50%), newspaper (39.00%) and farm magazine (15.00%) were possessed by sericulturists. Except age, all the independent variables had positive and significant relationship with management efficiency. The benefit cost ratio of sericulturists was 1: 1.68. Inadequate power supply, shortage of irrigation water, labour shortage, high susceptibility of bivoltine races to disease, non availability

## *Abstract of Theses*

of silkworm eggs in time and pest and disease were the major constraints in mulberry cultivation and silkworm rearing. Majority of sericulturists also expressed distant

market place, no good price in local market and high transportation cost are the major constraints in marketing of cocoons.

### **Impact of Trainings Conducted on Vermicompost by Krishi Vigyan Kendra, Bijapur**

SUNIL N. KHARATMOL

2006

Major Advisor : Dr. N. MANJULA

A study was conducted during 2005-06 under the jurisdiction of KVK, Bijapur. The purpose was to analyse, the impact of trainings conducted on vermicompost by Krtshi Vigyan Kendra, Bijapur, with special importance to the knowledge and adoption of vermicompost technology, personal, socio-economic and psychological characteristics of trained and untrained farmers. The highlight of the study was that more than half of the trained (53.33%) and 43.33 per cent of the untrained respondents possessed medium and low knowledge level respectively. Forty per cent of the trained respondents had high adoption. Nearly 47.00 per cent of the trained and 45.00 per cent of the untrained respondents had high and medium extension participation respectively. Nearly an equal per cent (37.00% trained) and 38.33 per cent of the untrained respondents had high mass media participation. Medium cosmopolitaness was observed in 41.66 per cent of the trained and 33.33 per cent of the untrained respondents. Thirty nine per

cent of trained and 50.00 per cent of the untrained respondents possessed high and low innovativeness respectively. Forty three per cent of trained and 41.66 per cent of the untrained respondents possessed medium risk orientation. An equal per cent of trained and untrained (43.33%) respondents possessed medium scientific orientation. A positive and significant relationship was observed between knowledge level and education, extension participation, mass media participation, cosmopolitaness, innovativeness and scientific orientation in case of trained respondents. While, a positive and significant relationship was observed between education, extension participation, mass media participation in case of untrained respondents. A positive and significant relationship was observed between adoption level and education, extension participation, mass media participation, cosmopolitaness, innovativeness and scientific orientation.

### **A Study on Technological Gap and Constraints of Bidi Tobacco Cultivation in Belgaum District, Karnataka State**

SANTOSH SWAMI

2006

MAJOR ADVISOR: Dr. F. R. NIDAGUNDI

The study on technological gap and constraints of Bidi Tobacco cultivation was conducted during 2005-06 involving 120 growers from villages of Chikkodi and Hukkeri taluks in Belgaum districts. The findings of the study were overall technological gap for the total respondents was 50.96 per cent. For application of potash, irrigation schedule 64.94 and 60.06 per cent, topping 15.02 per cent, application of nitrogen 24.47 per cent. Majority of respondents 48.34 per cent belonged to medium category and equal number of respondents 25.85 in both low and high technological gap categories, 46 per cent middle aged, about 28 per cent educated upto high school, 55.33 per cent belonged to nuclear family nearly 37.33 per cent had upto 5 acres of land. Among mass media, radio (64%) and television (48.66%) were widely possessed by the

respondents, 10.66 and 6.67 per cent were member of co-operative society and gram sabha, 78 per cent of the respondents were found medium level of innovation, while 58.00 per cent by medium level of risk orientation, 44.17 per cent had medium credit orientation followed by high 31.66 and low 24.17 per cent, respectively. All the variables showed negative relationship with the technological gap, two variables viz., age and education had negative non-significant relationship. Majority of the respondents 70.83 per cent expressed that susceptibility of Bidi Tobacco to adverse climatic conditions as major constraint. Majority of the respondents 70.66 per cent suggested that Bidi Tobacco should be included in crop insurance scheme while 52.50 per cent suggested that support price should be announced for bidi tobacco.

## **AGRICULTURAL STATISTICS**

### **Statistical Analysis on Rare, Endangered and Threatened (RET) Medicinal Plants in Sacred Groves of Kodagu, Central Western Ghats**

C.R. VIJAY

2006

Major Advisor: Dr. P. A. KATARKI

Sacred groves are unique landscapes and relies of original vegetation being preserved under community conservation concept. The assessment of population

status of RET species was carried out in the sacred groves of Kodagu district. The growing stocks and regeneration status of RET species with respect to their potential spatial

distribution that are influenced by ecological factors was assessed in ten sacred groves under semi-evergreen and seven groves under moist-deciduous vegetation. Species diversity of trees ( $H = 2.570$ ) and regeneration ( $H = 3.673$ ) and richness of both trees (17) and regeneration (8.00) were higher in sacred groves of semi-evergreen than that of moist deciduous vegetation. With respect to spatial pattern of RET trees *Cannarium strictum* showed clumped pattern ( $X_2 = 8.7042$ ) where as other species showed neither clumped nor random pattern. In spatial distribution pattern of regeneration only *Artocarpus hirsutus* showed clumped pattern ( $x_2 = 6.6716$ ). Assessment of species abundance was also done from data of both vegetation types. *Cinommomum macrocarpum* acquired first position (398) with relative abundance (0.3376) in case of growing

stock and also in regeneration with recorded number of 245 individuals and relative abundance of 0.4890. while considering individual vegetation type. *Cinommomum macrocarpum* had 723 and 275 individuals in sacred groves of semi-evergreen and moist deciduous vegetation respectively. From the pooled data of regeneration of both vegetation types, the abundance with individuals of 188 and 157 and with relative frequency of 0.5000 and 0.4830. Regarding assessment of influence of ecological factors on population of RET species. the ecological parameters such as latitude, longitude and rainfall had significant influence on girth, height and basal area ( $r = 0.630$ ,  $0.49$  and  $0.597$ ), respectively. The present study confirms the hypothesis that mild disturbance had great influence on higher density of RET medicinal species.

## AGRICULTURAL ENGINEERING

### Studies on Impact of Water Management Practices on Sustainable Use of Water Resources Under Tuntapur Tank in Raichur District

SHUKLODHAN

2006

MAJOR ADVISOR: Dr. S. S. KUMATHE

A study was conducted to evaluate the present status of water resource utilization in Tuntapur tank system, which is a part of the Tungabhadra sub catchment in Raichur district and to work out appropriate strategies for water management by adopting water balance technique for developing a sustainable tank eco-system. In the present study, supply and demand of Tuntapur tank was worked out. The runoff generated from the Tuntapur tank catchment for past ten years (1995-2004) was 128.63mm, 120.38 mm, 2.71 mm, 171.13 mm, 46.57 mm, 77.42 mm, 112.42 mm, 54.21 mm, 8.27 mm and 105.71 mm respectively, which was calculated by using SCS-Curve Number method. It was found that in past ten years the tank filled up to its capacity only during four years. In the present study (2004), excessive application of water to

paddy fields by farmers in command area was observed. It was found that from the water available in the tank a additional area (27 ha) can be brought under paddy cultivation for optimal utilization of tank water for growing transplanted paddy. In the light of this experience optimized plans were suggested considering different percentage storages in the tank i.e. at 100, 80, 60, 40, and 20 per cent of live storage capacity of tank by changing the crop and cropped area. The cost economics of the above plans was worked out based on recorded data and found that the net returns from the proposed plans would be higher than the present net returns. The predicted cost economics shows that the proposed plans are expected to help farmers in maintaining their net returns even during sub-normal rainfall years.

### Techno Economic Analysis of Water Conservation Measures Adopted by Ground Water Users in Gamanagatti and Sutagatti Micro Watersheds of Dharwad District

D. T. SANTOSH

2006

MAJOR ADVISOR: Dr. U. SATISHKUMAR

The study was conducted to evaluate the impact of soil and water conservation measures imposed by groundwater users in Gamanagatti and Sutagatti micro watersheds of Dharwad district. The selected area is a apart of northern transitional zone of Karnataka. As a number of borewells increased from year to year (1975-2005), the average water table depth found to be lowered from 36.8 to 65.1 m in Gamangatti and 20 to 71.5m in Sutagatti. The corresponding irrigated area under bore wells were also increased from 1.2 to 184.4 ha in Gamanagatti and 1.6 to 67 ha in Sutagatti micro watersheds.

The SCS-CN method was employed to predict the runoff generated from Gamanagatti and Sutagatti micro watersheds. In order to quantify the impact of soil and water conservation due to different combination of mechanical measures, five farms were identified. The Farm 1 which consisted of contour bunding system only conserved 92.63 percent (5780 m<sup>3</sup>) out of 6452.92 m<sup>3</sup> of runoff excess generated. The Farm 4, which included with all contour bunding system, farm pond and recharge pit conserved the runoff of about 85.6 percent (16190 m<sup>3</sup>) against total runoff volume of 18905 m<sup>3</sup>. After adopting the

## Abstract of Theses

soil and water conservation methods in the year 2005, more quantity of water was retained in the root zone as compare to the previous year 2004 and as result of this water use efficiencies were increased in furrow (20%), sprinkler (18%) and drip (10%) irrigation systems. The unit cost of irrigation water supplied through furrow method

was least (0.44Rs/m<sup>3</sup>) followed by sprinkler system at (0.634Rs/m<sup>3</sup>) and drip irrigation system (0.78Rs/m<sup>3</sup>). The Benefit Cost Ratio (BCR) was highest for contour bund system (2.27). The combination of contour bund system, recharge pit and farm pond found to have lower BCR (1.20) and longer Pay Back Period (5 years) as compared to other combinations.

## HORTICULTURE

### Evaluation and Propagation of Cashew (*Anacardium occidentale* L.)

A. B. SANJAY

2006

MAJOR ADVISOR : Dr. S. I. HANAMASHETTI

An attempt has been made to evaluate different cashew genotypes at eight different locations during 2005-2006. The observation on growth parameters, yield and quality were recorded. Among the 37 genotypes identified in Belgaum and Khanapur talukas of Belgaum district, the genotype HIL-4 had higher plant height (15.90 m), while stem diameter and crown size were higher in HIL-1 (0.88 m and 17.75 m, respectively). Nut yield per tree was the highest in HIL-2 (34.18 kg). Higher apple weight was recorded in HIL-2 (124.80 g), nut weight was the highest in HIL-2 (12.11 g). At Kittur Rani Channamma College of Horticulture, Arabhavi, the variety VRI-3 showed the highest survival percentage after twenty months of planting (70.00%). Higher plant height (70.00 cm) was

observed in Madakkathara-1, stem diameter was the highest in VRI-3 (2.41 cm), maximum new flush emergence was noticed in February, whereas the flowering was noticed from November to March. At Agricultural Research Station, Kanabargi, plant height (3.18 m), stem diameter (0.27 m) and crown size (5.95 m) were maximum in Vengurla-3. Nut yield per tree was the highest in Vengurla-2 (4.53 kg). Apple weight (68.56 g) and nut weight (9.30 g) were maximum in Vengurla-3 and Vengurla-6, respectively. Acidity of apple juice was the highest in Vengurla-6 (0.16%), TSS of juice was the highest in Ullal-2 (22.02°B). Softwood grafting on two months old rootstocks gave higher success percentage (80.00), whereas among different months of grafting, August recorded the high success (75.33%) under Arabhavi condition.

### Evaluation of Gladiolus Hybrids (*Gladiolus hybridus* Hort.0 for Yield and Quality out Flower Production

ARCHANA B. BHAJANTRI

2006

MAJOR ADVISOR : Dr. A. A. PATIL

A field experiment was carried out to evaluation of gladiolus hybrids (*Gladiolus hybridus* Hort.) at the Floriculture Unit, Division of Horticulture University of Agricultural Sciences Dharwad during Kharif 2002-03. The experiment consisted of 24 gladiolus hybrids and 8 gladiolus parents. The experiment was laid out in RBD with two replications. AB x MC was the hybrids having maximum corm weight, corm size, spike length and also earliest with good flowering attributes and vase life next followed by AB x S, M x AB, AB x S and M x AB are the vigorous hybrids having highest plant height and n of leaves per plant. There were significant variations among the hybrids with respect to corm and cormel production. Average weight of daughter corm was maximum in the hybrids AB x MC followed by M x HG and AB x S, highest cormels produced in the hybrids AB x M. The positive and significant

correlation were observed for corm weight and corm size (planted), plant height (30 and 60 DAP), spike length, rachis length, no of days taken for full emergence of spike, number of days taken for first floret to show colour and first floret to open. Corm diameter (planted) had positive correlation with most of the characters both at genotypic and phenotypic level spike length had strong positive correlation with corm weight and corm size (planted) number of leaves at (30 and 60 DAP), spike weight both at both levels. High habitability with high genetic advance mean was observed for the characters like, corm weight and diameter (planted), plant height (30 and 60 DAP) and number of marketable spikes per plant. But least genetic advance mean was observed in the characters like number of days for first floret to show colour, number of days taken for first floret to open and diameter of floret.

### Effect of Integrated Nutrient Management on Growth, Yield and Quality of China Aster (*callistephus chinensis* (L.) Nees)

R. CHAITRA

2006

MAJOR ADVISOR: Dr. V. S. PATIL

A field experiment was conducted at new orchard, Floriculture unit, Department of Horticulture, College of Agriculture, University of Agricultural Sciences,

Dharwad, during rabi season of 2005-06 to study the effect of integrated nutrient management on growth, yield and quality of china aster. The experiment was laid out in

randomized block design with 3 replications and 12 treatment combinations, comprising of inorganic fertilizers organic manures and biofertilizers. The treatment receiving *Azospirillum*, PSB, vermicompost and 50 per cent recommended NPK recorded the highest plant height, number of leaves, leaf area, dry matter accumulation and yield attributes such as number of flowers per plant and flower yield. Significantly higher available nutrients (N,  $P_2O_5$  and  $K_2O$ ) and their uptake by plants was recorded in

treatment receiving Azo + PSB, vermicompost and 50% recommended NPK. Application of Azo + PSB + VC + 50% recommended NPK registered significantly higher quality parameters such as stalk length, flower diameter, shelf life of loose flowers and vase life of cut flowers. The economic analysis clearly indicated that net returns/ha and B:C ratio was the highest in the plots treated with Azo + PSB + VC + 50% recommended NPK (Rs. 1,06,695.00 and 4.10, respectively) and this finding can be used in making china aster production more profitable.

#### Evaluation of Tuberose (*Polianthes tuberosa* L.) Varieties for Growth, Flower and Concrete Yield

GOPALKRISHNAGUDI

2006

MAJOR ADVISOR : Dr. P. M. GANGADHARPPA

An investigation was carried out to study the performance of seven tuberose varieties with respect to growth, flower and concrete yield in the field of Department of Medicinal and Aromatic Plants at Kittur Rani Channamma College of Horticulture, Arabhavi, during the period from July to December 2005. Among the seven varieties, Prajwal recorded highest growth and yield attributes viz., plant height, number of leaves, leaf length, leaf width, number of florets per spike, number of spikes per plant and loose flower yield per plant followed by variety Shringar. The variety Prajwal recorded maximum per cent concrete recovery as well as concrete yield, which was followed by variety Shringar and the least was observed in variety IARI - Double. The characters such as number of spikes

produced per plant, diameter of the florets, girth of the spike, number of florets per spike, spike length, loose flower yield and concrete recovery were positively and significantly correlated with yield. The characters viz., loose flower yield per plant, loose flower yield per plot, 100 - flower weight, concrete recovery and concrete yield per hectare showed moderate to high phenotypic and genotypic co-efficient of variance. The higher heritability was also observed for the characters viz., spike length, number of florets per spike, diameter of the floret, loose flower yield per plant, loose flower yield per plot, 100 - flower weight, concrete recovery and concrete yield. The characters viz., number of spike per hectare, loose flower yield per plant and 100 - flower weight showed higher genetic advance.

#### Processing of Sapota Fruits

JAYALAXMI. B. HIREMATH

2006

MAJOR ADVISOR : Dr. A. K. ROKHADE

An investigation on processing of sapota fruits i.e. experiments on preparation and storage of sapota juice and its beverages, candy and burfi were carried out at the Department of Post harvest Technology, Kittur Rani Channamma College of Horticulture, Arabhavi during 2005-2006. The sapota RTS containing 40 per cent juice, 0.075 per cent citric acid, adjusted to 14° Brix was found to be acceptable with good organoleptic scores for colour and appearance (4.00), taste (4.50), flavour (4.00) and overall acceptability (4.50). Among three beverages, maximum scores for colour and appearance (3.97), taste (4.74), flavour (4.35) and overall acceptability (4.45) were found in the beverage containing 100 per cent juice, 0.10 per cent citric acid adjusted to 40°Brix which was followed by beverages with 100 per cent juice with 0.15 and 0.10 per cent citric acid adjusted to 55 and 65° Brix respectively

after 30 days after storage. Recovery of sapota candy was highest (60.66%) in candy prepared with initial syrup concentration of 40° Brix closely followed by 40° Brix syrup containing one per cent citric acid (59.74%). The mean maximum scores for colour and appearance (4.65), taste (4.64), flavour (4.54), and overall acceptability was recorded in the candy prepared with initial syrup strength of 60° Brix containing one per cent citric acid, whereas, maximum scores for texture, (4.39) was observed in candy with 40° Brix containing one per cent citric acid, with or without blanching. The sapota burfi prepared from fresh pomace (obtained after extraction of juice from pulp) and sugar (1: 1 and 1: 1.5 proportions) with 0.2 per cent citric acid and the burfi prepared from pomace powder and sugar (1:1) with 0.2 per cent citric acid were found superior with respect to sensory qualities.

#### Effect of Dates of Sowing and Nitrogen Levels on growth and Yield of Isabgol (*Plantago ovata* Forsk)

MAHADEV S. HINDIHLI

2006

MAJOR ADVISOR : Dr. K. N. KATTIMANI

A field experiment was conducted on isabgol (*Plantago ovata* Forsk) var. Gujarat Isabgol-II at the Department of Medicinal and Aromatic plants, Kittur Rani

Channamma College of Horticulture, Arabhavi during rabi 2005-06. The experiment consisted of four dates of sowing (first and second fortnight of October and

## Abstract of Theses

November) and four nitrogen levels (0, 25, 50 and 75 kg N/ha). The experiment was laid out in split plot design. The observations were recorded at different stages of crop growth at monthly interval. Among the different dates of sowing, the crop sown during first fortnight of November took significantly less days to sprout and recorded highest plant population, plant height, number of leaves, tillers and spikes per plant, leaf area index, spikelets per spike, spike length, unhusked seed, husk and straw yield, dry matter production, harvest index and test weight of seeds. Highest plant population, number of spikes, spikelets, seeds, unhusked seed yield, husk yield, dry matter

production, harvest index, test weight and nitrogen uptake were recorded when the crop was supplied with 50 kg N /ha. Significantly highest plant population, number of spikes, spikelets and seeds per spike, unhusked seed yield, dry matter production, test weight, harvest index and nitrogen uptake were recorded when the crop was sown during first fortnight of November supplied with 50 kg N /ha. The highest net returns of Rs. 53,403/- and the benefit cost ratio of 1: 4.99 was recorded when the crop was sown during first fortnight of November supplied with 50: 25: 30 N :P:K kg /ha, respectively under Northern Dry zone of Karnataka.

### Stability Analysis in Gladiolus ( *Gladiolus hybridus* Hort.)

KIRTIMALA BALAJI NAIK

2006

MAJOR ADVISOR : Dr. BALAJI S. KULKARNI

An investigation on stability analysis in gladiolus' was conducted at Kittur Rani Channamma College of Horticulture, Arabhavi during 2005 - 2006 comprising fourteen gladiolus genotypes under three environments. The entries in all the environments were evaluated for different characters following the stability model of Eberhart and Russell (1966). The genotypic variance was significant for the characters like days taken for corm sprouting, plant height, number of leaves, shoots, leaf length, leaf width, plant girth, days taken for spike emergence, days taken for first floret opening, days from first to last floret opening, spike length, rachis length, weight and girth of spike, number of corms, cormels, corm weight, corm diameter and ten cormel weight. The genotype X environment (GXE) interaction was significant for all the characters except for spike emergence and days taken for first floret opening. The genotypes Sylvia, American Beauty, Candiman, Priscilla and White Prosperity showed stability for number of days taken for corm sprouting. For

number of leaves the genotypes American Beauty, Summer Sunshine, Vedanapoli, Candiman, Priscilla, Jester Yellow, Eighth Wonder and Pacifica were found to be stable. All the genotypes were stable for days taken for spike emergence and first floret opening. The stable genotype with respect to yield of spikes and yield of corms was Vedanapoli. For vase life the stable genotypes were Summer Sunshine, Vedanapoli and Pacifica. The genotype Vedanapoli was stable with high mean values for yield of spikes per plant (2.16), yield of spikes per sq.mt (35.91) and yield of corms per plant (2.22). It also showed stable performance with respect to quality parameters and hence this genotype can be used in breeding programmes for further crop improvement. Correlation studies over different environments revealed that the yield of spikes was positively and significantly correlated at ( $p=0.01$ ) with number of shoots, number of corms and cormels indicating the importance of these characters for higher spike yield.

### Effect of Pulsing and Chemicals on Post Harvest Life of Gerbera (*Gerbera jamesonii* Bolus)

DEBJANI DASGUPTA

2006

MAJOR ADVISOR : Dr. B. S. REDDY

Experiments were under taken on gerbera' cut flowers at the laboratory of Department of Floriculture and Landscaping, Kittur Rani Channamma College of Horticulture, Arabhavi from 2005 - 2006 in order to enhance the post harvest life of gerbera cultivar 'Scilla'. Pulsing gerbera cultivar 'Scilla' with 200 ppm  $\text{COSO}_4$  + ten per cent sucrose and 300 ppm HQS + twenty per cent sucrose showed favourable result in enhancing the post harvest life of the flowers up to nine days and eight days, respectively. Among the individual chemical treatments an increased vase life was observed when the flowers were held in the solution containing 100 ppm  $\text{COSO}_4$  + four

per cent sucrose, 200 ppm HQS + four per cent sucrose, 200 ppm  $\text{Al}_2(\text{SO}_4)_3$  + four per cent sucrose and 200 ppm citric acid + four per cent sucrose over control by 15 days, 14.66 days, 15.66 days and 14 days, respectively. Among the interactions, treatments containing 200 ppm HQS + 200 ppm Citric acid + four per cent sucrose and 200 ppm HQS + 100 ppm  $\text{COSO}_4$  + four per cent sucrose resulted in improved water uptake, water balance and fresh weight and a decreased microbial growth in the vase solution, which ultimately led to an increased vase life (16 days) over control in gerbera cultivar 'Scilla'.

**Exploitation of Rangpur Lime for Softwood Grafting in Citrus**

PRANANATH BARMAN

2006

MAJOR ADVISOR : Dr.G. S. K. SWAMY

An investigation was carried out for exploitation of Rangpur lime as a rootstock for seedless lime with different AM fungi at Department of Pomology, Kittur Rani Channamma College of Horticulture, Arabhavi, University of Agricultural Sciences, Dharwad during 2005-2006. Viability of Rangpur lime seeds with different fungicides and bio-agents were also studied. Freshly extracted seeds treated with copper oxychloride (0.2%) and *Trichoderma harzianum* fresh culture (10%) significantly recorded highest germination (76.67% and 76.34%, respectively). Fresh seeds treated with copper oxychloride (0.2%), *T. harzianum* fresh culture (10%) and overnight soaking in cow dung slurry resulted in the highest seedling vigour (8.61, 8.47 and 7.84, respectively) compared to control. *Acaulospora laevis* inoculated seeds sown in May and *Glomus mosseae* inoculated seeds sown in June and May recorded the highest germination (96.00%, 90.00% and 88.00%, respectively) compared to uninoculated control. Rangpur lime seeds inoculated with *G. leptotichum* recorded significantly highest seedling

vigour (105.60 and 209.92) at 180 and 270 days after sowing compared to control (17.21 and 75.28, respectively). *G. leptotichum* and *G. mosseae* inoculated rootstocks of nine months old recorded significantly highest graft success with seedless lime scion (95.35% and 90.00%, respectively). *G. leptotichum* inoculated rootstocks of nine months old also recorded highest graft survival (97.56%) followed by *G. mosseae* (97.22%). When grafting was performed on different ages of rootstock raised in same months but grafted at different months, eight and nine months old rootstocks during February and March were the best with respect to graft success, graft survival and growth parameters. But when seeds sown in different months and grafting was done at a time, six to nine month old rootstocks resulted in better graft-take and growth parameters. *G. leptotichum* and *G. mosseae* showed better performance with respect to graft success, graft survival, sprout length and increment in stem diameter above the graft joint, while *A. laevis* recorded more numbers of sprouts and leaves.

**Rootstock Studies in Mango**

SHANTAGOUDA D. PATIL

2006

MAJOR ADVISOR : Dr. G. S. K. SWAMY

An investigation was carried out on rootstock studies in mango in the Department of Pomology, Kittur Rani Channamma College of Horticulture, Arabhavi (University of Agricultural Sciences, Dharwad) during 2005-2006. Four experiments were conducted to know viability of stones, effect of different rootstocks, response of rootstocks to different AM fungi and different varieties with completely randomised design. Among different days of sowing, stones sowed immediately after extraction (zero) recorded maximum germination percentage (35%), seedling height (21.94 cm), diameter (6.44 mm) and number of leaves (8.39) at 90 days after sowing. The Alphonso grafted on Sindhura rootstock recorded highest graft success (77.80%), while Nekkare recorded maximum survival (64.77%). The inoculation of AM fungi *Gigaspora margarita* and *Glomus fasciculatum* resulted in highest germination (47.19%) compared to control (39.76%), while control recorded significantly highest germination index (3.84). The shoot and root parameters, viz., spore count

(670.13) and per cent root colonisation (91.19%) were recorded maximum in rootstocks inoculated with *Gigaspora margarita*. Also, stones inoculated with *Gigaspora margarita* and *Acaulospora laevis* took significantly lower days for initiation (9.25 days) and completion of germination (46.75 days). Alphonso grafts on eight month old rootstocks exhibited maximum graft success (77.33%) and survival (82.06%), while 10 month old rootstocks recorded maximum sprout height (4.84 cm), graft diameter (11.58 mm) and number of leaves (6.51). Rootstock inoculated with *Gigaspora margarita* recorded maximum graft success (56.67%) and survival (78.81 %). Interaction results showed that 10 month old rootstocks inoculated with different AM fungi recorded higher graft success and graft growth over control. Among different varieties, Totapuri recorded maximum graft success (59.99%) and Amrapali showed maximum survival (83.29%) and stocks inoculated with *Gigaspora margarita* showed maximum success (83.33%).

**FLORICULTURE**

***In Vitro* Conservation of Dahlia (*Dahlia variabilis* L.)**

G. SHIVAYOGEPPIA

2006

MAJOR ADVISOR : Dr.J. DINAKARA ADIGA

An investigation on *in vitro* conservation of dahlia (*Dahlia variabilis* L.) was conducted during 2005-2006 in the Department of Floriculture and Landscaping, Kittur

Rani Channamma College of Horticulture, Arabhavi. The study on decontamination revealed that explants treated with 0.1 per cent HgCl<sub>2</sub> followed by 0.5 per cent citrimide



## Abstract of Theses

for five minutes each showed a very least contamination. The highest number of multiple shoots was produced by the media supplemented with BAP (2 mg/l), while standardise the rooting protocol was unsuccessful. Quarter strength MS media was proved to be the best for conservation of *in vitro* cultures. Exclusion of sucrose from medium was good for slow growth of cultures. Alar and maleic hydrazide at a concentration of 40 mg per litre

extended the storage period. Two per cent mannitol acting as an osmotica was proved to be good for storing cultures. Use of polypropylene cap was proved to be good for storing the *in vitro* raised cultures compared with aluminium foil and cotton plug. With the use of above slow growth strategies, the *in vitro* dahlia cultures can be stored upto 134.00 days without subculturing.

### Effect of Growing Condition, Spacing and Nutrition on Growth, Flowering and Flower Yield of Heliconia (*Heliconia sp*)

J. GIRISH

2006

MAJOR ADVISOR : Dr. B. S. REDDY

An investigation on effect of growing conditions, spacing and nutrition on growth, flowering and flower yield of heliconia (*Heliconia Sp.*) under different growing conditions was carried during 2005-06 following randomized block design in the experimental field of department of floriculture and Landscaping, Kittur Rani Channamma College of Horticulture, Arabhavi, Belgaum, Karnataka. The plants grown under 35 per cent shade conditions were superior for all the growth parameters, flowering yield and quality as compared to the plants grown under open condition. But the open condition was found more congenial for cercospora leaf spot index than the 35 per cent shade condition. The spacing and nutrition influenced all the growth, flowering and quality, attributes of heliconia plants, with treatment T<sub>12</sub> (40 x 40cm with 25:10:20 g NPK + 2kg FYM / m<sup>2</sup>) being superior as compared

to the plants grown with the T<sub>7</sub> (30 x 30 cm with 20g K + 2 Kg FYM / m<sup>2</sup>). But the yield attributes were superior in plants grown in treatment T<sub>5</sub> (30 x 30 cm with 25:10:20 g NPK+ 2 Kg FYM / m<sup>2</sup>). And T<sub>6</sub> (30 x 30cm with 25:20:20 g NPK+ 2 Kg FYM / m<sup>2</sup>) as compared to plants grown in T<sub>14</sub> (40 x 40cm with 20 g K + 2 Kg FYM / m<sup>2</sup>). The amount of nitrogen and potassium present in soil was found to be more in the treatment T<sub>7</sub> (30 x 30cm with 20g K+ 2Kg FYM/ m<sup>2</sup>) and treatment T<sub>3</sub> (30 x 30cm with 20:20:20 g NPK + 2Kg FYM / m<sup>2</sup>) and less in the treatment T<sub>14</sub> (40 x 40 cm with 20 g K+ 2Kg FYM / m<sup>2</sup>). But the cercospora leaf spot index was found more in treatment T<sub>12</sub> (40 x 40 cm with 25:10:20 g NPK+ 2 Kg FYM / m<sup>2</sup>) as compared to the plants grown in treatment T<sub>2</sub> (30 x 30cm with 15:20:20g NPK + 2 Kg FYM / m<sup>2</sup>).

## OLERICULTURE

### Varietal Evaluation and Influence of Vermicompost in Guava (*Psidium guajava L.*)

RAGHAVENDRA S. DESHPANDE

2006

MAJOR ADVISOR : Dr. S. I. ATHANI

An investigation was carried out on varietal evaluation and influence of vermicompost in guava during 2005-06 at Department of Pomology, Kittur Rani Channamma College of Horticulture, Arabhavi, University of Agricultural Sciences, Dharwad. Of the 19 varieties evaluated, maximum plant height and plant girth was noticed in cv. Seedless, whereas higher number of branches and plant spread were observed in cv. Allahabad Safeda. Early flowering was noticed in cv. Sardar. Maximum flower drop was observed in cv. SWY -1 and maximum number of days from flowering to maturity was noticed in cv. CIW-5. Higher fruit length and fruit diameter were noticed in cv. CIW-4, whereas maximum fruit weight, fruit volume and pulp weight was noticed in cv. Sardar and minimum number of seeds were noticed in cv. Seedless. Maximum total soluble solids was recorded in cv. SWY-1, ascorbic acid was in cv. Sardar and acidity was noticed in cv. GR-3.

Maximum number of fruits per plant was found in cv. SWY-1, whereas yield per plant and yield per hectare were recorded in cv. Sardar. Maximum leaf and soil nutrients, viz. nitrogen and phosphorus were found in cv. CIW-4, while maximum potassium content in leaf and soil were noticed in cv. CIW-1 and cv. GW-1, respectively. Higher chlorophyll 'a' and total chlorophyll was noticed in cv. CW -1, while chlorophyll 'b' was noticed in cv. SWY-I. The *in-situ* vermiculture plants recorded early flowering, minimum flower drop, fruit volume, fruit diameter and number of fruits per plant. The plants fertilised with 75 per cent RDF + 10 kg vermicompost produced significantly higher fruit length, fruit weight, pulp weight, total soluble solids, ascorbic acid, yield per plant and yield per hectare, leaf and soil nitrogen, phosphorus and potassium and chlorophyll 'b' content, while higher acidity, chlorophyll 'a' and total chlorophyll were noticed in 100 per cent RDF.

**Effect of Organic, Conventional and Integrated Form of Nutrient Management Systems on Growth, Yield and Quality of Tomato (*Lycopersicon esculentum* Mill.)**

TATYASAB NANDANI

2006

MAJOR ADVISOR : Dr.M. B. MADALAGERI

The investigation on effect of organic, conventional and integrated form of nutrient management systems on growth, yield and quality of tomato (*Lycopersicon esculentum* Mill.) was carried out in Olericulture Department of Kittur Rani Channamma College of Horticulture, Arabhavi during kharif 2005 by adopting randomised block design with five treatments replicated five times. The treatments included meeting 75 per cent ( $T_1$ ) and 100 per cent ( $T_2$ ) nutrients through organic sources, integration of organic and inorganic (50 : 50) nutrient sources ( $T_3$ ), 100 per cent nutrients (RDF) through inorganic fertilisers ( $T_4$ ) and 100 per cent RDF + recommended FYM ( $T_5$ ). Tomato plants in  $T_3$  recorded the highest plant height (91.36 cm) and number of branches (10.28) at 90 days after transplanting. Significantly higher number of leaves (69.84), leaf area (1218.38 cm<sup>2</sup>) and dry matter (66.66 g) per plant were recorded in  $T_3$  plants

followed by  $T_2$ . The  $T_4$  plants flowered early (18.60 days). The highest yield (32.60 t/ha) was recorded in  $T_3$  treatment followed by  $T_2$  (31.46 t/ha) and  $T_5$  (30.13 t/ha). The tomato fruits in  $T_2$  recorded the highest TSS (5.10°Brix), total sugars (3.19 g/100 g) and lycopene content (7.99 mg/100 g). However, the fruits from  $T_3$  showed higher shelflife (14.00 days). After the cropping season, the soil from  $T_2$  plots recorded the least bulk density (1.44 mg/m<sup>3</sup>), pH (7.49) with maximum water holding capacity (50.65%). Available N and P content of soils were higher in  $T_5$ , while K content was higher in  $T_1$  treatment. The population of bacteria, fungi and actinomycetes were higher in  $T_2$  soil samples with high soil dehydrogenase activity. The seeds harvested from  $T_2$  plants recorded higher germination percentage (92.80%) and seedling vigour index (1477.39). The highest net income (Rs. 1,39,509/ha) and cost: benefit ratio (1 : 6.44) were obtained in  $T_3$  followed by  $T_2$  model of nutrient management.

**Studies on Influence of Planting Date and Spacing on Yield and Quality of Onion Seeds**

DEBARAJ BARMAN

2006

MAJOR ADVISOR : Dr. RAVINDRA MULGE

The investigation was undertaken to find out the influence of different planting dates and spacing on seed yield and quality of seeds in onion cultivar Nasik Red at Olericulture Unit of Kittur Rani Channamma College of Horticulture, Arabhavi, Belgaum (Karnataka). The experiment was laid out in split plot design with three main plots accommodating planting dates (1<sup>st</sup> September, 1<sup>st</sup> October and 1<sup>st</sup> November) and four levels of spacing (45 x 15 cm, 45 x 30 cm, 60 x 15 cm, 60 x 30 cm) as sub plots in three replications. Better growth was observed in October planted crop while earliness was observed in November planted crop. Planting of onion bulbs on first October resulted with maximum plant height at 90 days after planting (DAP) and maximum number of leaves at 90 and 120 DAP. Planting of bulbs at a closer spacing of 45 x

15 cm resulted with maximum plant height in all the stages (30, 60, 90 and 120 DAP) of observation and wider spacing of 60 x 30 cm resulted with maximum number of leaves at 120 DAP. Planting of onion bulbs on first October resulted with early flowering (50.8 days). Planting of onion bulbs on first October resulted with maximum umbel diameter, maximum number of umbels per plant, highest seed yield per umbel, maximum seed yield per plant and maximum seed yield per plot and per hectare. A closer spacing of 45 x 15 cm resulted with maximum seed yield per unit area (497g/plot, 459 kg/ha). Planting of onion bulbs on first October at 45 x 15 cm spacing resulted with maximum seed yield per unit area (705g/plot, 625 kg/ha). Seeds produced from first October planting recorded maximum test weight and per cent germination up to 15<sup>th</sup> and 20<sup>th</sup> days after incubation.

**POST HARVEST TECHNOLOGY**

**Value Addition to Jamun Fruits**

SAMEERA. SIRDESHPANDE

2006

MAJOR ADVISOR : Dr.A. K. ROKHADE

An investigation on the development of value added products from jamun fruits and their storage was carried out in the Department of Post harvest Technology, Kittur Rani Channamma College of Horticulture, Arabhavi during the year 2005-2006. Jamun RTS with the recipe containing 16 per cent juice + 0.1 per cent citric acid adjusted

to 16 per cent TSS and jamun squash with 40 per cent juice + 0.45 per cent citric acid adjusted to 40 per cent TSS scored significantly higher values (out of 5.0) with respect to colour and appearance (4.29, 4.16), taste (4.29, 4.00), flavour (4.29, 4.14) and overall acceptability (4.34, 4.25), respectively. During the storage period of six months, the

## Abstract of Theses

changes with respect to chemical parameters and microbial load were comparatively minimum under refrigerated storage than at ambient storage. At the end of 60 days after storage, the carbonated RTS jamun beverage with 80 psi CO<sub>2</sub> stored under ambient condition recorded (highest scores for colour and appearance (3.30), taste (3.58), flavour (3.38) and overall acceptability (3.62) compared to 100 and 120 psi CO<sub>2</sub> with or without addition of ascorbic acid. A recipe containing 1 kg pulp + 675 g sugar + 2 g citric acid + 25 mg pectin was found to be

suitable for preparation of jam from big and small fruits, while a recipe having 1 kg pulp + 850 g sugar + 4 g citric acid + 25 g pectin was found to be more suitable for medium sized fruits. A recipe containing 1 kg pectin extract + 1 g citric acid + 5 g pectin + sugar 1 : 0.75 ratio (pectin extract: sugar) was found to be suitable for preparation of jelly from big sized fruits, while a recipe having 1 kg pectin extract + 3 g pectin + sugar 1 : 0.75 ratio (pectin extract: sugar) was found to be more suitable for medium and small sized fruits

## FOOD SCIENCE AND NUTRITION

### Effect of Spirulina on Lipid Profile of Hyperlipidemics

SMITHA M. KURDIKERI

2006

MAJOR ADVISOR : Dr.B. KASTURIBA

A study entitled effect of spirulina on lipid profile of hyperlipidemics was undertaken during 2004-05 to assess the nutritional status of 30 hyperlipidemics in comparison to 25 normolipidemics and to determine the effect of spirulina on lipid profile of hyperlipidemics. The study revealed that hyperlipidemics had higher body weight, higher body mass index and higher waist to hip ratio compared to normolipidemics. Majority of hyperlipidemics (63.32%) were abdominally obese compared to normolipidemics (44%). The normolipidemics had higher intake of most of the nutrients like protein,  $\alpha$ -carotene, vitamin C, folic acid and iron. On the contrary, the mean intake of visible fat was higher (31.55 g/d) in hyperlipidemics compared to normolipidemics (29.66 g/d). Hyperlipidemics had higher intake of cholesterol (79.42 g/d) and saturated fat (19.75 g/d) compared to normolipidemics (60.21 g/d and 19.33 g/d, respectively) whereas, PUFA intake was

higher (14.56 g/d) in normolipidemics and lower in hyperlipidemics (12.59 g/d). Vices such as smoking (46.66%) and alcoholism (60%), were more prevalent in hyperlipidemics whereas, habit of exercise was more in normolipidemics (60%). The non-vegetarians had significantly higher serum levels of total cholesterol, triglycerides, very low density lipoprotein cholesterol, low density lipoprotein cholesterol, TC/HDL-C, LDL/HDL-C and lower serum high density lipoprotein cholesterol level compared to vegetarians. The spirulina supplementation (1.6 g/d) for 60 days to experimental hyperlipidemics resulted in significant reduction in mean total cholesterol (8.65%), triglycerides (26.16%) and very low density lipoprotein cholesterol (25.38%) when compared to the initial values. Spirulina supplementation also improved the blood haemoglobin status (from 9.81 to 10.14 g/100 ml) of the experimental hyperlipidemics.

### Physical Characters and Glycemic Response of Fresh and Dehydrated Underutilized Cucurbits

B. KARTHIKA

2006

MAJOR ADVISOR : Dr.PUSHPA BHARATI

Investigation on physical characters and glycemic response of fresh and dehydrated underutilized cucurbits were carried out at college of Rural Home Science, UAS, Dharwad during 2003-04 to find a suitable method of dehydration and to evaluate the therapeutic value of the vegetables in both fresh and processed form. Fresh vegetables procured from local market were analyzed for the physical characteristics and moisture and dehydrated employing sun, hot air oven and microwave drying. The change in physical characters on drying was recorded. The glycemic index (GI) of the vegetables in the fresh form as *bhaji* and powder seasoned like *bhaji* given as an accompaniment with *chapathi* was assessed in six non diabetic volunteers. The study revealed that the length, breadth and mean

diameter of spinegourd and bittergourd (5.90:15.74, 2.70:3.20 and 9.36:9.23, respectively) and the weight and volume of the fruit of spinegourd and bittergourd was 1.58:35.60 g and 4.60 :43.00 ml, respectively with bulk density 0.34:0.90 g / ml. The moisture of spinegourd was maximum (86.75%) than bittergourd (84.20%) and *karchikai* 981.18%). Sundrying of vegetables took maximum time as compared to other two modes of drying. Sun dried vegetables had maximum bulk density and dispersibility compared to microwave and hot air dried vegetables. Microwave drying resulted in high in shade drying (68.2%) as compared to sun (66.3%), hot air oven (63.1%) and microwave (63.5%). Particle size of the vegetable powders did not differ much with different drying methods. GI studies revealed that *karchikai* had high GI in both powder and *bhaji* (72.41 and 74.03 respectively)

compared to bittergourd (53.40 and 56.68) and spinegourd (54.82 and 42.44 respectively). All the three vegetables were found to significantly reduce the AUC in both *bhyaji*

and powder form. Spinegourd (*Adavihagal*) in the form of *bhaji* is found to have low and a high soluble fiber content which may be of value in planning diabetic diets.

#### Nutritional and Processing Qualities of POP Sorghum Cultivars and Value Addition

ZEENATH A. GUNDBOUDI

2006

MAJOR ADVISOR : Dr. NIRMALA B. YENAGI

The demand for sorghum as a staple food is declining day by day, as there are no alternative uses and value added products. Popped sorghum is one of the ready to eat snacks which is popularly consumed by local growers. It has got potential to develop value added products as a convenient ready-to-use food. Hence, the study was undertaken to evaluate nutritional and processing qualities of pop sorghum cultivars, grown in different seasons and value addition. Physico-chemical characteristics of three kharif and three rabi cultivars were analyzed by standard procedures. Cultivars were also evaluated for conventional and modern microwave method of popping and nutritional quality. Two spice flavoured and two sweet coated popped snacks were standardized and studied for consumer acceptability by using 5 point scale. Storage quality of popped grains and flour were assessed for changes in moisture, free fatty acid content and organoleptic characters, stored in suitable packaging

materials at ambient temperature. Sorghum cultivars grown in rabi season possess superior physico-chemical and popping qualities than kharif. Popping qualities were better in conventional than microwave method. Mugad local a kharif and Marole local a rabi cultivars exhibited good popping qualities in both the methods. Popping yield showed a negative relationship with 1000-kernel weight and volume, and flake size was positively related with kernel weight and volume. Among the developed products of sweet coated and spice flavoured snacks, popped jaggery laddu and cinnamon flavoured snacks had better organoleptic scores than other snacks respectively. Popped sorghum stored in polythene cover and flour stored in aluminium pouch had better storage quality of 21 and 28 days with excellent organoleptic scores respectively. Thus market potential of pop sorghum can be enhanced by developing varieties of popped snacks of different flavouring substances as value addition.

#### Revival of Relic *Khana* Material as Contemporary Designer's Bed Linen

M. NAMRATA

2006

MAJOR ADVISOR : Dr. SHAILAJA D. NAIK

The present study entitled "Revival of relic *khana* material as contemporary bed linen" was conducted during 2004 - 06. Traditional handwoven *khana* materials are the blouse (kubasa) material with extra warp dobby figures of Northern Karnataka. In the present days, the utility of *khana* materials for choli purpose has declined to a greater extent affecting the weaver's community. Hence efforts were made to revive the relic *khana* material by diversifying its utility towards designing contemporary diwan sets. According to objectives, 30 each of housewives and working women were interviewed using self structured schedule by personally interviewing to assess the most suitable fibre content, colour and pattern of *khana* material for designing diwan sets. Five diwan sets were designed by using different patchwork techniques like block, crazy, logcabin, mosaic and tucked patchworks. They were surface enriched with tribal embroideries and accessories viz., coins, shells, tassels, frills and bells to give an ethnic

look. Further, consumer's acceptance to the newly designed diwan sets was assessed from 50 each of housewives and working women to reveal its suitability to the contemporary era. Mosaic patchwork was highly accepted followed by block, logcabin, tucked and crazy patchwork. About 82 percent of the respondents opined excellent for designer's diwan sets and expressed that they give trendy look. These diwan sets were digitized using Corel DRAW version 7.0 to throw light on applicability of *khana* on three lighter background material viz., blue, red and yellow. The total cost and return was high in block and crazy patchworks, moderate for tucked and logcabin patchworks and low for mosaic patchwork. These designer's diwan sets have great demand in three star and five star hotels which would enrich their interiors. Self entrepreneurs can expand their units to build international market and in turn promote *khana* weavers.

#### TEXTILE AND APPERAL DESIGNING

##### Assessment of Physical Properties of Camel and Goat Hair

KIRTINAGAL

2006

MAJOR ADVISOR : Dr. SHAILAJA D. NAIK

The present study entitled assessment of physical properties of camel and goat hair was carried out during 2004-06 to assess the physical properties of

camel and goat hair, to compare the quality parameter of camel, goat and blended yams and determine the effect of acid and reactive dyeings on the colourfastness of camel

## *Abstract of Theses*

yarn. The camel hair was procured from National Research Centre on Camels, Bikaner (Raj) and goat hair from Rajasthan Agricultural University Bikaner (Raj). The fibre samples were assessed for morphological, chemical and physical characteristics. The hair were distinctively handspun into camel, goat and blended yarns (Camel:goat 50:50) and were assessed for yarn count, yarn twist and single yarn strength. But camel yarn was alone dyed in acid and reactive dyes and assessed for colour fastness. From the results of pilot study yellow, green and blue colour and 2 per cent dye concentration was selected on the basis of dye absorption and visual appearance.

Camel hair was relatively finer with lower medullation percentage compared to goat hair. Camel yarn was finer with greater number of tpi whose single yarn strength and elongation percentage was lower than to goat and blended yarn. Acid and reactive dyes showed significant adverse effect on yarn properties, that inturn resulted into yarn coarseness, lower tpi and decreased in single yarn strength regardless of hues and dyeing methods. Dyed samples showed good colourfastness to crocking and sunlight. Hence to enhance the appearance of camel hair, colour can be added as value addition that aids the young entrepreneurs to take up this venture and rejuvenate the applicability of speciality hair fibres.

## **HUMAN DEVELOPMENT**

### **Reproductive Health of Rural Married Adolescent Girls**

H. S. NETRAVATI

2006

MAJOR ADVISOR : Dr. K. SAROJA

This study was conducted in Ranebennur taluk of Haveri district during 2004-05. 150 samples were selected from 14 villages by lottery method. Interview schedule was the tool used for data collection. Results revealed that, 52% of the respondents were literate having education from primalY to high school level. Majority (89%) hailed from joint family. 81% had family size of 8-13 members. All of them experienced first pregnancy, 50% had two children. Majority (97 :3%) were conceived before they reached 18 years, 54% had child wastage. Miscarriage (51.5%) was the main type of child wastage. Half of the child wastage occurred in first pregnancy. One fourth of them suffered from mild to moderate mahnourishment. 80% knew about spacing methods. Only 26% were using spacing methods during survey. 57%, nearly 48% and 43% had health problems during pre, peri and postnatal period respectively. Menstrual (77%), vaginal (55%) and

uterine (43%) problems were common among respondents. Less than one-fourth utilized government health services. Lack of bus facility was the main reason for non-utilization. More than half (55%) of them received IFA tablets. Only 48.8% consumed regularly. However, nearly 60% were immunized completely. Nearly 65% delivered at home and of these 41 per cent were assisted by untrained family members. Majority (80%) reported either physical or mental violence. 57% reported mental cruelty. Almost all of them reported bad-habits of their husband (90%). One third of those suffering mental cruelty worried too much as their husband wasted their earnings on bad habits. 43% suffered battering by mother-in-law for not having brought enough dowry. 61% were prevented by in-laws and husband from seeking medical treatment. As such there is a need to educate adolescent girls and especially family members regarding the importance of general and reproductive health of girls during adolescence.

### **Impact of Preschool Programmes on Mental and Motor Development of Young Children**

GITIKA MATHUR

2006

MAJOR ADVISOR : Dr. PUSHPA KHADI

The study on impact of preschool programme on mental and motor development of young children aimed to assess the preschool programmes in Hubli-Dharwad Municipal Corporation Area and to study the impact on mental and motor development of young children. The sample consisted of 72 pre-school children aged 2½ - 3½ years from four most popular and preferred pre-schools of Dharwad and Hubli. Bayley Scale of Infant Development (1993) and Peabody Motor Developmental Scale (1997) were employed to assess developmental outcomes of children. A developed preschool programme evaluation tool to assess the quality of preschool programme and socio economic status scale developed by AICRP(CD) was used. The results revealed that the children of all the schools were in normal range of developmental indices ranging

from 110-121 for mental development and 94-97 for motor development. Though the children from one of the school hailed from lower socio-economic strata i.e. 62.5 per cent, unlike none from other schools, their developmental outcomes were on par with children of other schools. The fee structure of one school was Rs.1500/month while the laboratory school of UAS, Dharwad charged a minimum of Rs.3 -10/month. Mental development indices of children differed significantly between ECCE centers while non-significant differences were noticed on motor development indices. Mental development was significantly influenced by factors such as school, socio-economic status and child's ordinal position while none of the factors had significant influence on motor development. This implies that there is a need to educate the parents and school

teachers and administrators to provide a congenial environment to facilitate motor development. A need to educate and equip the teachers with skills in offering the pre-school programme. There is also a need to appraise

the early childhood education specialists and social workers, service personnel to offer good quality and meaningful programme for young children affordable by all socio-economic groups.

#### **Analysis of Parenting Style and Emotional Intelligence**

SHWETA BIRADAR

2006

MAJOR ADVISOR : Dr.V. S. YADAV

This was an ex-post-facto study to analyse parenting styles and emotional intelligence of college respondents conducted on a purposive sample of 300 males and 200 females respondents of College of Agriculture and College of Rural Home Science, University of Agricultural Sciences, Dharwad, Karnataka state. The age of the respondents ranged between 18-23 years. The respondents selected were undergraduate respondents from I, II, III and IV year classes. Parenting scale was used to measure parenting style developed by Bharadwaj et al (1998). Emotional Intelligence questionnaire was used to measure emotional intelligence developed by Dulewicz and Higgs (2001). The results revealed that there was no significant relationship between demographic characteristics with parenting styles and emotional intelligence of the respondents. There was no significant difference between male and female respondents on seven perceived models of parenting and seven components of emotional intelligence. But there was significant difference between male and female respondents on perceived freedom vs. discipline model of

parenting. Majority of the respondents have developed rejection, carelessness, neglect, lenient standard, freedom, faulty role expectation, marital conflict and realism perceived models of the parenting. I. On the basis of overall results of emotional intelligence it can be concluded that among the respondents about 56.31 and 13 per cent of them had developed lower, average and higher level of emotional intelligence, respectively. As acceptance, protection, indulgence, realism, moralism, discipline, realistic role expectation, marital adjustment perception of parenting, increase, the emotional intelligence of the respondents increases. As acceptance, protection, indulgence, realism, moralism, discipline, realistic role expectation, marital adjustment models behaviours of fathers, mothers and parenting with children in their interaction increase, the six components (viz., self awareness, emotional resilience, motivation, influence, interpersonal sensitivity and conscientiousness) of emotional intelligence also increases. But the increase of intuitiveness among the respondents was inversely related to the above models of behaviour of fathers, mothers and parenting.

#### **Prevalence of Learning Difficulties / Disability Among Primary School Children : Effect on Emotional Problems and Academic Achievement**

HEENA AFREEN M. DILSHAD

2006

MAJOR ADVISOR : Dr. PUSHPA KHADI

An exploratory study on prevalence of learning difficulties/ disability among primary school children and its effect on emotional problems and academic achievement was carried out in Dharwad city during the year 2004-06. A sample of 198 children (110 with learning difficulties and 88 without learning difficulties) was drawn from 3 selected English medium schools studying in 3<sup>rd</sup> and 4<sup>th</sup> standards. A writing test was administered to know the learning difficulties/ disability. Emotional problems were assessed through teachers ratings using emotional problem scale developed by Prout and Strohmer (1985) and two semesters grades were obtained from school records to know the academic achievement of selected children. Results revealed that prevalence was found to an extent of 21 per cent, among which 17 per cent of children had learning difficulties and 4 per cent had learning disability. The learning disabilities was found in writing errors such as substitutions, reversals, omissions, other than

punctuation errors and wrong capitals etc. Boys had 2-4 times more learning difficulties / disability than girls. The learning difficulties were due to factors such as change in medium of instruction and number of hours spent by parents for coaching at home. Children with learning difficulties/ disability had 2-4 times more emotional problems viz., thought disorder, verbal aggression, physical aggression distractibility, somatic concerns, non-compliance, withdrawal, depression, low self-esteem and hyperactivity than their peers in the other group and were low in academic achievement. Girls performed better than boys irrespective of their difficulties and boys with learning difficulties/disability had relatively low academic achievement indicating learning difficulties as one of the important cause of failure in school. A high prevalence of learning difficulties/ disability is an alarming condition that needs attention and early intervention.

## Abstract of Theses

### **Influence of Relations of Family and Peers and Pressures of PUC II year Students on Their Adjustment and Academic Performance**

KAMALAVVA B. BAILUR

2006

MAJOR ADVISOR : Dr. PUSHPA KHADI

The study on influence of relations of family and peers and pressures of PUC II year students on their adjustment and academic performance on sample of 231 students revealed that majority of the students perception of relations of family and peers was normal, while 34.6 per cent and 12.5 per cent had poor family and peer relations, respectively and 22 per cent perceived to have high pressures. About 77 per cent of students had poor adjustment. There was no significant difference between gender and SES levels on students perception of family and peers relations, pressures and academic performance. The health, emotional and total adjustment differed significantly by level of SES with higher SES being better. Family relations, pressures and adjustment significantly influenced academic performance of students

in PUC II year. Academic performance of PUC I year and PUC II year was highly correlated. Education of father, mother, occupation of father and family income significantly influenced adjustment and academic performance of students. This implies the need for counseling and guidance of PUC students and their parents for normal adjustment. Fifteen per cent of the class strength were selected from each division of selected three popular science colleges in Dharwad, Karnataka state. To study the family and peer relation and pressures of students a developed tool as per the guidelines of the Moos and Moos's (1994) LISERS-Y tool was employed. Selected parameters of SES was assessed as per the scale developed by AICRP - CD (2002). Marks secured in final exam of I and II year PUC were considered for academic performance.

### **The Analysis of Parenting Style and Personality Disorder of the College Students**

ROOPA U. KABBUR

2006

MAJOR ADVISOR : Dr. V. S. YADAV

This was an ex-post-facto study to analyse parenting style and personality disorder on a purposive sample of 227 male and 125 female science students of JSS college, Dharwad, Karnataka state, who were living with their both the parents. The age of the respondents ranged between 18 to 23 years. Respondents were undergraduate from B. Sc. I, B. Sc. II and B. Sc. III years. Parenting scale (Bharadwaj *et al.*, 1998) was used to measure models of parenting and OMNI-IV Personality Disorder Inventory (Loranger Armand, 2001) was used to measure personality disorders. The data were subjected to percentage, correlation and association to analyze the results. The results revealed that there was positive relationship between age and personality disorders, negative relationship between education, occupation of

parents and personality disorders. There was no significant difference between the male and female respondents on eight perceived models of parenting and eight personality disorders, but there was significant difference on two personality disorders. Majority of the respondents had developed acceptance, indulgence, realism, discipline and marital adjustment model of parenting, even then the respondents had developed obsessive-compulsive, narcissistic, histrionic, schizoid, paranoid, avoidant, schizotypal, dependent, antisocial and borderline tendencies hierarchically from 1.00 to 21.00 per cent. Correspondingly, eight perceived models of parenting had negative relationship with 10 personality disorders. Subsequently, it was confirmed that mothering, fathering and parenting have significant negative relationship with 10 personality disorders.

\* \* \* \* \*