

Abstracts of Theses accepted for the Award of Postgraduate Degrees in the University of Agricultural Sciences, Dharwad.

Ph. D.

Genetics and Plant Breeding

Studies Related to Genetics of Economic and Quality Traits and Exploitation of Heterosis in Chilli *Capsicum annum* L.

N. B. GADDAGIMATH

1993

Major Advisor : R. PARAMESWARAPPA

A study was undertaken at the College of Agriculture, Dharwad during 1985–1992 to understand genetic behaviour of economic and quality traits and exploitation of heterosis on commercial scale. The study included 4 lines and 18 testers crossed in Line X Tester design to produce 72 hybrids which were studied along with four checks, viz. Byadagi, Sankeshwar, G-3 and Jwala. Cytoplasmic and genetic male sterile line DCA-1 was used along with its maintainer DCB in this study. Two genetic markers have been identified on ms-line. Histological and histochemical studies have revealed that abnormal hypertrophic growth of tapetum in male sterile line from PMC to pollen tetrad stage of microsporogenesis was the main cause for sterility. Heterosis for several attributes was reported. Crosses DCA-1 X Sindhur, DCA-1 X Perennial and Pant C-1 X 419-1-44 were found promising. Role of both additive and non-additive gene action was found. Parents DCA-1, DCB, Sindhur, LCA-245, IHR-930, IHR-976, Perennial, 21-17 and 419-1-44

were found to be good general combiners for several traits. The hybrid combination involving ms-line DCA-1 x Sindhur and DCA-1 x Perennial were extra early in maturity and highly heterotic for various economic traits and yield. Inbreeding depression was noticed for yield attributes. Pollen grain was found viable for 8 hours after dehiscence and maximum viability was at 10.00 A.M. Stigma was receptive for 48 hours after opening of flowers. 2:1 female to male row proportion was found suitable for hybrid seed production. Average cross-pollination was found to be 50.3 per cent. Role of both insects and wind for cross pollination was reported. Suggestion was made to classify chilli under oftenly cross-pollinated crops. Correlation and path analysis revealed the prime importance of number of fruits as the sole contributing factor for yield through indirect effects of spread of plant, number of seeds per fruit and per day productivity.

Genetic Analysis of Yield, Its Components and Resistance to Charcoal Rot in rabi Sorghum (*Sorghum bicolor* (L.) Moench.)

M. R. GURURAJA RAO

1992

Major Advisor : S. J. PATIL

The present study was undertaken to determine the combining ability of parents, heterosis in F_1 hybrids, variability generated in selected F_2 populations, gene action and association in respect of yield and its components, and mode of inheritance of charcoal rot resistance in selected crosses in rabi sorghum through diallel analysis, generation

mean analysis, variability and path analysis. The first year of study involving six parents, viz. SPV 488, SB 905, E 36-1, M 35-1, SPV 86 and SPV 504 and their 15 direct F_1 s revealed superiority of E 36-1, M 35-1, SPV 86 and SPV 504 for use in rabi sorghum breeding programme based on combining ability. The General Combining Ability (GCA) variances

were higher than Specific Combining Ability (SCA) variances for most of the traits suggesting additive and additive x additive gene action. Kharif x rabi combinations were better compared to rabi x rabi indicating good scope for developing all-season hybrids/varieties. The scope for heterosis breeding in the material studied was very much limited since none of the hybrid excelled the yield of M 35-1. Ear weight followed by stalk girth and ear length had high positive direct effect on grain yield. Presence of digenic interaction was indicated in both E 36-1 x SPV 86 and E 36-1 x M 35-1 crosses for all the traits except for ear width for which a still higher order interaction was suspected. For majority of the traits studied, dominance (h) gene effect was significant and greater in magnitude compared to additive (d) gene effect and among interactions, additive (i) and dominant x dominant (l) effects were predominant. Ear weight, grains per panicle and grain yield per plant recorded

higher values of Genetic Co-efficient of Variability (GCV) and Genetic Advance. Of the five F_2 populations studied, E 36-1 x M 35-1 and M 36-1 x SPV 86 which recorded high GCV, heritability and Genetic Advance for most of the traits could be exploited further in developing high yielding charcoal rot resistant cultivars. Charcoal rot as evidenced by non-lodging of inoculated plants was found to be inherited as a recessive trait with a basic dominant gene for lodging. The fitment of observed F_2 segregation to two separate trigenic ratios in E 36-1 x SPV 86 (39 S : 25 R) and E 36-1 x M 35-1 (21 S : 43 R) crosses indicated a set of five pairs of genes viz., Ld____, l-Ld____, Ai-Ld____, l-Lda____ and l-Ldb____ with two pairs of genes common to the parents of above crosses. Reciprocal recurrent selection or diallel selective mating system was proposed as future breeding methods for simultaneous improvement of both grain yield and charcoal rot resistance.

Agronomy

Nitrogen and Weed Management In Upland Rice (*Oryza sativa* L.)

P. SUSHAMA KUMARI

1992

Major Advisor : M. M. Hosmani

Field experiments were conducted at Agricultural Research Station, Mugad, Dharwad district and at the farmer's field, Mugad to find out the effectiveness of pre-emergence herbicides, butachlor and pendimethalin and post-emergence herbicides 2, 4-D in comparison to conventional hand weeding and to manipulate the nitrogen fertilizer application to favour the crop and prevent fertilizers from stimulating excess weed growth during the kharif 1989 and 1990. The highest grain yields of 4749 kg/ha, 4283 kg/ha were recorded by the weed free check at the farmer's field and ARS, Mugad, respectively which was however on par with two hand weedings at 25 and 45 DAS. This was very closely followed by butachlor 1.5 kg a.i/ha and pendimethalin 1.0 kg a.i/ha accompanied by hand-weeding at 30 DAS. So also these treatments recorded the minimum weed counts and weed dry weights next to two hand-weedings at 25 and 45 DAS and the weed free check. The application of 100 kg N/ha in three equal splits as basal,

at active tillering stage and at panicle initiation stage recorded the maximum grain yields of 3603 kg/ha and 4233 kg/ha at the farmer's field and at ARS, Mugad, respectively. This was very closely followed by the equal split applications of nitrogen at active tillering and panicle initiation stages. Increased number of weeds and weed dry weights were observed at 25 DAS, with the application of entire nitrogen or $\frac{2}{3}$ nitrogen as basal in contrast to the low weed counts and weed dry weights seen in treatments that received no nitrogen at all as basal application. At 60 DAS, after one regular weeding at 30 DAS, the treatments that received $\frac{1}{2}$ N as basal and the remaining $\frac{1}{2}$ N at active tillering stage, full N as basal and $\frac{2}{3}$ N as basal and $\frac{1}{3}$ N at active tillering stage recorded more weed counts and weed dry weights. Generally, these are the treatments that received more quantity of nitrogen either as basal or at active tillering stage and hence more weed growth.

Studies on Intercropping in Irrigated Wheat with Different Intercrops at Varying Plant Population and Wheat Rows.

H. L. HALEMANI

1992

Major Advisor : G. D. RADDER

Four field experiments were conducted at Main Research Station, Dharwad on black soil under irrigation during rabi 1983-84 and 1984-85. During 1983-84, eight intercropping systems comprising two intercrops (maize/sunflower in experiment 1 and chickpea/soybean in experiment 2) and two plant population levels (50 and 100% recommended) of wheat as well as intercrops were compared with respective sole crops. During 1984-85, the treatments were modified and increased to 12 comprising combinations of two intercrops (maize/sunflower in experiment 3 and chickpea/pigeonpea in experiment 4), two plant population levels (50 and 100% recommended) of intercrops and three levels of wheat rows (9, 11 and 13 in the third experiment and 4, 6 and 8 in fourth experiment) and were compared with respective sole crops. Intercropping in irrigated wheat with maize followed by sunflower and chickpea were found to be more profitable than sole wheat. On the basis of net income, intercropping of wheat + maize at 50 : 100 per cent recommended plant population with 6:2

row proportion was most profitable (Rs. 17,162/ha), followed by wheat + sunflower intercropping system (Rs. 13,467/ha at 50:100 per cent plant population with 6:2 row proportion and wheat + chickpea intercropping system (Rs. 12,677/ha) at 50:100 per cent plant population with 6:4 row proportion. These systems gave 137, 86 and 61 per cent more net income, respectively over sole wheat. On the basis of land equivalent ratio, wheat + pigeonpea intercrop system with 6 : 1 row proportion at 100 : 50 per cent plant population produced highest yield advantage, followed by wheat + maize intercrop system at 50 : 100 per cent plant population with 6 : 2 row proportion and wheat + sunflower intercrop system at 50 : 100 per cent plant population with 6 : 2 row proportion and they produced 12, 9 and 8 per cent more yield advantages as compared to sole crops, respectively. Reduction in wheat yield was more when maize (66%), sunflower (64%) and chickpea (35%) were intercropped, while it was negligible (2%) due to intercropping of pigeonpea in wheat.

Studies on Alley Cropping and Agrosilviculture Systems in Black Soils Under Dryland Agricultural Conditions

G. R. KORWAR

1992

Major Advisor : G. D. RADDER

Investigations on alley cropping and agrosilviculture systems in black soils under dryland agricultural conditions were carried out at Regional Research Station, Bijapur during 1989-90 and 1990-91. In the first experiment, roots unpruned and roots pruned *Leucaena* hedgerows and sole *Leucaena* were subjected to four cutting intervals (1, 2, 3 and 6 months). Rabi sorghum was intercropped in the alleys. Grain and stover yields of sorghum increased by 30 and 17 per cent, respectively due to root pruning of *Leucaena* hedgerows. Shorter cutting intervals (1 and 2 months) significantly increased sorghum grain and stover yields over longer ones (3 and 6 months). Highest (Rs. 4821/

ha/yr) net returns were realised from sole *Leucaena* followed by root pruned (Rs. 3167) and root unpruned (Rs. 2520) *Leucaena* hedgerows intercropped with sorghum. In the second experiment, four N levels (0, 12.5, 25 and 50 kg N/ha) were tested on sole sorghum and *Leucaena*-rabi sorghum alley cropping system with and without prunings application. Prunings applied alley cropped sorghum yielded 22 per cent more grain than unapplied (712 kg/ha), however, sole sorghum yielded the highest (1117 kg/ha). Highest (Rs. 4204/ha/yr) net returns were realised from prunings unapplied system, followed by prunings applied (Rs. 3382) and sole sorghum (Rs. 3176) system. In the third experiment,

effect of four tree species (*Eucalyptus*, *Neem*, *Dalbergia sisso* and *Hardwickia binata*) and four levels of tree management (control – unmanaged, root pruned, branches lopped and root pruned plus branches lopped) was evaluated on intercropped rabi sorghum. Sole sorghum yielded highest (626 kg/ha) grain, followed by sorghum in association with *H. binata* (323 kg) and the lowest (83 kg/ha) with *eucalyptus*. Net returns were highest (Rs. 4198/ha/yr) from *eucalyptus* followed by *H. binata*

(Rs. 2925) and the lowest (Rs. 1135) from sole crop. In the fourth experiment, three rabi crops (safflower, sorghum and sunflower) were tested with four tree species (listed above in the third experiment). Yield of all the rabi crops tested decreased when intercropped with the tree species. Highest reduction was observed with *eucalyptus* and lowest with *H. binata*. Among the three crops, sunflower was least affected and safflower the most.

Greenmanuring of Rice (*Oryza sativa* L.) with *Sesbania rostrata* (Brem. and Oberm) for Nitrogen Substitution and Sustained Production

P. S. MATIWADE

1992

Major Advisor : M. N. SHEELAVANTAR

Field experiments were conducted on red silty clay loam soils to study the greenmanuring of *Sesbania rostrata* (SR) both under sole and intercropping system and N-application for N-substitution and building up of soil fertility for sustained rice production at Agricultural Research Station, Mugad, UAS, Dharwad under irrigated conditions during kharif of 1989 and 1990. Greenmanuring of SR and application of nitrogen in various proportions significantly influenced the grain yield of rice. Grain yield produced in control was 25.78 q/ha and it significantly increased to 50.53 and 52.07 q/ha with the RDN (Recommended Dose of Nitrogen) alone and greenmanuring of SR alone, respectively. Grain yield produced with greenmanuring of SR alone was equal/more than that observed with the RDN alone to rice. This indicated that 100 per cent of N required for rice crop could be substituted by greenmanuring of SR alone. Greenmanuring of SR alone resulted in net profit of Rs. 13,393.31 /ha with benefit cost ratio of

3.64 while the highest net profit of Rs. 17,551.16 /ha with benefit-cost ratio of 4.18 was realized with greenmanuring of SR along with the 100 per cent of the RDN. In rice and SR intercropping system, greenmanuring of intercropped SR at various periods under different row proportions influenced the grain yield of rice significantly. The highest grain yield of 52.69 q/ha was produced with greenmanuring of intercropped SR at 55 DAP under 12:1 row proportion when compared to other row proportions. Similar trend was observed in straw yield. The maximum net profit of Rs. 14,155.63 /ha with benefit-cost ratio of 4.78 was realized with greenmanuring of intercropped SR at 55 DAP under 12:1 row proportion applied with nitrogen. There was a significant interaction effect of greenmanuring of intercropped SR and nitrogen application on grain yield of rice. Besides substitution of N, greemanuring of SR helped to improve the fertility status of soil.

Crop Physiology

Physiological and Histochemical Basis of Insect Pest Resistance in Cotton (*Gossypium* spp.) Genotypes

K. K. THIMMAIAH

1992

Major Advisor : Y. C. PANCHAL

Investigations were carried out to study the physiological, histochemical and anatomical factors responsible for host-plant resistance in cotton genotypes during two kharif seasons of 1989 and 1990. Field experiments were laid out at the Main Research Station, UAS, Dharwad, in RBD with three replications. During each season, two experiments were laid out side by side. In Experiment-I, crop was grown under natural pest infestation and without plant protection measures, while Experiment-II was conducted with minimum plant protection measures. Experimental material consisted of both the resistant (JK-345-3-3, JK-119, JK-276-4, JK-260-2 and LK-861) and susceptible (LPS-141, MESR-17, Sharada, DCH-32 and Laxmi) genotypes. The susceptible genotypes registered higher total nitrogen, crude protein, reducing sugars and total sugar contents as compared

to the resistant genotypes. The concentrations of phenolic substances, total phenols, ortho-dihydroxy phenols and tannins were recorded higher in resistant genotypes as compared to susceptible genotypes. It appears that genotypes resist insect attack through the antibiotic activity of phenolic compound. Histochemical studies confirmed the results of biochemical analysis with respect to protein and carbohydrates. Anatomical observations revealed that the leaves of susceptible genotypes were thick with loosely arranged cells in the leaf lamina and cortical cells in the midribs. The stem tips, petioles and boll rinds of the resistant genotypes were found to be relatively compact in cell density compared to susceptible genotypes. Perhaps compactness of the tissues increased toughness of the resistance genotypes.

Studies on the Physiological and Biochemical Changes in *Eupatorium odoratum* (L.) as Influenced by Herbicides and its Allelopathic Effects

M. B. DODDAMANI

1992

Major Advisor : Y. C. PANCHAL

In order to ascertain the indepth invasion and quantum spread of *Eupatorium odoratum* (L.) weed, an extensive survey was conducted in the infested areas of Western Ghats of Karnataka. The degree of *Eupatorium* infestation was low in thick, evergreen forests where light was the limiting factor. The complete absence of the weed growth all along the coastal line for about 2 km from sea was also particularly noted. Among the infested areas, the extent of spread was more in Shimoga, Uttara Kannada and Dakshina districts. Strong inhibition of germination was noticed in tested crop seeds to leaf, stem and root exudates of *Eupatorium* and similar observations were also recorded with root and shoot growth of crop seeds.

Higher inhibition was found with increased concentration of exudate. Among the crops, wheat and groundnut were more sensitive to leaf exudate. Higher reduction of total soluble sugar content and significant increase in phenol content were also recorded with higher inhibition of seed germination. Among the three herbicides tried, spraying of 2, 4-D or glyphosate at higher concentration (7500 ppm) was found to be more effective in controlling the *Eupatorium* growth and its resprouting ability. Conventional methods like burning or hand cutting with herbicides spray of 2, 4-D or glyphosate (5000 ppm) have given long-lasting effect in checking the perennial growth of the weed. Significant reduction in relative water

content, total soluble sugar content, catalase and peroxidase activity and chlorophyll degradation in leaves were recorded due to herbicidal treatments. The reduction was more with higher concentrations (7500 ppm) of 2, 4-D and glyphosate except chlorophyll degradation which was more with gramaxone

treatments. Contents of crude protein, phosphorous, potassium, magnesium and calcium in leaves, stems and roots of *Eupatorium* were greatly reduced by herbicidal treatments. In all the cases, glyphosate and 2, 4-D at higher concentrations (7500 ppm) were found to be more effective than gramaxone.

Agricultural Entomology

Use of Behaviour Modifying Chemicals for the Suppression of Cotton Bollworms

D. M. KORAT

1992

Major Advisor : S. LINGAPPA

The study conducted during 1989-91 included evaluation of Stirrup-PBW (Gossyplure) and Entice (Phagostimulant), Phago-stimulatory response of larvae, monitoring of bollworm moths and evaluation of traps for trapping pink bollworm (PBW) moths. Field evaluation of stirrup-PBW was carried out at Main Research Station, Dharwad and Regional Research Station, Raichur. Mixing of stirrup-PBW with insecticide reduced the PBW trap catches and subsequently larval population and incidence. However, it did not prove to be superior to insecticide alone in enhancing the ultimate yield. Bollworm incidence was negligibly reduced in Entice + insecticide treatments than in individual insecticides. Marginal increase in yield was not enough to separate the treatment effect. It failed to enhance the insecticidal efficacy in all the insecticides representing organophosphate, carbamate and synthetic pyrethroid groups. Significantly more leaf area was consumed by *Heliothis* larva from Entice treated leaves than check. Feeding of *Spodoptera* larvae on

phagostimulant treated leaves for 10 days increased larval weight significantly. PBW moths were active from mid October to the harvest of crop with 5 to 6 peaks. During 1989-90, *Heliothis* moths were active from mid September to November with 2 peaks, while it was extended upto January with 6 peaks during 1990-91. *Earias* spp. was found from mid November to February reaching peak at two times in a season. Positive correlation was noticed between trap catches and larval population and infestation recorded one and/or two weeks after trap catches. Maximum and minimum temperature had negative influence on trap catches of PBW and *Heliothis*, respectively. There was positive correlation between PBW moth activity and RH and inverse relation with *Heliothis* and *Earias* spp. Rainfall had positive effect with trapping of PBW moths and negative with other two species of bollworms. Wind velocity exhibited negative influence with all three bollworms. Polythene sleeve traps caught more number of PBW moths than delta sticky traps at high pest density.

Ecobiology and Management of Cutworms, *Agrotis* spp. (Lepidoptera : Noctuidae) on Cotton

R. S. GIRADDI

1992

Major Advisor : S. LINGAPPA

Investigations were undertaken at Dharwad from 1983 to 1986 and in 1990-91. *Agrotis segetum*

(Dennis & Schiffmuller) has been the dominant species of cutworm (88.4% of total collection)

infesting different crops in northwestern Karnataka and occurrence of *A. ipsilon* (Hufnagel) is inconsequential. *A. segetum* larvae moulted five times and *A. ipsilon* moulted five and six times with life cycle occupying 49.6 and 51.3 (57.2 for hexamoulter) days, respectively. In laboratory, both the species were reared throughout the year and developmental period varied from 45.9 – 51.5 (*A. segetum*) and 47.0 – 50.7 (*A. ipsilon*) days. *Apanteles ruficrus* (Haliday) was found to be dominant parasitoid on larvae. Moth activity was noticed from July to October and attained peak in August–September. Regression studies revealed evening relative humidity, minimum temperature and wind velocity as factors exerting greater influence on moth flight. Avoidable kapas loss ranged from 24.3 to 49.7 per cent. Regression studies suggested reduction in yield by 15.6 kg/ha for every per cent increase in cut seedlings. Damage potential of larva varied from 33.7 (at 2 larvae) to 156.7 (12 larvae) seedlings per 12 m² area. Regression equation predicted

increase in cut seedlings by 12.37 times for every unit increase in larval number in 12 m² area. One to seven day old seedlings were preferred most and feeding pattern was both partial and complete. Under free choice field conditions, larvae preferred cotton most, while wheat was least preferred. In laboratory, development was in shortest period (46.1 days) on potato and longest (62.4 days) on maize. All the larvae transformed to adults on cotton, potato and safflower while, only 40 per cent on maize. Field dispersal of larva was associated with proximity of food available. Later instars behaved as cutting instars and cannibalism studies indicated higher rate of cannibalism in *A. ipsilon* than in *A. segetum*. Diflubenzuron, a growth regulator, elicited ovicidal, larvicidal and pupicidal effects in *A. segetum*. Soil drenching with insecticidal emulsions was superior to other formulations like dusts, granules and poison-baits. Endosulfan as soil drench performed consistently well with less seedling damage and higher kapas.

Plant Pathology

Studies on Some Aspects of Wilt of Chickpea (*Cicer arletinum* L.)

S. T. PATEL

1992

Major Advisor : K. H. ANAHOSUR

Survey conducted in parts of Karnataka and Gujarat revealed association of *F. oxysporum* f. sp. *ciceri*, *F. solani*, *F. moniliforme* (together 34.6%), *M. phaseolina* (31.0%) and *S. rolfsii* (1.0%). *F. solani* was found in all locations. Isolates of *Fusarium* were found pathogenic to chickpea. Pathogens showed preferential association in respect of growth stages of chickpea. Varietal susceptibility, pathogens and soil moisture showed bearing on disease severity. Variability study of isolates was conducted in respect of morphological, cultural, nutritional, isozyme, serological aspects and pathogenicity. Isolates of *F. oxysporum* f. sp. *ciceri* appeared similar, but *F. solani* showed variation. On the basis of serology, three isolates of *F. oxysporum* f. sp. *ciceri* were put under one serotype, *F. solani* into three serotype and *F. moniliforme* under one serotype. On the basis of pathogenicity to each of 10 differentials, isolates of *F. oxysporum*

f. sp. *ciceri* appeared similar to race 4 which is already reported from Jabalpur and Hisar, but its report from Anand, Annigeri and Dharwad is new. Thirteen isolates of *F. solani* were grouped into three pathotypes, which are newly reported, viz. FsA4 (Annigeri) and FsAr (Arnej) to be more virulent, FsB2 (Bijapur) and FsG2 (Gulbarga) to be less virulent and FsA1, FsA2, AsA3 (Annigeri), FsB1 (Bijapur), FsBd1, FsBd2 (Bidar), FsD1, FsD2 (Dharwad) and FsG1 (Gulbarga) to be moderately virulent. Seed treatment (ST) @ 1.5 g/kg + soil drenching (SD) @ 0.05% with carbendazim + soil application of *Trichoderma harzianum* (Th) Raife was best integrated management practice followed by Th + FYM under rainfed field conditions. Under irrigated conditions, ST + SD + Th + irrigating field at sowing time + at 45 and 70 days after sowing reduced disease maximum (47% and increased seed yield (21%).

Agricultural Economics

Investment in Regulated Markets and its Impact on Market Structure, Conduct and Performance In Karnataka – An Economic Analysis

BASAVARAJA B. BANAKAR

1992 Major Advisor : H. G. SHANKARAMURTHY

Out of the 47 Regulated markets developed under I phase of IDA funds, five markets based on the amount invested were selected for detailed study. From the selected markets, one or two commodities which represented more than sixty per cent of the total arrivals in the respective markets were considered. The secondary data with regard to arrivals, amount invested, market intermediaries and prices were collected for 14 years, seven years (1969–70 to 1975–76) preceeding the investment of IDA funds and seven years (1983–84 to 1989–90) after completion of the project, which are called pre and post-investment periods, respectively. The primary data with regard to the turnover of each market intermediary were collected for one year in pre and post-investment periods. The pattern of investment was assessed through tabular presentation. The compound growth rates for the market arrivals during pre and post-investment period were worked out. Multiplicative model of the time series was used to examine the

temporal variation in arrivals and prices during both the periods of investment. The entry and exit and Gini coefficient ratios were worked out to assess the market structure and conduct of firms in the markets. Similarly, the performance or working of the regulated markets as a whole was assessed through factor analysis. The total amount invested for the development of all the markets during post-investment period was five times more than that during the pre-investment period and all the markets attracted more arrivals to the market yards and they handled bigger lots of the produce during post-investment period. The competition in the market had also increased during the post-investment period as compared to the pre-investment period. Market development had less impact on stabilization of arrivals. The grading wing and the market information system in regulated markets were weak even after heavy investments were made for the development of markets during post-investment period as highlighted by the factor analysis.

Agricultural Input Marketing In Karnataka – A Sectoral Analysis

R. A. YELEDHALLI

1992

Major Advisor : H. S. VIJAYAKUMAR

A sectoral analysis comprising Public, Private and Co-operative sectors in the marketing of three inputs, viz. chemical fertilizers, plant protection chemicals and seeds was undertaken in Karnataka. The market structure, market power and the price elasticities of inputs were studied using the secondary sources of data available with the Directorate of Economics and Statistics, Department of Agriculture and other relevant agencies. Compound growth rates, Gini ratios and functional analysis and Linear Programming were used for the analysis of data. Marketing of fertilizers was a very well knit activity compared to other two inputs. The Karnataka Agro

Industries Corporation in the public sector, the Karnataka State co-operative Marketing Federation through a network of village level Co-operative societies in the co-operative sector and a host of private agencies are the main channels through which the agricultural inputs are distributed. Agencies in the private sector control about 60 per cent of the inputs marketed in the state. The growth of fertilizer retail outlets was significant (3.80%) compared to that of plant protection chemicals (0.42%), while negative growth was observed for seeds. The extent of competition was high in the marketing of super phosphate and Di-ammonium phosphate

for which the Gini co-efficient observed were 0.68 and 0.90, respectively followed by Urea. The seeds of jowar, cotton and paddy witnessed high market competition. Demand forecast reveals that the state would need 3.4 million tonnes of fertilizers, 10,000 tonnes of plant protection chemicals and 0.59 mt of paddy seeds, 0.18 mt of jowar, 0.10 mt

of ragi, 0.69 mt of groundnut and 4000 tonnes of cotton seeds by the end of 2005 A.D. The functional analysis showed that the demand for these inputs were price inelastic. The lack of infrastructural facilities, lengthy registration procedures and high taxes were observed to be the major problems of the agencies involved in the marketing of inputs.

Agricultural Extension

Organizational Climate Perception and Job Performance of Anganwadi Workers of the Integrated Child Development Services (ICDS) Dharwad District, Karnataka State

SHOBHA NAGNUR

1992

Major Advisor : B. SUNDARASWAMY

The investigation was carried out in nine ICDS projects of Dharwad district in Karnataka. The sample consisted of 260 Anganwadi workers (AWWs). To study organizational climate perception and job performance, scales were developed. The organizational climate scale consisted of 58 statements covering 10 management functions namely Planning, Organising, Staffing, Directing, Co-ordinating, Reporting, Budgeting, Communicating, Representing and Innovating. The job performance scale consisted of 15 statements. A majority of the AWWs had medium level of organizational climate perception as well as job performance. The organizational climate perception of AWWs was positively and significantly related to the AWWs sociability, achievement motivation, job satisfaction, attitude towards job, job involvement, job stress, organizational stress and job performance. Job performance was positively and significantly related to the variables

experience, sociability, achievement motivation, job satisfaction, attitude towards job, job stress, job involvement and organizational climate perception. Regression analysis indicated that achievement motivation, job satisfaction, organizational stress and job performance contributed significantly to explain variation in organizational climate perception and the variables education experience, job satisfaction, attitude towards job, organizational climate perception explained variation in job performance. Path analysis further confirmed these results. Crucial variables in discriminating high and low organizational climate perception categories were achievement motivation, job stress, job satisfaction and job performance. The variables discriminating high and low job performance groups were experience, job satisfaction and organizational climate perception.

M. Sc. (Agri.)

Genetics and Plant Breeding

Genetics of Yield and Maturity Characters in Chickpea (*Cicer arletinum* L.)

B. S. ANNIGERI

1992

Major Advisor : S. J. PATIL

The field experiment was undertaken at two locations, viz. one at ARS, Dharwad farm and the other at RRS, Raichur farm. Seven parents of chickpea were crossed in all possible diallel combinations (excluding reciprocals) to study the extent of heterosis, combining ability, gene-action and correlations for different quantitative characters. The parents selected for the study included: A-1, Phule G-2, NPT, P-1631, Parmer 4-141, Simblapur and P-3720. Five crosses namely, Phule G-2 x P-1631, A-1 x P-3720, A-1 x Parmer 4-141, A-1 x Phule G-2 and P-1631 x Simblapur manifested high *per se* performance and maximum heterosis over the mid-parent for grain yield. For isolating early maturing lines the crosses, viz. A-1 x Phule G-2, Phule G-2 x Parmer 4-141, NPT x P-1631 and NPT x Simblapur can be used as they have shown heterosis for almost all the characters contributing to earliness in desirable direction. The combining ability analysis indicated the

significance of both GCA and SCA variances for all the characters studied except days to pod initiation, pods/plant and seeds/pod in which case only SCA variance was significant. The genetic component analysis indicated the predominance of additive gene action for pods/plant and seeds/pod at both the locations. Non-additive gene action was found to be important for days to maturity, secondary and reproductive branches and seed yield at both the locations. Both additive and non-additive gene action was found important for days to 50 per cent flowering. Association analysis among different characters conferring earliness indicated positive correlation of days to 50% flowering with all other characters. Positive correlation was observed between seed yield with pods/plant and 100-seed weight. Thus pods/plant and 100-seed weight can be directly used in improving yields in chickpea.

Studies on Combining Ability in Segregating Generations of Sorghum (*Sorghum bicolor* (L.) Moench)

B. SRIDHAR

1992

Major Advisor : S. S. PATIL

In sorghum, crosses E 36-1 x SPV 346 and E 36-1 x SB 905 were utilized to study the extent of variability for combining ability, consistency of this variability generated and genotypic influence on the amount of variability generated. In F_2 and F_3 randomly selected individuals (used as males) were simultaneously selfed (to obtain F_3/F_4 and crossed to 296 A (tester parent) to obtain derived F_1 s. These selfed males and derived F_1 s were evaluated in replicated trial along with 296 B and

checks. Data were recorded on days to flowering, plant height, ear length, peduncle length, number of nodes, ear diameter, number of whorls, head weight, seed yield, 100 grain weight, volume and density. The results indicated that variability was created for combining ability and *per se* performance, reflected by higher C. V. in derived F_1 and male populations against parents and checks. Further, higher C.V. in males was attributed to contribution of two gametes to variability while only one gamete

contributed to variability in derived F_1 s. Correlation between *per se* value and combining ability showed that it varies depending on genotype and generation. High within family variance in general indicated that selection is fruitful for *per se* and combining ability even in F_4 . C. V. was comparable in F_3 and F_4 indicating that selections can be initiated in F_2 . Higher C.V. in E 36-1 x SB 905 against E 36-1 x SPV 346 for most of traits indicated genotypic

differences for variability generated. Moderate heritability values were observed for yield and its attributes. Correlation and path studies revealed consistently high direct effects produced by head weight and 100 grain weight and negative direct effects and indirect effects of plant height, number of nodes, ear diameter and length *via* former characters emphasizes that yield improvement is governed by head weight and 100 grain weight.

Studies on Recombinational Variability for Combining Ability in B x R Crosses of Sorghum (*Sorghum bicolor* (L.) Moench)

S. G. MUTHALIK DESAI

1992

Major Advisor : S. S. PATIL

This study mainly aimed at determining the nature and magnitude of recombinational variability released for combining ability in F_2 and F_3 generations. The F_2 plants of 3660 DB x MR 750 and 2077 DB1 x MR 841 were evaluated for combining ability by using male sterile 296 A and DMS1A as testers while sample of F_3 lines (of 3660 DB x MR 750) were crossed to three restorers as testers (in Line x Tester fashion). The derived F_1 s obtained were evaluated with straight crosses and commercial checks. The two F_2 populations revealed difference in magnitude and direction of variability released for combining ability for all quantitative characters studies. The derived F_1 s of 3660 DB x MR 750 were in general superior indicating the impact of genetic constitution of parental genotype and testers used. The derived F_1 s also differed in their level of heterosis but *per se* performance of males was not related to its combining ability. Even in line x tester analysis some derived F_1 s were superior indicating that variability was released for ability

to combine with these testers irrespective of whether they were male sterile or restorers and also irrespective of whether male segregants were maintainer or restorer types. This reveals that ability/inability of a segregant to restore fertility need not reflect its combining ability, thus indicating that restriction regarding restoring ability should not be imposed while choosing parents to create variability for combining ability. Interestingly, the study revealed several potential maintainer and restorer lines capable of giving superior hybrids. This reveals the potentiality of B x R combination in developing new A and R lines for use in hybrid breeding. To study inheritance of fertility restoration and effect of season on restoration and maintenance of male sterility, the F_1 s were grown during summer. Restoration classes revealed monogenic 1 : 2 : 1 (RR : Rr : rr) ratio in F_2 generation. Observations in summer indicated breakdown of male sterility and restoring ability.

Heterosis, Combining Ability and Stability Analysis in Sunflower (*Helianthus annuus* L.) over Seasons

K. VIRUPAKSHAPPA

1992

Major Advisor : K. GIRIRAJ

A study was undertaken to assess the magnitude of heterosis, combining ability and stability involving ten inbred lines of sunflower. The inbreds

comprised four cytoplasmic male sterile lines and six restorer lines which were crossed in all possible combinations. The resulting 24 F_1 hybrids along

with their parents were studied for the extent of heterosis for ten characters, viz. seed yield per plant, days to 50 per cent flowering, leaf area, dry matter, plant height, 100 seed weight, stem girth, head diameter, husk content and oil content and the estimation of general and specific combining ability by adopting line x tester analysis and stability over three growing seasons, viz. rainy, post-rainy and summer. Considerable average heterosis was observed for all the characters studied. Highest magnitude of average heterosis was observed for seed yield (172.08%) followed by leaf area (91.01%), total dry matter (49.19%), head diameter (44.25%), 100 seed weight (38.39%), plant height (33.33%) and stem girth (26.67%). Oil content and husk content recorded low level of average heterosis. Heterotic effect exhibited for component characters, viz. leaf area, head diameter, 100 seed weight

and plant height was reflected in seed yield. The three crosses, viz. CMS 234 x RHA 298, CMS 234 x NDRLOS - 6 and CMS 851 x RHA 298 out yielded the commercial hybrid BSH-1 (CMS 234 x RHA 274). CMS 234, CMS 400, RHA 298 and NDBLOS-3 recorded significant gca effects for almost all the characters and hence were considered to be good general combiners. None of the hybrid combinations considered was superior for all the ten characters studied. The gene action for all the characters was predominantly non-additive. Three hybrids, viz. CMS 234 x NDRLOS-6, CMS 851 x RHA 298 and CMS 234 x RHA 298 recorded high mean seed yield over three seasons and were considered to be stable over three seasons considering stability parameters, viz. regression coefficient and mean square deviation.

Agronomy

Studies on Intercropping of Legumes in Kharif Maize and Their Residual Effect on Succeeding Wheat

V. V. KANAKERI

1992

Major Advisor : V. S. GIDNAVAR

A field experiment to study the influence of different legumes in maize intercropping system and their residual effect on succeeding wheat crop with different levels of recommended nitrogen was conducted on black clay soils of MRS, Dharwad during 1990-91 under rainfed conditions. The experiment consisted of 13 treatments laid out in RBD replicated three times during kharif while in rabi the kharif treatments were formed into three subplots and the treatments were laid out in a split plot design for wheat crop. The data on intercropping of maize with legumes did not indicate significant differences with regard to plant height, number of leaves, leaf area, leaf area index, cob length, cob girth, test weight, grain and straw yield of maize when compared with maize as a sole crop. It was further observed that all the above yield attributing parameters were also found non-significant for different legumes as well as row proportions of

legumes in the intercropping system. The yield of legumes in pure stand was higher than that of intercropped legumes. This was attributed to the maintenance of 100 per cent population in pure stand. Soybean as sole and in intercropping with maize recorded the highest yield compared to other legumes. Further, the grain and straw yield of wheat were significantly affected in intercropping system. The performance of wheat grown after soybean as sole crop and intercrop was found better than other sole crops and intercrops in the system. The economics of various system revealed that intercropping of two rows of soybean in maize recorded the highest net returns (Rs. 10,291.8/ha) followed by soybean in one row with maize (Rs. 9,481.6/ha). The highest net returns (Rs. 12,807.9/ha) were obtained when wheat crop was preceded by maize and soybean intercropping in 1:2 row proportion.

Studies on Fertilizer Management in Chilli-Cotton-Onion Intercropping

B. M. DODAMANI

1992

Major Advisor : M. M. HOSMANI

A field experiment was conducted on black clay loam soil at MRS, Dharwad during kharif 1990 to study the effect of cropping systems, row arrangement of onion and fertilizer management on the growth and yield of component crops in chilli-cotton-onion intercropping. The treatments consisted of three sole crops (chilli, cotton and onion), one with chilli + cotton, rest eight treatment combinations with four fertilizer levels FH (full dose of recommended fertilizer to cotton-half to onion), FN (full dose to cotton - nil to onion), HH(half dose to cotton - half to onion) and HN (half dose to cotton - nil to onion), and two methods of row arrangement of onion (planting onion in rows 15 cm and 30 cm away from chilli); replicated three times in a randomised complete block design. Most of the growth parameters, yield parameters and yield of onion (150 q/ha), chilli (13.20 q/ha) and cotton (13 q/ha) were significantly higher under

sole cropping than intercropping. Onion planted 15 cm. away from chilli recorded significantly higher growth, yield (71.79 q/ha) and yield parameters, than planted at 30 cm. Chilli (4.85 q/ha) and cotton (9.45 q/ha) performed significantly better when onion was planted 30 cm away from chilli. Among fertilizer treatments, FH recorded significantly higher growth, yield parameters and yield of onion (74.35 q/ha), chilli (9.85 q/ha) and cotton (10.35 q/ha) than other fertilizer treatments. The nutrient uptake (NPK) by the crops was significantly higher under sole cropping than intercropping. The nutrient uptake by onion was significantly higher when it was planted 15 cm away from chilli. But uptake of nutrients by chilli and cotton was significantly higher when onion was planted 30 cm away. The highest net returns (Rs. 49,255 per ha) was obtained in the treatment consisting of FH and onion planted 30 cm away from chilli.

Studies on Effect of Sulphur and Zinc on Rainfed Cotton (*Gossypium hirsutum* L.)

R. B. KHANDAGAVE

1992

Major Advisor : V. R. KORADDI

A field study was conducted at ARS, Dharwad to know the influence of soil application of elemental sulphur and zinc sulphate individually and in combination on cotton Var. Abadhita (*Gossypium hirsutum* L.) under rainfed conditions during 1990-91. The treatments included three levels of sulphur, i.e. 0, 20, 40 kg ha⁻¹ and three levels of zinc sulphate, i.e. 0, 25, 50 kg ha⁻¹ individually and in combination adopted in RBD replicated three times. Application of zinc sulphate @ 25 kg ha⁻¹ increased dry matter weight, number of flowers, green bolls, harvested bolls and seed

cotton yield per plant and seed cotton per ha significantly but sulphur application gave non-significant results for the said parameters. Neither sulphur nor zinc sulphate influenced significantly the fibre properties and seed quality. However, application of 20 kg/ha sulphur increased the seed oil content by 3 per cent and protein by 2 per cent. Similarly, 25 kg/ha ZnSO₄ increased the seed oil and protein contents by 1.8 per cent. Uptake of N, P₂O₅, K₂O and Zn was found significantly higher due to the application of zinc sulphate @ 25 kg ha⁻¹ but non-significant due to sulphur application.

Soil Science

Effect of Incorporation of Crop Residues and Fertilizer Levels on Crop Yield and Soil Properties

A. AZEEZ QURESHI

1992

Major Advisor : C. V. PATIL

Incorporation of crop residue @ 5 t/ha and application of different levels of fertilizers either individually or in combination significantly increased the growth and yield of sunflower during kharif and the succeeding bengalgram during rabi. Inoculation of crop residues with *Aspergillus awamorii* has further increased the yield of both the crops. The increase in yield over no residue control was 44 per cent in sunflower and 48 per cent in bengalgram. Application of crop residues along 50 per cent of recommended dose of fertilizer produced yield equivalent to that of 100 per cent recommended dose of fertilizer alone. Higher uptake of major and micronutrients by both the crops was observed due to increased availability of these nutrients in soil with the incorporation of crop

residues and fertilizer application. In general, incorporation of redgram stalks had pronounced effect on the uptake and available status of nitrogen and phosphorus. Crop residue incorporation significantly lowered the soil pH and increased electrical conductivity and organic carbon content of soil. Fertilizer application had similar effect in increasing the electrical conductivity and organic carbon content of soil but did not influence the soil pH. The reduction in bulk density and increase in water holding capacity and infiltration rate of soil was noticed due to incorporation of crop residues. Incorporation of crop residues along with the application of fertilizers was beneficial and resulted in higher monetary returns from both the sunflower and bengalgram crops.

Effect of Organic Residues and Fertilizers on Soil Properties Nutrient Uptake and Yield of Sorghum

SANATKUMAR T. HUNDEKAR

1992

Major Advisor: V. P. BADANUR

A field experiment was conducted at Regional Research Station, Bijapur during rabi 1991-92 to investigate the effect of incorporation of organic residues in conjunction with fertilizer on physical and chemical properties of vertisol, nutrient uptake and Sorghum yields. The treatments consisted of six main treatments, viz. sorghum stubble, cotton and red gram stalks, sunhemp, subabul and glyricidia, and three sub treatments (RDF, 50% and control). The experiment was laid out in split plot design with three replications. Rabi sorghum (5-4-1) was raised as a test crop. The results on infiltration rate of soil indicated that organic residues increased the infiltration rate significantly. The crop residues like sorghum stubbles and cotton stalks were superior to green manuring crop

incorporation. The water stable aggregates (>0.25 mm) increased with sorghum stubble and green manuring crop incorporation with or without fertilizer application. Moisture retention of soil was improved significantly with green manure crop incorporation than residues. Organic carbon, available N, P and K content of soil increased significantly with organic residues incorporation. Residues in conjunction with fertilizer enhanced the availability of nutrients. The sorghum yields and uptake of nitrogen, phosphorus and potassium by rabi sorghum was enhanced significantly with organic residue in conjunction with fertilizers at all the stages of crop growth. Incorporation of Sunhemp, Subabul and glyricidia were superior to cotton and red gram stalks and sorghum stubbles. The study emphasised

the dominant influence of nitrogen supplied through organic/inorganic or in combination on yield, composition and moisture use efficiency in rabi sorghum crop in the black soils of Bijapur. The

organic residues alone or in combination with inorganic fertilizer have improved the soil physical environment and chemical characteristics of vertisols.

Soil-Stratigraphic Studies In Dharwad District

M. G. BHARABHARI

1992

Major Advisor : G. S. DASOG

Three Soil-Stratigraphic profiles from Nargund, Hebsur and Navalur in Dharwad district were studied to understand the properties of different layers with a view to understand their genesis and significance. The profiles exhibited black soil cover at the surface underlain by carbonate layer, a transitional yellowish brown layer, reddish layer and weathered rock layer. The black soil layers in general were clayey, highly calcareous and had structure development. Free iron content was relatively low, cation exchange capacity was high and montmorillonite was the predominant clay mineral. A gravelly clayey layer enriched with carbonate nodules with a montmorillonitic mineralogy was evident at Nargund and Hebsur sites. The yellowish layer was transitional in nature. The reddish layers were massive and texture varied from gravelly sandy loam to gravelly clay. Free iron content was higher and CEC was relatively lower. The montmorillonite content decreased considerably whereas kaolinite was slightly higher in this layer.

The clay fraction of weathered gneiss at Nargund site was predominantly montmorillonitic and that of Dharwad shale at Navalur site was a mixture of montmorillonite, kaolinite and inter-stratified mica-smectite. The dark coloured, thick A horizon, high clay content, uniform distribution of organic matter and presence of slickensides signify the pedoturbation process in the black soil at all the three sites. Similarities in the particle size and mineralogy between the black soil and carbonate layers suggest that both are derived from a similar material not related to the underlying geology. High kaolinite in the reddish layer compared to high montmorillonite in the weathered gneiss below at Nargund suggested that montmorillonite was the first weathering product of the gneiss transformed to kaolinite under humid tropical conditions of the past. The intensely weathered reddish layer signify a humid tropical climate. The black soil and the carbonate layer signify setting in of aridity during the late pleistocene-pliocene period.

Effect of Irrigation on Soil Physical and Chemical Properties In Malaprabha Command Area

S. S. GUNDLUR

1992

Major Advisor : P. A. SARANGAMATH

A study was conducted to assess the effect of continuous irrigation for ten to fourteen years on physical and chemical properties of soils in Malaprabha Command Area. Irrigation increased the pH of Hanchinal, Kiresur, Kallapur, Chimmanakatti and Jamkhandi soil series. Increase in total salt content due to irrigation was observed in all the profiles studied. The CEC of soils increased with increase in clay content in different horizons.

Among the exchangeable cations, $\text{Ca}^{++} + \text{Mg}^{++}$ were dominant over Na^+ . The ESP of soils increased with depth. Irrigated soils recorded higher ESP values compared to unirrigated soils. Soluble sodium was the dominant cation in all the soil series. Higher soluble sodium and SAR were observed in irrigated soils. There was an increase in organic carbon content and decrease in available potassium under irrigation, specially on surface layers. Clay

migration and accumulation was not observed in all soil series due to irrigation. The higher dispersion index and lower hydraulic conductivity values were observed in irrigated soils. Decrease in infiltration rate and slight increase in bulk density were observed in irrigated soils. Dispersion index was positively

correlated with exchangeable sodium, SAR and clay, while it was negatively correlated with hydraulic conductivity. Hydraulic conductivity was negatively correlated with clay exchangeable sodium and SAR.

Horticulture

Studies on the Effect of Plant Density and Nitrogen on Growth and Flower Production in Everlasting Flower (*Helichrysum bracteatum* Andr.) Cv. 'Tall Double Mixed'.

C. K. VENUGOPAL

1992

Major Advisor : A. A. PATIL

A field investigation was carried out during rabi 1990 at Floriculture Unit, UAS, Dharwad to find out the suitable plant density and nitrogen level to increase the flower production of everlasting flower. A factorial experiment was laid out in RBD with three levels of plant density (1,66,666-30 x 20 cm; 1,11,111 - 30 x 30 cm and 83,333 - 30 x 40 cm plants per hectare) and five levels of nitrogen (0, 50, 100, 150 and 200 kg/ha). The experiment was replicated thrice. Highest flower yield (7.42 t/ha) was obtained with the plants spaced at 30 x 20 cm which was significantly superior to other spacing levels. The plant height increased with the increase in plant density but other characters like number of branches, number of leaves, total dry matter production, number of flowers per plant, flower diameter and flower yield per plant were more in widely spaced plant. A lower yield of 7.35 tonnes per hectare was obtained at the highest nitrogen

level of 200 kg per hectare. Plant height increased with the increase in nitrogen level upto 200 kg per hectare. Number of branches, number of leaves, total dry matter production and its accumulation in different plant parts, number of flowers per plant, flower size and flower yield per plant were all found to be maximum at highest level of nitrogen. Studies on flower drying methods revealed that drying at room temperature and in oven at 50° C were found to be better to retain the colour and shape of the flower for longer time. Thus the present investigation revealed that the everlasting flower can be grown at a closer spacing of 30 x 20 cm with 200 kg nitrogen per hectare for higher yields which recorded the maximum net income of Rs. 72,958.07 per hectare. The flowers can be dried at room temperature and at 50° C in oven to retain their colour for longer time.

Effect of Mulches and Pitcher Irrigation on Growth and Yield of Pomegranate (*Punica granatum* L.) Var. Jyoti

M. E. RAVI KUMAR

1992

Major Advisor : G. S. SULIKERI

A field experiment was carried out during winter and summer seasons of 1990-91 involving eight treatments in a RBD with three replications. Soil moisture retention, efficiency of weed control,

growth and yield of pomegranate were significantly better in the treatments involving mulches as compared to control. Black polythene mulch recorded the highest soil moisture at both depths (18 and 20.12

per cent at 9 and 18 inch depth, respectively) and it was closely followed by sannhemp straw mulch (17.79 and 19.96 per cent at 9 and 18 inch depth, respectively). No significant difference were observed among wheat straw, transparent polythene sheet, sawdust and jowar kadabi. Growth of weeds was significantly less in black polythene, sannhemp straw and wheat straw mulches over the treatment irrigation without mulch. Sannhemp straw mulched and black polythene sheet mulched plants showed better growth of plants and yield per plant. Maximum yield (5.54 kg/plant and 2.81 t/ha) was recorded in sannhemp straw mulched plants and it was closely followed by black ploythene sheet (5.50 kg/plant

and 2.65 t/ha). The minimum yield was found in control (2.04 kg/plant and 0.98 t/ha). Sannhemp recorded maximum number of flowers (167 flowers/plant) and fruits per plant (32.66 fruits/plant) and it was closely followed by black polythene sheet (158 flowers/plant and 28.66 fruits/plant), while the individual weight of fruits was maximum in black polythene sheet mulch (191.86 g) and it was followed by transparent polythene sheet (187.50 g). Percentage of fruit cracking varied from a minimum of 9.5 per cent in black polythene sheet to maximum of 19.4 per cent in sawdust as against 35.4 per cent in control.

**Studies on Irrigation Requirement, Nutrient Needs and Growth Regulator Use
In Curry Leaf (*Murraya koenigii* Spreng.) Cultivars**

VIKAS R. PATIL

1992

Major Advisor : B. B. MADALAGERI

Investigations on water requirement, nutrition requirement and use of growth regulator were carried out on three year old high density bush culture plantation of curry leaf comprising two cultivars, viz. DWD-1 and DWD-2. The cultivars did not differ much for the fresh leaf yield and unit shoot weight. The average fresh weight from seven harvests was 2.01 kg and 2.36 kg, respectively in DWD-1 and DWD-2 varieties. In irrigation experiment water was applied to crop based on IW/CPE ratio at 1.0, 0.75, 0.5, farmers method of irrigation and an unirrigated control. The maximum mean fresh

leaf yield of 3.63 kg per plant was noticed in irrigation level of IW/CPE = 1.0. To suffice this, 191 of water per day per bush was required. The fertilizer levels of 150:25:25; 225:37.5:37.5; 300:50:50 g NPK per bush along with an unfertilized control were imposed. The significant mean maximum yield over three seasons was 2.95 kg per plant when nurished with 225:37.5:37.5 NPK g per bush. The GA at 100 ppm or triacontinol at 0.5 ml/l exerted great influence on fresh yield. The mean maximum fresh yield of 1.8 kg per bush over two seasons was noticed in GA treated plants.

**Studies on Effect of Nitrogen and Spacing on Growth and Flower Yield in
Jasminum sambac Ait. and *Jasminum auriculatum* Vahl.**

S. M. V. MARUTHI PRASAD

1992

Major Advisor : A. A. PATIL

The field trials were conducted at the Floriculture Unit of New Orchard, UAS, Dharwad during 1989-90. The treatments included three levels of spacing ($S_1 = 2 \times 1m$; $S_2 = 2 \times 2m$; $S_3 = 2 \times 3m$, i.e. 5000, 2500 and 1667 plants/ha.) and four levels of nitrogen ($N_0 = 0$, $N_1 = 300$, $N_2 = 600$, $N_3 = 900$ kg/ha.) making 12 combinations. The

design was split plot with four replications. The study revealed that in *J. sambac*, the nitrogen dose of 300 kg per hectare and spacing of 2 x 1 m (5000 plants/ha.) recorded optimum plant height, number of sprouts, secondary laterals, productive shoots, leaf area, leaf area index and leaf area duration per unit area, which in turn gave rise to

maximum flower yield (5512.73 kg/ha.). Similar trend was seen in *J. auriculatum* with a nitrogen dose of 600kg per hectare and a spacing of 2 x 1 m (5000 plants/ha.) ultimately giving rise to a maximum flower yield of 16403.00 kg per hectare. Quadratic response curves also revealed that in *J. sambac* the flower yield increased with increase in nitrogen level from 0 to 300 kg per hectare and next higher dose of 600 kg per hectare reduced the yield. In the case of *J. auriculatum* there was an increase in flower yield with increase in nitrogen levels from 0 to 600 kg per hectare and the next

higher dose of 900 kg per hectare resulted in decrease in flower yield. In the case of *J. sambac* a maximum net profit of Rs. 70,874.57 per hectare was obtained at a planting density of 2 x 1 m and nitrogen level of 300 kg per hectare, whereas, in case of *J. auriculatum* the maximum net profit of Rs. 2,59,244.30 per hectare was obtained at a planting density of 2 x 1 m and nitrogen level of 600 kg per hectare. Among the environmental factors, heat units and diurnal temperature range were found to play an important role influencing the flowering behaviour in both the species.

Standardization of Back Pruning Date and MH Treatments for Fruitfulness In Grapes (*Vitis vinifera* L.)

AMAYOGI R. KURUBAR

1992

Major Advisor : N. C. HULAMANI

An investigation was carried out at New Orchard, MRS, Dharwad during 1990-91 to standardise the back pruning date and concentration of MH for increasing fruitfulness and yield in Thompson Seedless and Gulabi grape cultivars under Dharwad conditions. Pruning the vines on 14th April recorded highest yield in Thompson seedless and Gulabi grapes with the yield of 3.09 kg and 5.91 kg per vine, respectively. However, higher number of bunches were noticed in vines pruned on 29th April. In the vines pruned on 14th April, sprouting occurred comparatively late but the berries matured earliest of all and also balanced vegetative growth in terms of lower shoot length, side shoots, internodal length, etc., was observed in both the cultivars. MH at 500 ppm proved to be the best in obtaining desirable effects in most of the characters. Vines

sprayed with 500 ppm MH recorded increased yield, number of bunches, weight of bunches, number of berries and berry size in both the cultivars, TSS: Acid ratio was found to be significantly improved by MH 500 ppm to both the cultivars. The interaction effects of pruning on 14th April and spraying with MH 500 ppm resulted in highest yield of 3.90 kg and 7.40 kg per vine in Thompson Seedless and Gulabi, respectively. Higher TSS: Acid ratio was observed with treatment combinations of 29th April pruning coupled with MH 750 ppm and 15th March pruning with MH 250 ppm in Thompson Seedless and Gulabi, respectively. Pruning on 14th April followed by spraying with MH at 500 ppm resulted in better performance of vegetative characters like shoot girth, internodal length in both the cultivars.

Crop Physiology

Physiological Basis of Growth and Yield Variation In Sesamum Genotypes

K. N. PAWAR

1992

Major Advisor : M. B. CHETTI

A field experiment was conducted at MRS, Dharwad during kharif, 1990. The experiment consisted of ten genotypes laid out in RBD with three replications.

Wide variation was observed among the genotypes with respect to various morphological, physiological, biochemical and yield and yield attributes studied.

Among the geotypes, E-8 (7.59 q/ha), OMT-10 (6 q/ha) and RT-49 (5.35 q/ha) exhibited superiority to rest of the genotypes in seed yield. Besides, these genotypes also had more number of branches higher leaf area, leaf area duration, NAR, AGR, CGR, and RGR. The genotypes with high chlorophyll, sugar, nitrogen and oil content also had higher seed yield. The genotypes which had poor seed yield, viz. TC-359 and VS-117, also had low chlorophyll, sugar, nitrogen and oil contents. The dry matter

production and its distribution in different plant parts particularly into reproductive structures, days to 50 per cent flowering and days to physiological maturity and the performance of yield attributing parameters and leaf nitrogen content play important roles in determining the seed yield. The genotypes E-8, OMT-10 and RT-54 were found superior and may be suggested for cultivation under rainfed conditions for better productivity.

Physiological Aspects of Bollworm Tolerance in Cotton (*Gossypium hirsutum* L.)

M. B. MUNDAS

1992

Major Advisor : B. S. JANAGOUDAR

A field experiment was laid out at ARS, Dharwad during Kharif, 1990-91 under rainfed conditions to assess the performance of cotton genotypes under unprotected condition and to establish the physiological and biochemical basis of bollworm tolerance, if any. Yield levels at all the genotypes were low due to drought and severe out break of the bollworms incidence during the season. However, genotypes JK-345-3-2, JK-259-7, JK-260-2 and Abadhita produced higher seed cotton yield while LK-861, JK-119, NA-1280, LPS-141, Laxmi, TCH-1003 and Supriya TCH-1002 produced low seed cotton yield. High yielding genotypes were comparatively taller, recorded more number of monopodia, sympodia and medium lengths

of monopodia and sympodia. They also possessed thick stem and more number of gossypol glands per unit leaf area. These genotypes took less number of days to 50 per cent flowering and 50 per cent boll opening. Floral shedding due to insect pests was less in these genotypes as compared to low yielding genotypes. Higher yields obtained in these genotypes were attributed to high dry matter production with larger leaf area. In addition higher values of CGR, RGR, NAR and LAD contributed much for the increased yields. Biochemical analysis showed lesser protein content and total sugars, and higher tannin in reproductive parts of the high yielding genotypes at peak flowering and boll opening stages.

Physiological, Biochemical and Histological Aspects of Leaf Rust (*Puccinia recondita* f. sp. *tritici* Rob. ex. Desm.) Resistance in Wheat Genotypes

MAHADESHWAR HEGDE

1992

Major Advisor : M. B. CHETTI

A field experiment was conducted during 1991-92 at the rust nursery, Wheat Improvement Project, MRS, Dharwad to study the physiological, biochemical and histological aspects of leaf rust in both resistant (DWR-162, DWR-174 and Local Khapli) and susceptible (Local red, NI-5439 and MACS-1967) wheat genotypes. The leaf rust (*Puccinia recondita* f. sp. *tritici*) inoculum was sprayed uniformly

at an interval of 2 days from 30 days after sowing upto 45 days and were compared with non-inoculated control. In general, most of the morphological, physiological, biochemical, biophysical and histological parameters performed better under non-inoculated conditions as compared to inoculated conditions. Among the genotypes, DWR-162, DWR-174 and Local Khapli performed better as compared to

NI-5439, Local red and MACS-1967 under inoculated conditions. A minimum reduction in plant height, leaf number, tiller number, leaf area and total dry weight was observed in the inoculated plants of DWR-162, DWR-174 and Local Khapli indicating the resistance nature of these genotypes. It was observed that CGR, AGR, NAR and SLW decreased and SLA increased in the inoculated treatments of NI-5439, Local red and MACS-1967. The decrease in the grain yield in these genotypes was attributed mainly to a significant decrease in the grain weight and not in the grain number and spike length. Leaf diffusive resistance increased with a decrease in the transpiration rate in inoculated plants of NI-5439, Local red and MACS-1967. The chlorophyll content,

sugar content, nitrate reductase activity and wax content decreased with an increase in the phenol content in the inoculated plants of NI-5439, Local red and MACS-1967 in comparison to DWR-162, DWR-174 and Local Khapli indicating susceptible nature of these genotypes. There was no significant variation in histological parameters between inoculated and non-inoculated plants of Local Khapli, DWR-174 and DWR-162, while the genotypes Local red, MACS-1967 and NI-5439 had significantly lower leaf thickness, epidermal, mesophyll and sclerenchyma thickness and vascular bundle area in the inoculated as compared to non-inoculated plants and thus suggesting the susceptible nature of these genotypes.

Agricultural Entomology

Response of the Egg Parasitoid *Trichogramma chilonis* Ishii to Insecticides Recommended Against Cotton Bollworms in Karnataka

AJITKUMAR A. JOKI

1992

Major Advisor : K. JAIRAO

Experiments were conducted to find out the persistent toxicity of recommended insecticides to cotton bollworms against the egg parasitoid, *Trichogramma chilonis*, effect of insecticides on different developmental stages of the parasitoid in different host eggs, their effect on longevity and sex ratio of the parasitoid and evaluation of insecticides on *T. chilonis* under field condition. Persistent toxicity of eight insecticides to *T. chilonis* adults based on PT values was in the following order: Carbaryl > quinalphos > phosalone > monocrotophos > cypermethrin > deltamethrin > fenvalerate > endosulfan. All the insecticides tested were highly toxic to the larval stage of the parasitoid and were least toxic to the egg stage followed by pupal stage. Based on the emergence of the parasitoid from insecticide treated host eggs, endosulfan and fenvalerate were found to be least toxic to immature stages of *T. chilonis* while carbaryl and quinalphos were more toxic. Monocrotophos, deltamethrin, phosalone and cypermethrin were found to be moderately toxic. *Heliothis armigera*

eggs gave comparatively more emergence of the parasitoid than *Earias vittella* and *Corcyra cephalonica* eggs. Longevity and sex ratio of *T. chilonis* adults that emerged from insecticide treated host eggs were found adversely affected by carbaryl and quinalphos. Deltamethrin, monocrotophos, phosalone and cypermethrin moderately affected while endosulfan and fenvalerate caused least effect on longevity and sex ratio. Emergence of the parasitoid was significantly reduced when insecticides were sprayed on host eggs before parasitisation. Toxicity of the test insecticides in the ascending order was fenvalerate, phosalone, deltamethrin, monocrotophos, cypermethrin, quinalphos, endosulfan and carbaryl. Residual toxicity of pyrethroids, i.e. fenvalerate, cypermethrin and deltamethrin did not significantly inhibit the parasitism of *T. chilonis* females on *H. armigera* and *E. vittella* eggs in the cotton field. But in the conventional insecticides carbaryl and quinalphos residues inhibited the parasitism significantly.

Use of Cotton Seed Oil In the Management of Sucking Pest Complex on Cotton

J. B. GOPALI

1992

Major Advisor : B. V. PATIL

Investigations were conducted at the College of Agriculture, Raichur during 1991-1992 on the evaluation of emulsifying agents for cotton seed oil, bioefficacy of oil against sucking pests and phytotoxicity on cotton. The study also included integration of oil in the recommended plant protection schedule against sucking pests and compatibility with synthetic insecticides. Among emulsifying agents, both Nirma and teepol at 1.0 per cent provided excellent emulsification for 1.0 per cent cotton seed oil. These emulsifiers recorded significantly better reduction of whitefly and aphid than triazophos 40 EC and monocrotophos 36 SL after one day of spray (DAS) without causing phytotoxicity to cotton. However, efficacy was reduced on subsequent days. Though higher concentrations of emulsifiers registered highest reduction, they proved phytotoxic to cotton. Nirma and teepol with cotton seed oil reduced phytotoxicity considerably. One per cent

cotton seed oil emulsified with 1.0 per cent Nirma was significantly inferior to oxydemeton methyl 25 EC against leafhoppers. One per cent cotton seed oil against whiteflies, aphids and mites recorded maximum reduction than triazophos 40 EC, monocrotophos 36 SL and dicofol 18.5 EC, respectively after one and three DAS without causing phytotoxicity but was at par with insecticides at 7 DAS. Cotton seed oil at 5 and 10 per cent significantly reduced the sucking pests than insecticides but caused phytotoxicity to cotton. Integration of 1 per cent cotton seed oil in the protection schedule was not effective to leafhoppers. Two sprays of cotton seed oil were as effective as recommended insecticides to aphids and whiteflies and increased kapas yield. Cotton seed oil was compatible with monocrotophos 36SL, phosphamidon 85 WSC, endosulfan 35 EC and fenvalerate 20 EC.

Plant Pathology

Slow Rusting Mechanism In Sorghum

R. B. KERUDI

1992

Major Advisor : R. V. HIREMATH

Development of rust caused by *Puccinia purpurea* Cooke was studied on 18 cultivars during 1990-91 at MRS, Dharwad to understand some factors of resistance. Components of slow rusting namely, germination of uredospores on leaf surface, latent period, number of pustules per cm², leaf area, size and number of spores per pustule were studied. Fungicidal control of rust was also studied. It was observed that the rust appeared late and severity was less in all the varieties tested in June planting. Severity was more in subsequent sowings. Uredospore germination was completed within 12 hours of incubation in all the varieties. Maximum spore germination was obtained on M-35-1 and

least in SB-905. The latent period was more by one day during rabi than kharif. Among the cultivars, SB-905, IS-3443, SPV-462, CSV-4 and SB-101 B recorded longer latent period, lesser number of pustules, smaller pustule size, and lesser number of uredospore per pustule. Cultivars SB-905, IS-3443, SPV-462, CSV-4, SB-101 B, E-36-1 and SPV-913 appeared to be slow rusters, while CSH-5, CSV-10, SPV-1009 and SPV-475 were intermediates and M-35-1, SPV-86, D-340, CK-60 B, 2077 B, SPV-839 and SPV-795 were grouped as fast rusters. Among the fungicides tested, Mancozeb @ 0.2 per cent was found to be effective in reducing the disease incidence.

Studies on Compatibility of Fungicides, Antibiotic and Insecticides

P. RAVINDRA

1992

Major Advisor : G. M. PADAGANUR

Investigations were carried out to assess functional compatibility of fungicides, antibiotic and insecticides and phytotoxic effects of agrochemicals individually and in combinations during 1990 on cotton and groundnut. In the field experiments, application of Ziram or copper oxychloride were successful in reducing *Alternaria* blight either used alone or in combination with monocrotophos or fenvalerate indicating their compatibility. Application of copper oxychloride + monocrotophos + streptomycin sulphate reduced the incidence of bacterial blight and found to be compatible. Incidence of bollworm was significantly lower where monocrotophos or fenvalerate was used. Ziram reduced the efficacy of monocrotophos, but improved the efficacy of fenvalerate. Copper oxychloride reduced the efficacy of monocrotophos but improved efficacy of fenvalerate. In *in vitro* evaluation, ziram or copper oxychloride alone and in their combinations with fenvalerate or monocrotophos inhibited the conidial germination of *Alternaria*. Copper oxychloride + monocrotophos + streptomycin sulphate inhibited the bacterial

growth. Thus, found to be compatible. Application of carbendazim alone, or in combination with endosulfan or monocrotophos reduced the incidence of late leafspot. Mancozeb alone and in combination with monocrotophos or endosulfan gave best control of rust and was found to be compatible. Monocrotophos or endosulfan alone and in combination with carbendazim or mancozeb recorded lowest incidence of leaf eating caterpillar. Carbendazim alone and in combination with monocrotophos or endosulfan reduced the conidial germination of *Phaeoisariopsis personatum*, Berk. Curt. N. Arx. Mancozeb alone or in combination with endosulfan or monocrotophos suppressed the uredospore germination of *Puccinia arachidis* Speg. indicating their compatibility. Monocrotophos or endosulfan alone and in combinations with carbendazim or mancozeb caused maximum mortality of *Spodoptera litura* (F.). None of the chemicals either used alone or in combination exhibited phytotoxic effects thus indicating their compatibility.

Studies on Leaf Spot of Zinnia (*Zinnia elegans* Jacq.) Caused by *Cercospora zinniae* Ellis and Martin

K. B. YADAHALLI

1992

Major Advisor : SRIKANT KULKARNI

Cercospora zinniae was isolated from infected leaves of Zinnia and single spore isolations were made. The pathogenicity was proved and confirmed the culture. Different solid and liquid media were tested for the growth of fungus. Among the solid media, potato dextrose agar and host leaf extract agar supported maximum growth. In liquid media, the fungus made maximum growth on Czapek's medium while, maximum growth was attained on potato dextrose broth after 16 days of inoculation. Sucrose as carbon source and sodium nitrate as nitrogen source supported maximum growth of the fungus. A pH range of 6.0 to 7.5 was found favourable for the growth of fungus, with maximum growth at pH 6.5. Maximum spore germination was observed in the tap water and two per cent water agar, after six hours of

incubation. At 100 per cent relative humidity, pH 8.0 and a temperature of 28°C, maximum spore germination was observed. The fungus entered the host through stomata. Plants 45 days and above were susceptible to this disease. The fungus was pathogenic to chrysanthemum, marigold, safflower and sunflower besides Zinnia. The fungus survived throughout the year. Culture filtrate of the fungus caused drooping and wilting of tomato seedlings. Toxic metabolites were thermostable at 60°C temperature. Infection was found to increase total amino acids, phenols and reducing sugars, while total sugars decreased. Mancozeb was more resistant and persisted for 24 days. Mancozeb and chlorothalonil among non-systemic fungicides and carbendazim as systemic fungicide were most effective in inhibiting the growth of the fungus.

Studies on Collar Rot of Groundnut Caused by *Sclerotium rolfsii* Sacc.

S. A. KULKARNI

1992

Major Advisor : SRIKANT KULKARNI

A survey was conducted to know the incidence and intensity of the disease in three districts of northern Karnataka. Overall disease incidence was maximum in Bijapur district and least in Dharwad district under rainfed conditions and under irrigated conditions. Maximum disease incidence was recorded in Bijapur district and least in Belgaum district. The most susceptible stage of the crop for infection was at 15 days. The susceptibility of the crop to *S. rolfsii* decreased with the increase in the age of the groundnut crop. Maximum activity of the fungus was found at soil EC level of 0.4 dS/m. The activity decreased, with an increase in EC levels. The fungus survived better in soil at wide range of pH levels. Maximum saprophytic activity of the fungus was observed at soil pH level of 6.0. The fungus survived better at low soil moisture levels. Maximum saprophytic

activity of the fungus was observed at 30 per cent soil moisture level. Among the amendments tested, safflower oil cake was more effective in reducing the mortality of groundnut seedlings. The population of fungi, bacteria and actinomycetes increased with increase in the interval of incorporation of amendments. Biogas plant slurry at concentrations of 3.0 and 2.5 per cent by weight of soil was effective in reducing the disease incidence. Among the antagonistic organisms tested, *Trichoderma harzianum*, *T. viride*, *Streptomyces* sp and *Bacillus subtilis* were more effective both as seed and soil drenching treatments. Among VA-mycorrhizae tested, *Glomus fasciculatum* (Thaxt.) Gerd. and Trappe was more effective in checking the disease incidence. Vitavax, Bayleton and Emissan were found effective as soil drenching fungicides against *S. rolfsii*.

Seed Technology

Studies on Germination In Babul (*Acacia nilotica* L.)

B. C. KASHINATH

1992

Major Advisor : S. D. SHASHIDHAR

Different mechanical scarifications were compared with the acid and hot water treatment to break the seed coat dormancy and to study the germination in *Acacia*. Acid scarified seeds were treated with different concentration of GA_3 for different durations to enhance germination. Performance of different seed size and tolerance to salinity and water stress condition were also studied. Acid scarification treatment was standardised for different intervals. Sixty minutes treated seeds gave 88 per cent germination while control gave only 32 per cent. Also hot water (80°C) treatment was standardised for different intervals – control gave 20 per cent germination while 3 hour treatment gave 52 per cent. When four mechanical methods were compared with the best acid and hot water treatment, acid treatment performed better than hot water or mechanical methods. Acid scarification followed by GA_3 treatment at 100 ppm for 24 hours

produced 98 per cent germination and simultaneously reduced the germination period to 10 days. Among different seed sizes, medium size gave highest per cent (85) germination and seedling vigour was positively correlated with seed size. In salt tolerance studies, seeds tolerated salinity up to 8 dS/m and gave half the normal germination. In tolerance studies of *Acacia* to water stress and soil type, black soil influenced higher germination (60 per cent) than red soil (38 per cent). Germinating seeds of *Acacia* can withstand a water stress upto 5 bars to produce half the normal germination. Medium size seeds should be acid scarified (60 minutes) and treated with GA_3 (100 ppm) for 24 hours to get 98 per cent germination and high seedling vigour in just 10–12 days. Germinating seeds of *Acacia* produced half the normal germination at salinity upto 8 dS/m and water stress of 5 bar.

Seed Yield, Quality and Size Distribution in Sunflower (*Helianthus annuus* L.) as Influenced by Plant Densities

N. KANNA BABU

1992

Major Advisor : B. S. VYAKARANAHAL

The effect of plant densities on growth, yield and its components, recovery, seed quality and size distribution of restorer (RHA-274) and maintainer (CMS-234B) lines of BSH-1 hybrid and cv. Morden of sunflower was evaluated under field and laboratory conditions. The experiment was conducted on black soils of MRS, Dharwad during kharif, 1991 under rainfed condition. The experiment consisted of two factors, viz. three genotypes (RHA-274, CMS 234B and Morden) and three plant densities (1, 66, 666; 83, 333 and 55, 555 plants/ha) with nine treatment combinations laid out in RBD by adopting the factorial concept with four replications. Lower plant density (55, 555 plants/ha) exhibited higher leaf area, leaf area index, capitulum diameter and total dry matter accumulation per plant. The highest seed yield (4.68 q/ha) was obtained from medium plant density (83, 333 plants/ha) compared to other two plant densities. The medium and lower plant densities gave 68.9 and 55.2 per cent increase in yield over

higher plant density (1, 66, 666 plants/ha). The yield components such as 100 –seed weight, total number of seeds and per cent of filled seeds per head was highest with lower plant density followed by medium plant density. Seed recovery (%) obtained on recommended sieve was highest with lower plant density compared to other two plant densities. It also recorded significantly higher values for seed quality attributes like germination, field emergence, seedling vigour and oil content. Size distribution of seeds was maximum with larger size seeds due to lower plant density compared to medium and higher plant densities. The sieve sizes of 1.85, 2.24 and 2.4 mm were found to be optimum to get highest seed recovery and optimum germination in case of RHA-274, CMS-234 B and Morden, respectively. Lower plant density (55, 555 plants/ ha) can be adopted as an optimum plant density in all the three genotypes to register higher seed recovery, seed quality and optimum seed yield.

Agricultural Microbiology

Studies on Interactions Between VA Mycorrhizal Fungus and Phosphate Solubilizing Bacterium and Their Effects on Rhizosphere Microflora, Growth and Yield of Sunflower (*Helianthus annuus* L.)

P. JONES NIRMALNATH

1992

Major Advisor : M. N. SREENIVASA

A pot trial was carried out to study the possible synergistic interactions between Vesicular-arbuscular mycorrhizal fungus, *Glomus fasciculatum* (Thaxt.) Gerd and Trappe and a phosphate solubilizing bacterium, *Pseudomonas striata* (Chester) with two forms at four levels of Phosphorus and their effects on growth and yield of sunflower (*Helianthus annuus* L.) and also rhizosphere microflora. There was a positive interaction between *G. fasciculatum* and *P. striata*. The microbial population in the

rhizosphere soil was positively influenced by the presence of *G. fasciculatum* and *P. striata*. Total bacterial population was found to be very much influenced followed by the population of *Azotobacter*, actinomycetes, P-solubilizing bacteria and fungi. Among the two forms of P used, superphosphate stimulated the rhizosphere population to a greater extent compared to rock phosphate. However, it was observed that the population of rhizosphere microflora increased upto 60th day after sowing

and later declined. Percentage mycorrhizal root colonization and extramatrical chlamydospore numbers were highest in plants inoculated with both the organisms. In general, the increase in P-levels increased both per cent mycorrhizal root colonization and extramatrical chlamydospore numbers upto 25 per cent of P given as superphosphate and 50 per cent of P given as rock phosphate. The

dual inoculated plants recorded highest growth parameters, yield, drymatter and oil content of seeds with increase in P-levels compared to their comparable controls without inoculation. The shoot P concentration was maximum in plants inoculated with both *G. fasciculatum* and *P. striata*. The P concentration increased with increase in P levels with superphosphate than rock phosphate.

Studies on the Control of Insect Pests of Crop Plants by Microbes with Special Reference to *Bacillus cereus*

N. F. KATTEGOUDAR

1992

Major Advisor : A. R. ALAGAWADI

In a survey carried out for the natural occurrence of diseases of major insect pests of crop plants in and around Dharwad extended over eight months (June 1990 to Jan. 1991), ten diseased specimens were collected of which eight were caused by bacetria and two by fungi. *Bacillus* sp. was found to be the most frequently occurring pathogen in the region causing 80 to 95 per cent mortality on its host insect. Further studies were carried out using *B. cereus*, a locally isolated pathogen of castor semilooper. Studies on infectivity of *B. cereus* on castor semilooper in laboratory indicated a complete mortality of fourth instar larvae at a concentration of 24.5×10^8 viable cells ml^{-1} . On the basis of LC_{50} it was found that fourth larval instar was more susceptible (LC_{50} : 5.874×10^8 viable cells ml^{-1}) than the third and fifth instar larvae (LC_{50} : 7.834×10^8 and 9.778×10^8 viable cells ml^{-1} , respectively). The cross-infectivity of *B. cereus* on *Spodoptera litura* and *Heliothis* sp. was

also examined in laboratory. A dose of 18.0×10^8 and 28.5×10^8 viable cells ml^{-1} recorded cent per cent mortality in the third instar larvae of *S. litura* and *Heliothis* sp., respectively. The third instar larvae of both the species were more susceptible than the fourth instar larvae. Infectivity of *B. cereus* on silkworm and honey bees was also studied in order to test the safety of this culture to the two beneficial insects. Although complete mortality of silkworm was noticed at a concentration of 34.0×10^8 viable cells ml^{-1} compared to the three target pests, silkworms were less susceptible. However, worker honey bees were highly susceptible to the test culture showing cent per cent mortality at 13.2×10^8 viable cells ml^{-1} . Culture filtrate was less toxic to *A. janata* than the whole cell culture. Nutrient broth, among the seven laboratory media, was found to be excellent for the growth of *B. cereus*.

Effect of Inoculation of *Glomus fasciculatum* in Conjunction With Different Organic Amendments on Rhizosphere Microflora and Growth and Yield of Wheat (*Triticum aestivum* L.)

S. B. NAIK GOANKER

1992

Major Advisor : M. N. SREENIVASA

A pot trial was carried out to study the effect of different organic amendments on inoculated and native VA mycorrhizal fungi and their overall effect on the growth and nutrition of three genotypes

of wheat and also on the rhizosphere microflora. Six different organic amendments used in this study were groundnut cake (GNC), Biogas Spent Slurry (BSS), Farm Yard Manure (FYM), Jowar

Straw (JS), Rice Bran (RB) and Glyricidia (GLY). The genotypes of wheat tried were DWR-39, DWR-163 and DWR-187. The effect was assessed at four intervals, viz. 30, 60 and 90 days after sowing and at harvest (116 days for DWR-39 and DWR-163; 110 days for DWR-187) by enumerating the population of bacteria, fungi, actinomycetes and *Azotobacter* and also VA mycorrhizal spore number from the rhizosphere soil. The mycorrhizal root colonization was determined after harvest. There was a positive effect of *Glomus fasciculatum* inoculation and addition of different organic amendments on wheat genotypes and rhizosphere microflora, VA mycorrhizal spore production, per cent root colonization and yield parameters, viz. length of earhead, weight of earhead, seed yield, shoot dry weight and shoot P concentration and protein concentration over comparable uninoculated

control given no organic amendments. The plants inoculated with *G. fasciculatum* in conjunction with FYM had higher bacterial, *Azotobacter*, spore count and per cent root colonization compared to uninoculated plants given organic amendments. Inoculation of *G. fasciculatum* in conjunction with BSS stimulate higher population of actinomycetes. Population of fungi was highest when GNC was used in the inoculated plants. However, rhizosphere microflora increased upto 90 days after sowing and later a decline in their population was noticed. Growth and yield parameters were highest when FYM was used in the inoculated plants followed by BSS, GNC, GLY, JS and RB. Among the genotypes tried, DWR-39 showed its superiority to DWR-163 and DWR-187 and responded well to the inoculated *G. fasciculatum* and addition of FYM.

Agricultural Economics

Production and Marketing of Eggs and Broilers in Bellary District, Karnataka – An Economic Analysis

C. SHIVAPRASAD

1992 Major Advisor : H. G. SHANKARAMURTHY

Stratified proportionate random sampling was adopted in selecting the respondents. A total of 46 layer and 16 broiler farms, 5 wholesalers and 20 retailers constituted the sample. The data were collected through personal interview for the year 1990. The techniques of tabular presentation, financial feasibility analysis, production function analysis and time series analysis were employed. Total investment and total costs per bird decreased with the increase in the farm size, while the net returns increased with the increase in farm size. Large broiler farms recorded higher values of Net Present Value, Internal Rate of Return (57.61 per cent and 46.21 per cent) and Benefit Cost ratio

(2.63 and 2.83). Pay back period was lowest (1 year, 7 months) on large farms. The selected variables explained 99 per cent of the variation in physical and profit functions on all the farms. In the months of December, January, May, June, July and November the seasonal indices of egg prices were 100. The share of producers in consumer's rupee was highest in II channel of egg and I channel in broiler marketing. Non-availability of timely finance, high mortality rate of birds, water problem during summer and fluctuation in egg and broiler prices were the major constraints in poultry production in the district.

Technical Change, Yield Gaps and Constraints in Rainfed Chillies Production in Karnataka – An Economic Analysis

ASHOK B. HOLIKATTI

1992

Major Advisor : G.K. HIREMATH

The overall objective of present study was to analyse the profitability, decompose the total output into technical change, estimate the yield gap and to evaluate the constraints in the production of chilli. The primary data were collected from farmers by personal interview employing pretested questionnaire and they were post-classified into small and large farmers depending on the size of land holdings. Cost concepts for profitability analysis and Chow test to measure the structural break up to decompose the total yield into constituent by employing the Cobb-Douglas production function were used. Tabular presentation was used for yield gap and constraints analysis. The yield per acre of G-3 variety (improved) of chilli was three times that of Byadagi (local) variety and price-cost ratios were 1.72 and 1.28, respectively. There was 106 per cent growth in chilli output per acre with the introduction of new technology. Of this

total change in output, about 92 per cent was found to have been contributed by technical change and 13.96 per cent by difference in land size, FYM, plant protection chemicals and fertilizer. The magnitude of Yield Gap-I (difference between research yield and demonstration plot yield) was 101 kg per acre and Yield Gap-II (difference between demonstration and actual farm yields) was 113 kg per acre. Yield Gap-I was partly due to environmental differences and partly due to the non-transferable component of technology. Yield Gap-II was largely due to the result of biological and socio-economic constraints. The level of input use on farmers' fields was lower than that on demonstration plots. It was reported that majority of the farmers (about 97 per cent) experienced the problem of pests and diseases which prevented them from attaining high chilli yields.

Agricultural Extension

A Study on the Profile of Tribal Women of Nilgiris District, Tamil Nadu

NEENA K. MENON

1992

Major Advisor : B. SUNDARASWAMY

This study was undertaken to know the activities performed by the tribal women, their socio-economic status, their awareness and availment of benefits of developmental programmes, problems and opinion on certain issues. This investigation was conducted during 1990-91. Two hundred tribal women were selected from two taluks, viz. Gudalur and Kotagiri. The 12 variables included were personal and socio-economic characteristics, activities performed, participation in social activities, consultancy pattern of information sources, awareness on Government Official and developmental programmes, availment of their benefits, opinion on certain issues and problems of the tribal women. Domestic activities

performed regularly by all the respondents were cleaning the house, washing clothes, cooking food, and taking care of elders and children. Farm operations such as sowing, weeding and harvesting were performed by almost all the respondents. The dairy activities they performed were preparation of feed, feeding animals and milking. Majority of the respondents were illiterate (69%), engaged in own farming (29%), belonged to nuclear families (84%) and had an annual income varying from Rs. 4,800 to Rs. 10,000. Fifty two per cent of them possessed land. Tribal women enjoyed a great deal of freedom in household activities while their decision in farm activities were found negligible. Officials from voluntary

organisations, neighbours and village leaders were the most consulted sources of information. Almost all the respondents were aware of most of the developmental programmes undertaken by the voluntary organisations. Tribal woman had favourable opinion about formal education, family planning, working outside the village and the officials of the

voluntary organisation. The major problems faced by tribal women were lack of information on availability of loans and subsidies, lack of training programmes on agriculture and lack of interest of children in studies. The respondents who had own farming as their occupation were found to have higher socio-economic status.

A Study on Job Performance and Job Satisfaction of Subject Matter Specialists Working In NAEP, Karnataka

J. M. THIPPESWAMIAH

1992

Major Advisor : B. SUNDARASWAMY

This study was taken up with the specific objects of measuring job performance and satisfaction of Agricultural Officers working as subject matter specialists in the National Agricultural Extension Projects, Karnataka and to identify the personal and psychological factors related with job performance. Further, an attempt was also made to identify the problems faced by subject matter specialists and suggestions for improving the functioning of National Agricultural Extension Project. All the Agricultural Officers working in 60 cluster taluks numbering 125 were selected for the study. A job performance rating scale was developed and used to measure the job performance of Agricultural Officers. Appropriate scoring procedures or scales developed by an earlier researcher were used to quantify the other variables of the study. Majority (60.8%) of Agricultural Officers were in medium job performance categories. Seventy two

per cent of the Agricultural Officers had medium level of job satisfaction. The job performance was positively and significantly related with job satisfaction obtained by Agricultural Officers. The variable achievement motivation was significantly related with job performance whereas other variables like age, educational qualification, rural-urban background, total experience, mass media participation, organisational climate, training received and work load perception did not exhibit significant relationship with job performance. The major problems faced by Agricultural Officers as opined by them were non availability of vehicles for movement, inadequate travelling allowance, no recognition for good work and no direct control over the field functionaries. The important suggestions made by the Agricultural Officers were separate vehicles for movement under their control, sufficient grants to maintain the vehicles and sufficient travelling allowances.

A critical Analysis of Televewing Behaviour of TV Owning Farmers of Akila District – Maharashtra State

S. D. DHARMADHIKARI

1992

Major Advisor : B. SUNDARASWAMY

The investigation involving 200 respondents of purposively selected Akola District was conducted to study the televewing behaviour of TV owning farmers. Amachi Mati Amachi Manse (Agril. Programme) was viewed by highest number of respondents regularly with full attention. Average time spent on viewing different TV programmes

was highest for English News. Majority of the respondents (69%) belonged to medium category of televewing. Majority of the respondents indicated entertainment as the purpose of viewing TV. A.M.A.M. (Agril. Pprogramme) was the most liked and Kilbil was the least liked TV programme. Education, extension participation, extension contact, mass

media participation, credibility and information disseminating behaviour exhibited positive significant relationship with their televiewing. Lack of free time was the important reason for not viewing all

TV programmes regularly. Majority of the respondents suggested more information on dryland agriculture, fruit crops, new varieties, pest and livestock management.

Knowledge and Adoption Behaviour of Members and Non-Members of Karnataka Co-operative Oilseeds Growers Federation Regarding Groundnut Cultivation Practices in Raichur District – A Comparative Study

VEERABHADRA GOUDA SAHUKAR

1992

Major Advisor : C. M. DUDHANI

The study was conducted during May 1991 in Raichur taluk of Raichur district. Five villages were selected at random. Fifteen members and fifteen non-members were selected by proportionate random sampling procedure from each village. The total sample size selected for the study was 150 respondents. Hundred per cent of both the members and non-members had knowledge about the practices such as application of recommended quantity of nitrogen, phosphorus and potash, application of gypsum, number of hand weedings to be done and insect pests and their control. All the members and non-members had fully adopted practices like application of nitrogen, plant protection measures and time of plant protection measures. A positively significant relationship was observed between knowledge and adoption of groundnut cultivation practices in case of members

and non-members. Knowledge level and adoption behaviour had positive correlation with education, mass media participation, extension participation, extension contact and infrastructural experience in the case of members, whereas education, organisational participation, mass media participation, extension participation and extension contact in the case of non-members. Radio, KOF field officer, progressive farmer and Agricultural Assistant were the most consulted sources of information by members and non-members. All the members expressed training was most needed in plant protection measures followed by gypsum application and sowing area. Majority of the members participated in training programme and field days conducted by KOF. Hundred per cent of members utilized the facilities like gypsum and selling of produce of KOF.

Foods and Nutrition

Nutritional Quality of Some Horsegram Varieties

VANITA NADAGOUDA

1992

Major Advisor : G. S. SHARADA

Nutritional quality of some horsegram (*Dolichos biflorus*) varieties was studied with respect to composition, cooking quality, acceptability and *in vitro* digestibility of protein and starch. The varieties selected for the study were BGM-1, K-42, CODB-6, IC-11095, Macithos, PHG-13, PHG-20, PHG-62, Tumkur local and Dharwar local. Chemical

composition, cooking quality, acceptability and digestibility were analysed by standard methods. The chemical composition of varieties showed that the moisture, protein, fat, ash and crude fibre content of varieties varied from 8.17 to 12.28, 19.79 to 24.83, 0.64 to 2.02, 2.82 to 3.28 and 4.30 to 5.70 per cent, respectively. The starch, total

sugar and reducing sugar content of varieties varied from 43.64 to 56.77, 1.52 to 3.22 and 0.15 to 0.47 per cent, respectively. The iron content of varieties ranged between 6.91 and 9.72 mg per cent. The cooking time, per cent increase in volume and weight of varieties varied from 98.33 to 118.34 min., 100.00 to 149.08 and 83.34 to 110.02, respectively. The palatability test for both cooked and germinated recipes showed that the varieties Dharwar local, BGM-1 and Macinthosh had maximum

acceptability as compared to other varieties. *In vitro* protein digestibility of varieties showed that the varieties PHG-13, PHG-20 and BGM-1 had higher digestibility values and the varieties BGM-1, PHG-13 and Macinthosh had better starch digestibility values as compared to other varieties. Within the varieties, the pressure cooked horsegram varieties were more digestible than the raw ones. In general, the varieties BGM-1, Macinthosh and PHG-13 were found to be quite good in nutritional quality.

Human Development

Personality Needs and Adjustment of Adolescents Studying In Single-sex and Co-educational Systems

ANUPAMA M. PATIL

1992

Major Advisor : P. B. KHADI

This study was undertaken in Dharwad city. Four single sex schools, two each of boys and girls and two co-educational schools with kannada as medium of instruction were randomly selected. About 210 adolescents studying in eighth, ninth and tenth standards formed the sample. Tools used were scale on attitude towards co-education, Adolescent adjustment inventory and Edward's personal preference schedule. Adolescents studying in single-sex schools had a favourable attitude towards co-education due to modernization. Students of the two types of schools differed significantly in seven out of ten personality needs. Students from the single-sex schools were higher on n-Order and n-Endurance than co-educational students. n-Affiliation and n-Nurturance were higher among single-sex school students than among co-educational students. Co-educational students had significantly higher n-Dominance and n-Aggression scores. Co-educational students were found to be

highly adjusted than single sex school students. These differences in the adolescents of two types of schools may be due to the differences in their school environments or may be their personality itself. Positive relationship was observed between attitude towards co-education and adjustment only among co-educational students while among single sex school students, their attitude towards co-education might not have come in the way of their adjustment. Gender had significant influence on the personality needs of adolescents but not on their adjustment. In co-educational schools boys had significantly higher n-Achievement scores than girls. Co-educational girls had higher n-Affiliation than boys where as n-Affiliation was similar in boys and girls of single sex schools. Age was found to influence the personality needs and adjustment of adolescents. Ordinal position was also found to influence the personality needs but not adjustment.

Perception of Adolescents Towards Mothers' Employment

T. R. VENKATALAKSHMI

1992

Major Advisor : V. GAONKAR

The study was carried out in Dharwad. High School students whose mothers had full time

job in Dharwad city were selected for the study. A pre-tested questionnaire was used to collect

information. The older respondents expressed favourable opinion towards mother's employment. Further, girls perceived that their mothers employment had affected their work load in the family when compared to boys. Similarly first borns perceived that their mother's employment has affected their life when compared to later borns. Respondents of extended family felt their recreational activities had not been affected by their mothers employment when compared to the respondents of joint and

nuclear family. Respondents of nuclear family perceived that their mothers' job enhanced their family status. Similarly, the respondents of high per capita income expressed that their mothers' employment had not affected adversely to meet their personal need. Further, respondents with more number of siblings expressed that their mothers' employment had affected their life except in the area of recreational activity.

Psycho-social Correlates of Marital Adjustment Among Working Women

PRATIMA R. MANTRI

1992

Major Advisor : K. SAROJA

This study was undertaken during the year 1991 in Dharwad. The sample consisted of 170 married working women selected randomly from different institutions. The data were collected by personal administration of questionnaire and the scales, viz. marital adjustment and parent in-law adjustment by Kapur (1970), Dysenck personality inventory (1970) and anxiety by Sinha and Sinha (1990). The correlation and multiple regression analysis were used as statistical tools. There was no significant difference in the marital adjustment of the respondents belonging to nuclear and joint family. Respondents having children belonging to the age group of 0-3 and 12+ - 18, 12+ - 18 and 18+ and above differed significantly in their marital adjustment. The variables, viz. age at marriage, length of marriage, number of children, educational level and occupational status were found to have positive but non-significant correlation with marital adjustment. The mutual agreement regarding wife's and husband's status in the family and expenditure of wife's income, adjustment with

parent in-law, wife's satisfaction with how their salaries were spent, perception of parental marital happiness and level of extroversion were positively and significantly correlated with marital adjustment. Neuroticism and anxiety were negatively and significantly correlated with marital adjustment. Parent in-law adjustment was positively and significantly inter related with mutual agreement regarding wife's and husband's status in the family and expenditure of wife's income. Mutual agreement regarding each other's status was positively and significantly interrelated with wife's satisfaction with how their salaries were spent. Neuroticism and anxiety were found to be positively and significantly inter correlated. Marital adjustment was influenced to the extent of 43.38 per cent by a set of variables. Perception of parental marital happiness, mutual agreement regarding expenditure of wife's income, parent in-law adjustment, extroversion and anxiety were found to be first, second, third, fourth and fifth significant factors.

A Comparative Study of Emotional Maturity and Adjustment of Destitute and Normal Adolescent Girls

SUMANGALA G. HIREMANI

1992

Major Advisor : P. B. KHADI

One study was undertaken during the year 1991 in Dharwad taluk. The influence of age and ordinal position on both groups and parental

presence/absence, visit of parents, relatives and child, length of institutionalisation and locality were the variables exclusively studied for destitute girls.

Girls from government certified school, Hubli and Honnamma Destitute Home, Dharwad constituted the destitute sample while normal sample was from high schools and junior colleges in rural areas in order to match destitute sample for the age, gender and socio-economic status. Emotional maturity was assessed by using Emotional maturity scale by Singh and Bhargava (1984) and Adjustment of variance technique was applied to compare emotional maturity and adjustment between destitute and normal girls. Chi-square and correlation tests were used to know the association/relation and t-test was used to know the difference. Nearly 70 per cent of the destitute girls were emotionally unstable and about 67 per cent of normal girls belonged to extremely stable category whereas,

the difference in adjustment scores between destitute and normal girls was found to be non-significant. The relation between age and emotional maturity of destitute was found to be significant and in case of normals it was non-significant. Significant relation between age and adjustment in the case of normal girls and non-significant relation in the case of destitute girls was observed. Ordinal position was found to have no influence on emotional maturity and adjustment of both destitute and normal girls. Child's visit to home had significant influence on emotional maturity and adjustment of destitutes. Parental presence/absence and their visit, relatives visit, locality and length of institutionalisation had no influence on emotional maturity and adjustment of destitute girls.

A study on the Mental Ability of Privileged Urban, Rural and Slum Children of 6-12 years

MADHUMATHI Y. HULIKATTI

1992

Major Advisor : P. B. KHADI

One study was undertaken during the year 1991 in Dharwad taluk. The influence of age, gender, birth-order, number of siblings, family size, education and occupation of father on the mental ability of the children was also studied. In urban area, only such schools where there was co-education and english language being the medium of instruction were included. Purposive sampling technique was employed selecting only children whose parents were doctors, engineers or professors. In rural and slum area, children were randomly selected from such schools where there was co-education and with local language as the medium of instruction. Mental ability was assessed using Phatak's (1987) Draw-A-Man Test. To find out the association and relation between the selected variables and mental ability scores, chi-square test of significance and correlation coefficient were

used. To know the variation in the mental ability among different groups of children, one way analysis of variance was used. Privileged-urban, rural and slum children differed significantly in their mental ability, wherein privileged-urban children had highest mean scores and slum children had least mean scores. In the case of privileged-urban and rural group, none of the independent variables revealed significant relation with mental ability of children, whereas in the case of slum group, the variables like age, gender, birth order, sibling size, education and occupation of father had significant relation with mental ability of children. All the variables, viz. age, gender, birth order, sibling size, family size, education and occupation of father had significant relation with mental ability scores when all groups were considered.

A study of Prevalence of Behaviour Problems Among Pre-School Children as Reported by Their Mothers and Felt Needs of Mothers for Parent Education

JYOTI C. NADGOUDA

1992

Major Advisor : K. SAROJA

This study was undertaken during the year 1991 on the mothers of pre-school children from six randomized Government and aided nursery schools. Among these, only those who reported behaviour problem/s in their pre-school child and who were residing in Dharwad city with their child and husband were selected constituting the total sample size of 135. Data were collected by survey using a pretested personal interview schedule. Correlation co-efficient, t-test and percentage and frequency were used for data analysis. Total number and total intensity of behaviour problems among pre-schoolers as reported by the mothers were taken as dependent variables. The results revealed that out of 26 behaviour problems reported by the mothers, aggressiveness, stubbornness and temper tantrums were reported by more than 50 per cent of the mothers as most prevalent and more intense problems. Out of fourteen independent variables studied, presence of grand parents, working

status of the mother and educational level of the father were found to exert significant influence on the dependent variables. Majority of the mothers often used methods like physical punishment and consoling which would reinforce the child's problem behaviours. Few resorted to superstitious methods also. Majority of the mothers mistake the symptoms of the problems as causes of behaviour problems. Thus, majority of mothers were unaware of the real causes of behaviour problems and proper methods of handling these problems. Majority of them were not interested to learn anything about behaviour problems. Among those who were interested, majority did not know from whom or where to seek such information. Doctors and teachers ranked higher than mass media as preferred sources of information by respondents regarding behaviour problems. Fifty one mothers did not use any source of information.

Life Satisfaction Among the Elderly People

REVATI S. HOSMATH

1992

Major Advisor : V. GAONKAR

The study was carried out in Dharwad city during 1991. Two hundred and ten retired persons who were retired from different Government institutions and departments were selected for the study. The pretested questionnaire and the scale developed and standardised by Rammurti (1978) was used to know the adjustment of elderly people in the various aspects of life and their satisfaction in life. Chi-square test, 't' test, correlation coefficient analysis and multiple regression analysis were applied for analysing the data. As age of the elderly people advanced, their level of satisfaction in life diminished. The elderly people belonging to nuclear family were more satisfied than those living in joint family. It was also noticed that the elderly people who were living with their spouse were highly satisfied in their life compared to the respondents who had lost their wives. At the same

time, respondents who were re-employed after retirement were also found to be more satisfied in their life. The health status, financial position, family relationship, social and leisure time activities and religious activities were significantly related to the life satisfaction of the elderly people. To a greater extent life satisfaction of the elderly people was influenced by age, participation in leisure time and religious activities. The health status of the elderly people was also found to be significantly influenced by age, financial position, family relationship, participation in social, leisure time and religious activities. When the effect of all these factors was considered, age, financial position, participation in social and leisure time activities were found to cause change in the health status of the elderly people.

A Study of Problems of Working Women Hostellers and Their Level of Anxiety

LEENA V. KULKARNI

1992

Major Advisor : K. SAROJA

The present study aimed at finding out the various problems faced by working women hostellers in Bangalore city and their level of anxiety. Two hundred working women hostellers were selected by purposive sampling method. Necessary information was elicited by using a pretested interview schedule and Sinha's (1976) comprehensive anxiety scale. Simple percentage, correlation, chi-square and 't' test were used to analyse the data. The results revealed that even though respondents pointed out the rigid hostel rules as main disadvantage of hostel stay, most of them opted for hostel stay because of security and financial feasibility. It was also found that the respondents did not have cordial relationship with other inmates of the hostel and hostel staff. A negative and significant correlation was observed between age, years of education and income with the anxiety level, number and intensity of hostel related problems. The distance

of parents and parents-in-law residence from Bangalore was positively and significantly correlated with anxiety level, number and intensity of problems. A significant difference in the mean intensity scores of intensity of problems of urban and rural respondents was found. The respondents who face difficulties in commuting to work-place were found to experience significantly more anxiety and hostel problems more intensely than those who did not face any commuting problems. The perception regarding rural background as an obstacle to hostel adjustment was significantly associated with anxiety level of rural respondents and their anxiety level was significantly higher than those who did not perceive their rural background as an obstacle. The married respondents were found to face significantly more number of hostel related problems than unmarried respondents.

Adjustment and Emotional Maturity Among Institutionalised Children

SAROJINI BIRADAR

1992

Major Advisor : V. GAONKAR

The study was carried out in Bijapur (Government Agricultural Based Juvenile home for boys), Hubli (certified school) and Dharwad (Remand home) cities of Karnataka during 1990-91. The sample comprised 120 delinquents and uncontrollable children. Parikh and Das's (1988), Singh and Bhargava's (1984) scales were used to measure adjustment and emotional maturity, respectively. The influence of age, education, ordinal position, number of siblings and income of the respondents on adjustment and emotional maturity was investigated. Occupation and education of the parents were also studied. Correlation, regression and 'Z' tests were used to analyse the data. There was difference in the level of adjustment and emotional maturity among the respondents. Adjustment and emotional maturity among the respondents was negatively and significantly correlated. Age, education, ordinal position, number of siblings

and income did not influence family, educational and overall adjustment. But as age, ordinal position and number of siblings of the respondents increased, the social adjustment decreased. Emotional regression, social maladjustment and personality disintegration increased as age advanced. Further age did not show any influence on emotional instability and lack of independence. Social maladjustment, personality disintegration and lack of independence decreased as education level of the respondents increased. As the ordinal position of the respondents increased, their emotional regression also increased. Number of siblings and income did not show any influence on emotional instability, emotional regression, social maladjustment, personality disintegration, lack of independence and overall emotional maturity. There was no difference in the adjustment and emotional maturity among the rural and urban respondents.