

A Study on the Performance of Self Help Groups in Dharwad District

PRITA MARIAM PAPPACHEN

2001

MAJOR ADVISOR : Dr. B. SUNDARASWAMY

The study was conducted during February-March 2001 in Dharwad taluk of Dharwad district covering 12 female SHGS. The purpose was to obtain a comprehensive knowledge of the performance of SHGs in Dharwad district with special importance to the procedure followed in the formation, activities undertaken, benefits derived by members, the difficulties encountered as well as their suggestions and socio-economic profile of members. All the members of the SHGs and grassroot level workers of NGO were interviewed.

The findings of the study revealed that majority (91.67%) of the groups were initiated by workers of NGO and the procedure followed in the formation of SHGs was common for all groups. The most popular economic activities taken up by the individuals after joining the SHGs were raising paddy nursery for sale (25.95%) and pickle making (25.33%), the group activities included joint purchase of groceries in bulk (66.67%), addressing

community welfare issues like approaching the concerned authorities for middle school and electrification of the village (66.67%), immunization camps (50.0%). Almost all the respondents (98.47%) reported financial and social improvement after joining the SHGs while increased cultural participation was reported by one third (32.82%). The SHG members faced constraints in diversification of activities (41.67%), while the NGOs promoting them faced casteism, opposition and misunderstanding 66.67 per cent each. The members put forth several suggestions including overall improvement (74.05%), improvement in activities undertaken (60.31%) and to avail SJSY loan.

The socio-economic profile reveals that majority of the members were middle aged (68.70%), married (73.28%), illiterates (70.23%) with nuclear families (87.02%). The pre-dominant occupation was agricultural labour (46.56%). They were landless or small/marginal farmers with 76.34 per cent lying below the poverty line.

A Study on the Performance of Water Users Associations in Khammam District of Andhra Pradesh

K.S.PURNIMA

2001

MAJOR ADVISOR : Dr. S.N. HANCHINAL

The present study was conducted to assess the performance of WUAs in Andhra Pradesh in the year 2001. Khammam district which is irrigated by the Nagarajana Sagar Left Canal project was chosen and all the six WUAs on the 19th major distributory canal in the project area were studied. Data was elicited from 90 head reach farmers and 90 tail end farmers, and all the six presidents of the executive bodies of the WUAs, regarding their expectations from the WUAs, activities undertaken, benefits derived, constraints faced and finally suggestions given for better performance. Performance variable was measured against the activities performed by both categories of respondents using a performance index. The major findings of the study were;

Majority of the head reach farmers (85.5%) expected systematic water delivery and ensured availability of water in both seasons, while majority of the tail enders expected a control over unauthorized irrigation (95.55%) and impartiality in water distribution (91.11%), from the WUAs.

The benefit of representation of problems to higher authority was derived by more than half of both head

reach farmers (53.33%) and tail enders (88.88%). The major problem encountered by head reach farmers (93.33%) was very poor lining of the canal while cent percent of the tail enders expressed the problem of wide spread unauthorized irrigation.

Cent percent of the presidents faced problems such as lack of farmers participation in meetings. Lack of cooperation and timely support from higher authority and inability to control unauthorized irrigation during night time. The mean performance index for the overall activities of both categories of respondents i.e. users and presidents was maximum for WUA 141 which was given rank 1 in performance ranking of WUAs.

Major suggestions given by the head reach farmers was that all canals must be repaired immediately, while majority (83.33%) of the tail enders suggested that severe punishment must be given to unauthorized irrigation.

Cent percent of the presidents suggested that discharge must be fixed according to the soils of the region, works must be approved quickly by higher authority and Government and should provide more fund to take up works.

AGRICULTURAL STATISTICS

Formation of an Index for the Measurement of Agricultural Development in Districts of Karnataka

JAGADISH R. HIREMATH

2001

MAJOR ADVISOR : P. A. KATARKI

Agriculture is not only an important sector of an economy rather it also feeds other sectors of the economy. Agriculture development determines the rate of growth of an economy. The extent of agricultural development becomes even more important in the developing economy because of the dominance of the agricultural sector in such economies. The development of agriculture and the factors affecting regional disparity with respect to agricultural development was studied in detail using nine important agricultural development indicators. The study pertained to Karnataka state and its component districts. The secondary data were collected for a period of 6 years depending on the availability of the data starting from 1992-93 to 1997-98, pertaining to nine important agricultural development indicators like per cent net irrigated, per cent net area sown, productivity, per cent net area under high yielding varieties, number of irrigation pumpsets, fertilizer consumption, sericulture production, regulated markets and rainfall.

The Mahalanobis D^2 analysis (distance statistic) was employed to know the extent of regional disparity, factors affecting regional disparity and to classify the districts based on agricultural development. The results revealed

that districts were highly despair with respect to agricultural development and the per cent net irrigated area, number of regulated markets and sericulture production were the major factors affecting regional disparity followed by number of irrigation pumpsets, productivity of importance food grains, rainfall, per cent area under high yielding varieties, per cent net area sown and fertilizer consumption. All the 20 districts were grouped into ten clusters and the ten clusters were categorised into three groups is highly developed, moderately developed and low developed using the agricultural development index formed. In highly developed group five districts were included like Bangalore (R), Kolar, Shimoga, Bangalore and Dakshina Kannada, in moderately developed group 12 districts were included like Mandya, Mysore, Chitradurga, Hassan, Bellary, Raichur, Tumkur, Chickmangalore, Gulbarga, Uttar Kannada, Belgaum and Kodagu and in low developed group remaining 3 districts were included like Bijapur, Bidar and Dharwad. With this optimistic scenario, priority should be given to improve major development indicators and there is need to undertake developmental measures in low developed and other moderately developed districts to reduce regional disparity in the state.

Growth and Instability Analysis of Foodgrains Production in Karnataka

S. PANDURNG

2001

MAJOR ADVISOR : P. A. KATARKI

The study of growth instability analysis of foodgrains production in Karnataka was carried out at college of Agriculture, Dharwad during 2000. In this study 6 crops were studied namely rice, jowar, ragi, bajra, maize and wheat from 19 districts of Karnataka about area, production and productivity for the period of 22 years from 1976-77 to 1997-98. The data has been collected from the crop reports compiled by the Bureau of Economics and Statistics, Bangalore. Growth rates of these crops were found out by using Semi-log quadratic function, variability between two periods by Mann-Whitney test and variability between districts and crops by friedman two way analysis.

Among the cereals considered for study, area under rice, jowar, ragi, maize crops showed increasing trend in almost all districts of Karnataka while, bajra and wheat crop showed decreasing trend. During period I these crops showed decreasing trend during period II.

Bellary, Bidar and Raichur districts showed significant acceleration trend for area of rice crop in period I. While in period II some districts showed deceleration trend except Raichur district.

The productivity of jowar in period I showed acceleration trend in almost all districts of Karnataka. In period II Bidar, Bijapur, Chitradurga, Gulbarga, Mandya and Raichur districts showed significantly acceleration trend for yield of jowar crop.

The growth rate of area of ragi crop indicated that there was an increase in the growth of area in the state as a whole during period I when compared to period II. But the productivity of this crop showed deceleration trend in period I when compared to period II.

The area under bajra crop in both period I and period II showed declining trend. The productivity of this

crop showed acceleration trend in period I when compared to period II.

The area under maize increased during period I when compared to period II. However, the yield increased at a higher pace during the same period. The districts which recorded significant rise in the area were Bangalore, Belgaum, Bellary, Bijapur, Chitradurga, Dharwad And Gulbarga.

The area under wheat crop decreased in the state during period I compared to period II.

In rice, jowar and wheat there was greater variability during period II while, in ragi, bajra, maize there was greater variability during period I when compared period II.

Statistical Analysis of Price and Arrivals of Cotton in Selected Regulated Markets of Northern Karnataka

BASAVARAJ Y. BIRUKAL

2001

MAJOR ADVISOR : SOMAPPA N. MEGERI

Cotton is one of the most important cash fabric and good oil crops can be grown in India as well as in the Karnataka State. The information on Price and Arrivals of Laxmi, Varalaxmi, Hampi, Jayadhar, DCH-32 and New Hybrids of cotton have been collected from Dharwad Raichur and Soundatti Regulated Markets. The secondary data pertaining to monthly model price Rs. per quintals, monthly total Arrivals and Market functionaries were collected in respective Markets. For evaluating different objectives A multiplicative, Time series Analysis, Friedman's two way ANOVA, correlation coefficient, non linear regression, Gini ratio, Tabular Analysis and Exponential smoothing were used. The study shows, in Dharwad Market all Varieties and DCH-32 Arrivals were decreasing trend but an increasing trend in Price. In Raichur Market all Varieties except Jayadhar cotton and Hybrids Arrivals were decreasing trend but an increasing trend in Price. In case Soundatti Market all Varieties and Hybrids Arrivals were decreasing trend but Price were an increasing trend. The Arrivals of DCH-32 were presence of seasonality within and between years. The season starts from November to June in both Dharwad and Soundatti. However, December to July in Raichur Market. In case of Price there is presence of seasonality within and between

years and highest price was in July to January only Dharwad market but almost same price throughout the year in Raichur and Soundatti Markets. In the arrivals of Jayadhar were presence of seasonality within and between years and season starts from December to September, where as Price was same in all months but seasonal pattern changes over a year. The Cyclical indices of Price and Arrivals of Jayadhar in Raichur, DCH-32 in all Markets was no constant period between cycles.

The significant negative correlation was observed only in DCH-32 in Raichur Market and remains were non-significant. The extent of market integration between Dharwad and Soundatti Markets were generally high in unadjusted than adjusted price, R^2 values of third degree polynomial were high in all varieties and Hybrids. The magnitude of concentration of Price of Varieties and Hybrids were almost equally distributed. In Dharwad small buyer, in Raichur Buyer, Importer, Exporter, Ginner and Cruiser and Crusher. And in Soundatti Market Commission agent and Stockist were dominated. The Stability ratio was high in Soundatti Market. The Exponential Smoothing Method is more appropriate in case of Short term Forecasting of Price and Arrivals.

FORESTRY

Variation for Germination and Early Vigour among Progenies of Teak (*Tectona grandis* Linn. F.) Clones of Karnataka

JOHN MATHEW

2001

MAJOR ADVISOR : Dr. R. VASUDEVA

Families of eight teak clones of diverse origin, collected from a 20-year-old Clonal Seed Orchard (CSO), were studied at the College of Forestry, Sirsi, to understand the family variation for seed germination and early vigour. The study was also aimed at understanding the genetic basis of and association among these variations and finally to assess the divergence of half-sib families. Large variations were observed among families of different clones

for germination percentage and dormancy release pattern. Families of clone MySA₁ (11.09%), clone MyHaV₆ (8.65%) and clone myHaV₃ (8.46%) were superior in overall germination at the end of the study period.

Germination was under genetic control as suggested by high narrow sense heritability and showed high genetic gain (171.7%). There was a perfect negative association ($r = -0.902$) between age of the ortet (mother

Abstract of Theses

tree) from which the clonal material was originally derived and the per cent germination of its progeny supporting the hypothesis that deleterious mutations might be accumulated with age ("genetic load accumulation with-age hypothesis"). Hence care must be taken not to include clones of older oriels in the future CSOs.

Although there was a huge variation among families of different clones with respect to growth traits, differences were not significant. Principal component analysis identified leaf area as the most important trait

contributing to divergence of half-sib families, which also had higher narrow sense heritability (0.772) and was significantly associated with biomass traits. Hence leaf area per plant could be the most important trait for early selection in teak progeny trials. In general, families of clones of southern provenance had higher mean values with respect to number of lateral roots, plant height, collar diameter and biomass indicating a potential for early adaptation in field. Hence these clones could be given importance while establishing newer CSOs. Perhaps, in this first attempt to assess GCA of teak clones of Karnataka, MYHuT₁, MYHuT₂ were identified as best general combiners.

Studies on Arecanut Based Agroforestry Systems

GIRISH B. SHAHAPURMATH

2001

MAJOR ADVISOR : H. SHIVANNA

The studies on mixed cropping, microclimate with reference to Photosynthetically Active Radiation (PAR) and weed intensity in arecanut based mixed cropping systems were undertaken in Sirsi taluk of Uttara Kannada district of Karnataka. Arecanut in all the mixed cropping systems recorded higher number of functional leaves (fronds) the sole crop of arecanut. There was increased yield (*chali* kg/palm) of arecanut in the mixed cropping systems Arecanut + Cardamom + Pepper and Arecanut + Cardamom + Banana + Pepper (3.12 and 3.05 respectively), when compared to sole crop of arecanut (2.95). Growth and yield performances of cardamom as a component crop was satisfactory in all the mixed cropping systems except in Arecanut+cardamom + Banana +Pepper system (61.17 kg/ha). Pepper performed better under the systems Arecanut +Pepper (25.47 q/ha) and Arecanut + Cardamom+Pepper (22.22 q/ha) indicating the positive effect of cardamom on Pepper.

In the plantations, under sun fleck, the maximum mean PAR was recorded in mono cropping of arecanut (0.759 ly/min, which was 78.38% of open PAR) and the minimum value (0.646 ly/min, which was 67.04 per cent of open PAR) was observed in Arecanut +Cardamom +Banana+ Pepper mixed cropping system. The reduced interception of PAR (only 0.012 ly/min, which was 1.27% of total PAR) attributed to the poor performance of cardamom in the system Arecanut + Cardamom + Banana + Pepper as associated crop.

The dry weights of both dicot and monocot weeds in different mixed cropping systems were significant. Sole crop of arecanut not only recorded maximum dry weight of weeds (61.43g/m² of dicot and 7.90 g/m² of monocot weeds) in the study area. Among the mixed cropping systems, Arecanut + Pepper (52.8 g/m²) and Arecanut + Cardamom (6.70 g/m²) recorded the highest dry weight of dicot and monocot weeds respectively, consisting of banana and pepper as associated mixed crops.

Effect of Planting Technique and Fertilizers on Initial Growth of Teak Grown on the Bunds of Upland Paddy

RAVI M. MARIGOUDRA

2001

MAJOR ADVISOR : Dr. S.L. MADIWALAR

Agroforestry provides more opportunity for efficient use of natural resources as compared to monocropping of trees or crops. In the hill (zone 9) of Karnataka, the productivity of the upland paddy cultivation is declining in the recent past. Teak can be the potential species to be introduced along with upland paddy due to its varied advantages. The present study was under taken to find a suitable planting technique and optimal fertilizer dose to boost the initial growth and establishment of teak.

The growth parameters of teak were not influenced significantly due to different planting methods. So adopting crowbar hole method is cheaper as compared

to conventional pit method, which require more investment for digging pits.

Among the seven fertilizer treatments 2.5 kg FYM + 30:15:30 NPK g per plant (F₇) exhibited superior performance in terms of teak growth parameters. The per cent increase of growth parameters viz. Plant height, collar diameter and leaf area per plant of teak at 8 MAP over control was to the tune of 234.2, 345.3 and 849.4 per cent respectively. The interaction of pit and crowbar hole method with F₇ performed better in effecting the good seedling growth.

The growth parameters viz. plant height and dry weight per plant and yield parameters viz. Grain and straw yield of paddy were not influenced significantly due to planting methods, fertilizer levels or interaction between them. The relative crop yield figures were around 100 per cent in all the treatments indicating that yield of paddy grown with teak were similar to sole paddy crop yield.

The growth attributes of teak grown with and without paddy were almost similar indicating that growing paddy with teak had no negative effect on the growth of teak in the first year. The moisture content at 1 m distance from teak and light intensity near the teak line was not affected due to any of the treatments tried, indicating the least competition between teak and paddy for the basic resources during first year of teak growth.

Ecological Analysis of Vegetation Along Altitudinal Gradation in Devimane Ghat, Uttara Kannada District

S.S. INAMATI

2001

MAJOR ADVISOR: Dr. K.V. DEVAR

Ecological analysis of vegetation along altitudinal gradation in Devimane Ghat is generally aimed at identifying optimum elevation required for the growth of vegetation. Four altitudinal gradations of Devimane Ghat were evaluated for various growth parameters to assess the composition, structure, regeneration and influence of locality conditions. The vegetation of the Devimane Ghat consisted of 131 species belonging to 44 families. The species diversity was found to be directly correlated with the altitude as such maximum number of species (76) were recorded in the higher altitudinal zone and least (68) in the lowest altitudinal zone. Contiguous distribution was found to be most common type of distribution associated with vegetation irrespective of variation in altitude.

Among various component species, *Knema attenuata*, *Alstonia scholaris*, *Hopea wightiana*, *Myristica*

dactyloides, *Holigama amotiana*, *Syzygium gardneri*, *Vateria indica* and *Ficus nervosa* were found to be most abundant. Both Myristicaceae and Clusiaceae members dominated the study area as compared to rest of the taxonomic families. Lower altitude showed maximum basal area (7.41 M²/ha) where as the density was highest in third altitude (171.7/ha). The species richness and species diversity were highest in fourth altitude and lowest in second and third altitudinal zone respectively.

The vegetation attributes were positively and significantly with altitude, conversely the degree slope was negatively associated with all the vegetation parameters. Nutrients such as N, P, K and organic carbon in soil exhibited positive association with various vegetation parameters; where as pH and electrical conductivity has no substantial effect on vegetation parameters studied.

Studies on Fertilizer Requirements of *Acacia auriculiformis* A. Cunn. Under Mainad Conditions

VASUDEV LAMANI

2001

MAJOR ADVISOR: Dr. S.K. PATIL

Acacia auriculiformis being a fast growing exotic species could meet the growing demand of various sectors of the economy. Hence, the area under this species is increasing. Generally the tree species respond better to fertilizer applications in the initial stages of growth. Therefore, the present investigation was under taken to study the growth response of *Acacia auriculiformis* to different levels of NPK fertilizers and to assess the residual soil nutrient build up due to fertilizer application, in first, second and third year plantations.

Comparison of varying levels of treatments indicated that nutrients in general enhanced the growth of *Acacia auriculiformis* significantly. In the first year plantation, application with 200:100:200 NPK kg ha⁻¹ had put on maximum increment for all attributes (collar diameter

3.48cm, height 3.08 m, crown diameter 2.16 m, basal area 1.524 m² ha⁻¹ and volume 4.67 m³ ha⁻¹), while a dosage of 250:125:250 NPK kg ha⁻¹ promoted significantly higher growth for all the parameters in second and third year plantations (collar diameter 5.04, 7.37cm, height 3.72, 5.73m, crown diameter 2.09, 3.17m basal area 3.198, 6.836m² ha⁻¹ and volume 12.984, 39.096 m³ ha⁻¹)

With increased application of fertilizers the status of soil fertility has also increased. Nutrient build-up was found to be significantly higher with the application of 300:150:300 NPK kg ha⁻¹ for available N, P and K at 0-15cm and 15-30cm soil depths in all the three plantations. Though the maximum nutrient build-up was recorded with the application of 300:150:300 NPK kg ha⁻¹, it was slightly higher than 200:100:200 NPK kg ha⁻¹ in first year and

Abstract of Theses Abstract of Theses

250:125:250 NPK kg ha⁻¹ in second and third year plantations. It may be said that the application of 200:100:200 NPK kg ha⁻¹ in first year and 250:125:250 NPK

kg ha⁻¹ in second and third year would suffice to boost the growth of *Acacia auriculiformis* under malnad condition and also to improve soil fertility status.

Genetic Structure of *Semecarpus Kathalekanensis*: A Critically Endangered Tree Species of Central Western Ghats

P.G. SURAJ

2001

MAJOR ADVISOR : Dr. R.V. VASUDEVA

Genetic structure of *Semecarpus kathalekanensis*, a critically endangered, dioecious medicinal tree species of the *Myristica* swamps of the central Western Ghats was studied adopting isozyme and PCR based Randomly Amplified Polymorphic DNA (RAPD) techniques. Leaf samples from 34 adult individuals of two neighboring populations were subjected to starch-gel electrophoresis after standardizing the protocol for six isozymes. Only four isozyme loci out of 9 identified were polymorphic in both the populations. The overall-mean allele number per loci was 1.44. The Shannon's information index based on all loci was 0.204 ± 0.027 ; it was 0.55 ± 0.11 based on polymorphic loci. The observed mean heterozygosity (H_o) of the populations was extremely low at 0.095 compared to the expected heterozygosity (H_e) based on Hardy-Weinberg equilibrium (0.134). This strongly suggests that the populations are suffering from heterozygote deficiency, which could be attributed to severe genetic bottlenecks and genetic drift. Rare-relic nature and severe anthropogenic pressures faced by the species

might be responsible for genetic drift, while, lack of mating partners due to incomplete blooming synchrony among male and female trees could result in inbreeding. Interestingly, bigger matured individuals with GBH (> 100 cm) had higher H_o (11.11 %) than those which had less than 100 cm GBH (6.67%) indicating that younger generations might possess reduced genetic variation, which calls for an urgent recovery plan.

The genomic DNA were initially subjected to PCR based RAPD using 65 primers. A total of 76 loci were identified based on 10 random primer data. The polymorphism for RAPD ranged from 71.05 to 61.84 per cent and a diversity index of 0.627. The level of genetic differentiation among two populations was very low as suggested by mean F_{st} value (<1%). This study, perhaps the first assessment of genetic diversity of a critically endangered tree species in India, strongly suggests that understanding genetic structure of rare/endangered species is highly essential in formulating conservation plans.

Standardization of Nursery Techniques in Teak (*Tectona grandis* Linn. F)

SIDDAPPA KANNUR

2001

MAJOR ADVISOR: Dr. K.V.DEVAR

Standardization of nursery techniques for production of healthy, planting stock is one of the important aspects of nursery management. Teak is one of the most valued timber species due to its good quality wood properties and other uses. The present study was undertaken on teak to find suitable nursery techniques on suitable soil media stump size and optimum fertilizer dose for production of good seedlings within a reasonable time.

Among eight different soil media tried the medium consisting of soil sand and FYM in the proportion 1:1:2 exhibited superior performance in terms of growth and establishment of seedlings. The percentage increase of seedling growth over usual soil medium consisting of soil sand and FYM in the proportions of 2:1:1 in respect of seedling height, collar diameter and matter production, respectively accounted for 41.81, 21.74, and 59.23. The stumps of 1-2 cm collar diameter, 2-4 cm shoot and 15 cm root portion was found to be most ideal size which showed good performance in growth and dry matter production. It

showed significant increase in seedling height (27.97 per cent). Collar diameter (27.17 per cent) and dry matter production (51.82 per cent) over the usual stump size (collar diameter of 1 - 2 cm, 2.5 cm shoot and 10 - 12 cm of root). These stumps also produced least number of coppies. Which reduced the cost of thinning and enhanced the growth of selected coppice. The application of one gram of N per seedling in two equal splits promoted seedling growth and dry matter production.

The percentage increase in seedling growth over control in respect of seedling height collar diameter and dry matter production was 13.39, 12.62 and 32.65, respectively. The planting of stumps (1-2 cm collar diameter, 2-4 cm shoot and 15 cm root) in the soil medium consisting of soil sand and FYM (1:1:2) and one gram of N per seedling in two equal splits has resulted in considerable reduction of nursery period to the tune of two and half months.

HORTICULTURE

Evaluation of Jamun Seedling Progenies and Standardisation of Softwood Grafting

H.S.PRABHURAJ

2001

MAJOR ADVISOR: Dr. N. C. HULAMANI

A survey was conducted to evaluate promising jamun strains in four villages of Gokak taluk of Belgaum district.

Among the different vegetative parameters studied, strain AJK-9 recorded longest leaf length (17.92 cm), while longest breadth was in AJD-20 (7.28 cm). Thirty three strains out of 55 were tall statured.

The strain AJG-47 registered highest stomatal pore length (29.03 μ), while the strain AJG-89 recorded highest guard cell length (32.38 μ). The strain AJG-93 recorded maximum stomatal index (23.66%).

The shape of the fruits was oblong except strains AJD-25 and AJK-8. The strain AJG-58 recorded higher fruit breadth (2.45 cm), fruit size (8.91 sq.cm.), fruit weight (14.67 g), fruit volume (11.70 ml), pulp weight (12.48 g) pulp thickness (1.30 cm). Longest fruit (3.80 cm) was recorded in the strain AJD-24. The strain AJG-85 recorded highest pulp (87.56%) and pulp:seed ratio (7.03).

The maximum seed breadth (1.60 cm), seed size (3.88 sq.cm.) and seed per cent (29.92%) were recorded

in the strain AJK-8. The polyembryony ranged from 1.20 (AJG-75) to 3.50 (AJG-63).

The strain AJG-63 recorded maximum TSS (17.20%), while AJG-89 recorded highest acidity (0.470%). The anthocyanin content was highest in AJG-72 (0.955 OD).

The characters leaf area, stomatal pore width, fruit size, fruit weight, pulp weight, pulp thickness, pulp:seed ratio, seed weight, seed percentage, number of embryos, acidity and, anthocyanin content had a coefficient of variation of more than 15 per cent.

Fruit size, fruit breadth, fruit volume, pulp weight, pulp:seed ratio and pulp per cent had positive significant correlation on fruit weight. Seed percentage, pulp percentage and pulp weight had direct effects on fruit weight.

Strains AJD-20 (8.65), AJG-58 (8.20) and AJG-92 (8.15) recorded higher acceptability scores.

Highest graft-take was noticed in the strain DPD-30 with the activated scions.

Heterosis, Combining Ability, RAPD Analysis and Resistance Breeding for Leaf Curl Virus and Bacterial Wilt in Tomato (*Lycopersicon esculentum* Mill.).

MAHESH N. SAJJAN

2001

MAJOR ADVISOR : R.M. HOSAMANI

Studies on heterosis, combining ability, RAPD analysis and resistance breeding for leaf curl virus and bacterial wilt were conducted on tomato at the Olericulture Unit, Department of Horticulture, College of Agriculture, Dharwad during 2000-01 in late summer on bacterial wilt sick plot.

Five varieties (viz., H-36, H-88, H-86, NDTV-60 and L-15), ten hybrids (without reciprocals) with Pusa Ruby as commercial check were used for heterosis, combining ability and resistance studies. There was considerable variability for the sixteen characters in tomato varieties and hybrids as indicated by the analysis of variance.

Evaluation of F₁ hybrids along with parents derived from 5 x 5 diallel crosses without reciprocals revealed that crosses H-36 x H-88, NDTV-60 x H-88 and

NDTV-60 x L-15 were found heterotic for yield. *Per se* performance of parents and hybrids for maximum fruit yield was observed in NDTV-60 x L-15 (4572.2 g/plant) followed by NDTV-60 x H-88 (2242.53 g/plant), higher yield was due to higher average fruit weight (102.18 g and 59.97 g) respectively. Whereas in parents fruit yield was highest in L-15 (2528.67 g/plant) followed by H-86 (1377.68 g/plant). The heterosis for high yield was found due to the combined effect of heterosis for yield parameters viz., number of inflorescence per plant, number of fruits per plant and average fruit weight. The four crosses H-36 x L-15, H-88 x H-86, NDTV-60 x L-15 and H-36 x NDTV-60 recorded economic heterosis for high total soluble solids, locules per fruit and pericarp thickness.

All hybrids showed resistance to leaf curl virus except H-86 x L-15, based on coefficient of infection. Seven hybrids (H-36 x L-15, H-88 x H-86, H-88 x L-15, NDTV-60

Abstract of Theses

x L-15, NDTV-60 x H-88, H-36 x NDTV-60 and NDTV-60 x H-86) were found resistant to both the diseases with higher yielding ability. These F₁'s can be exploited for production of tomato during summer.

Combining ability for sixteen characters indicated that non-additive gene action was predominant for fifteen traits except fruit shape index. Pooled analysis indicated all crosses except NDTV-60 x H-86 were heterotic and involved L x L, L x H as well as H x H parents. H-88 and L-15 showed high GCA status for majority of the characters.

These lines could be used as potential sources in future breeding programme.

Molecular diversity was studied in thirteen genotypes (L-15, Punjab Chhahara, Pusa Ruby, BL-333-1, BT-1, H-36, PKM-1, BL-342-1, H-24, COMLCR-9, AVT-1, AVT-2 and AVT-3) using RAPD analysis. The genotypes were characterized by PCR product profiles using random primers obtained from Operon Technologies Inc. Alameda, USA. Sixty primers used for assessing the molecular diversity generated 36 bands in six genotypes involving eight primers.

Weed Management Studies In Gladiolus (*Gladiolus hybridus* L.)

VIJAYKUMAR KORI

2001

MAJOR ADVISOR: Dr. V. S. PATIL

Experiment on weed management studies in *Gladiolus hybridus* L. Cv. Sylvia was conducted during 2000-2001 in the Floriculture Unit, Division of Horticulture, University of Agricultural Sciences, Dharwad. The treatments included were six herbicides and organic mulch for weed management studies. The experiment was laid out in randomized complete block design.

Oxyfluorfen 0.15 kg a.i. ha⁻¹, alachlor 1.50 kg a.i. ha⁻¹ caused slight toxicity at early stages of gladiolus crop. Unweeded control had significantly higher weed count and higher dry matter of weeds at all the crop growth stages. In general the weed population and weed dry weight were reduced with the application of herbicides. Atrazine 1.00 kg a.i. ha⁻¹ was very effective against dicot weeds. Pendimethalin 1.00 kg a.i. ha⁻¹ and oxyfluorfen 0.15 kg a.i.

ha⁻¹ were very effective against controlling of weeds and recorded maximum plant growth parameters like number of leaves, plant height and higher cut flower yield.

The quality of flower spikes was not effected by different herbicide treatments and vase life was also not affected by these treatments.

Economics of weed control, weed free check resulted in higher marginal and net returns which is on par with pendimethalin at 1.00 kg a.i. ha⁻¹ and oxyfluorfen 0.15 kg a.i. ha⁻¹, whereas, lowest net returns and marginal returns were obtained in metolachlor 1.00 kg a.i. ha⁻¹. Highest profit per rupee spent on weed control was obtained in atrazine 1.00 kg a.i. ha⁻¹, whereas less profit per rupee invested was obtained in hand weeding treatment.

Evaluation of Tamarind (*Tamarindus indica* L.) Genotypes for Productivity and Grafting

KHIZER CHANDA MD

2001

MAJOR ADVISOR: Dr. SATISH S. PATIL

A study was conducted at forest Research Centre Gungargatti, during fruiting season of 2000 - 01 to assess the variability and path analysis for qualitative and quantitative traits and correlation studies among yield attributing traits. Significant genotypic differences were observed for all the traits under study thereby indicating presence of large genetic variability in the material.

Among 48 genotypes 31 were orthotropic, and 17 were plagiotropic plant types. The range of flowering varied from 0 to 100 per cent among different genotypes. Two types of pod shape were observed viz. straight and semicurve.

High tartaric acid content in pulp was noticed in SMG-4, 13, NTI-15, 54, 56, 84, 85. S/17, P/1, S/18 and S/

16. High phenotypic coefficient of variation was observed for number of secondary branches, yield, pulp weight, seed weight per pod and vein weight.

Number of secondary branches, pod weight, pulp weight, shell weight, seed weight had significant positive association with pod yield per tree. Pulp weight exhibited highest positive direct effect on pod yield per tree.

Based on mean performance eight genotypes (NTI-19, NTI-14, NTI-15, SMG-4, NTI-7, SMG-I-J, NTI-70, NTI-32) and three genotypes (P/3, S/16, S/17) were identified as potential genotypes in Block I and Block II respectively. It has been suggested to use these genotypes in future breeding programme for improvement of specific traits in tamarind.

The genotypes P/5, NTI-19, NTI-84 and NTI-35 registered significantly high graft success, on the contrary

the graft success was found considerably reduced in genotypes NTI-3 2, S/ 1 8, NTI- 1 5, J/82.

Influence of Environmental Factors, Nutrient Sources on Growth Yield and Quality of Tomato (CV. Megha)

SRI HARSHA

2001

MAJOR ADVISOR Dr. N. BASAVARAJA

An experiment was conducted at Main Research Station, University of Agricultural Sciences, Dharwad in the Department of Horticulture during rabi 2000-2001 to study the effect of environmental factors and different source of nutrients on growth, yield and quality of tomato. The treatments comprising of three growing environments viz., low cost polyhouse, medium cost polyhouse and open field condition and six level of nutrient sources, viz., recommended dose of fertilizer (115:100:60 kg NPK ha⁻¹), RDF + calcium @ 27.5 per cent, RDF + calcium @ 38.5 per cent, RDF + Boron 0.59 per cent and RDF + Boron 1.18 per cent and RDF + vermicompost (2 t ha⁻¹). The experiment was laid out in split plot design with three replications.

The highest tomato yield of 35.27 t ha⁻¹ was recorded in medium cost polyhouse, 31.98 t ha⁻¹ in low cost polyhouse and 24.38 t ha⁻¹ in open field condition.

The increased yield in medium cost polyhouse might be due to the favourable day temperature (25-30°C), soil temperature (24-28°C), relative humidity (65-80%) and uniform light intensity (10000-11000 ft.cd) compared to low cost polyhouse and open conditions.

Among the different nutrient sources, application of vermicompost along with RDF registered the higher fruit yield of 35.27 t ha⁻¹.

The interaction effects between growing environment and application of different sources of nutrient levels were not significant with returns Rs. 2,55,267 and gross returns Rs.4,06,738 were obtained in the treatment combination of vermicompost + RDF in low cost polyhouse conditions. However, higher B:C ratio of 5.91 was observed in the treatment combination of RDF + Boron @ 0.59 per cent in open field which is mainly due to lesser cost of cultivation.

Genetic Variability and Performance of Sweet Potato (*Ipomoea batatas* L. Poir.) Genotypes

SHASHIKANTH EVOOR

2001

MAJOR ADVISOR: M.P. PATIL

Field investigation on variability, correlation, path coefficient analysis and performance of 15 accessions of sweet potato was conducted at Kittur Rani Channamma College of Horticulture, Arabhavi, University of Agricultural Sciences, Dharwad during Kharif 2000.

The analysis of variance revealed that the sweet potato accessions showed significant differences for all the 14 characters studied. The values of phenotypic and genotypic coefficient of variations were moderate to high for most of the characters studied except the length of vine (14.78% and 16.61%, respectively) and sugar content (10.19% and 10.68%, respectively), indicating need for generation of new variability for these traits.

High heritability coupled with high genetic advance over mean were observed for protein content (37.30% and 48.18%, respectively), tuber dry matter (93.30% and 35.23%, respectively), tuber weight (81.50%

and 38.84, respectively), starch content (98.50% and 30.60%, respectively), number of leaves (86.40% and 37.83%, respectively), fresh weight of vine (88.50% and 30.42% respectively), tuber length (70.10% and 32.41%, respectively), number of tubers (71.20% and 35.93%, respectively) and number of branches (70.70% and 30.94%, respectively). Therefore, selection for these characters would be gainful.

The results on character association studies demonstrated that selection of genotypes for higher tuber yield should be based on fresh weight of vine, tuber diameter and tuber dry matter as these traits had positive and significant association with yield. They also had high direct effect on the tuber yield.

Among the tested accessions, the genotypes IB-4 (34.42 t/ha) and IB-9 (37.19 t/ha) were found superior with respect to tuber yield, growth and quality parameters.

Evaluation of Ginger (*Zingiber officinale* Rosc.) Genotypes Under Ghataprabha Left Bank Command Area of Northern Karnataka

UMESH B. KALE

2001

MAJOR ADVISOR : Dr. N.K. HEGDE

An attempt has been made to evaluate fourteen genotypes of ginger at Agricultural Research Station, Arabhavi (Tq. Gokak) during 2000-2001. The field trial was laid out in a randomised block design replicated thrice with a plot of 3m x 1 m size. Observations on growth parameters were recorded on five randomly selected plants in each replication at different stages of crop growth, viz., 60, 90, 120, 150, 180 and 210 days after planting. Rhizome Yield and quality parameters were recorded after harvest. Among the genotypes tried, Humnabad, Rio-de-Janeiro, Hirekerur and Maran were recorded higher yield (>24q/ha) under Arabhavi conditions.

Among different genotypes evaluated Humnabad, Hirekerur and Rio-de-Janeiro, recorded higher plant height (51.25 cm, 45.54 cm and 43 cm, respectively), while the genotype Haveri recorded lower height (30.17 cm). The genotype Haveri, Himachal Pradesh, Maran and Wynad are found to be of short duration types (< 205 days) while remaining genotypes took more than 240 days for attaining maturity stage.

The curing percentage was higher in genotype Humnabad (28.29%) closely followed by Rio-de-Janeiro (25.53%), Hirekerur (25.51%) and the lowest was recorded in the variety Suravi (18.42%). There was significant difference among genotypes for cured yield and it ranged from 8.04 tonnes per hectare (Humnabad) to 2.44 tonnes per hectare (Haveri). The highest crude fibre content was recorded in Haveri (6 %) and the lowest was recorded in genotype Basavakalyan (3.28%). Essential oil content was maximum in Rio-de-Janeiro (2.38%) followed by Karkal (2 %), Humnabad (1.99%) and the minimum was recorded in cultivar Himachal Pradesh (1.05%). The oleoresin content was maximum in Humnabad (8.94%) followed by Rio-de-Janeiro (8.73%) and the minimum was recorded in genotype Haveri (3.69%). Among the genotypes studied higher fresh rhizome yield was observed in genotype Humnabad (28.45 t/ha) followed by Rio-de-Janeiro (27.48 t/ha), Hirekerur (24.94 t/ha) and the lowest was recorded in genotype Haveri (12.45 t/ha).

Characterization and Genetic Diversity Studies in Brinjal Genotypes

B. RAMESH BABU

2001

MAJOR ADVISOR: Dr. R. V. PATIL

Characterization for qualitative and evaluation for quantitative characters, genetic variability and genetic diversity in brinjal was carried out at the vegetable section of Golden Jubilee Block, Kumbapur Farm, University of Agricultural sciences, Dharwad during 2000-2001.

Among the 90 brinjal genotypes the frequency of purple black fruits was observed in 33 genotypes followed by striped (28), netted (2) and mottled (2). Seventy genotypes were non-spiny and rest spiny.

Of the 90 brinjal genotypes, the top five ranking genotypes in term of yield in descending order were DBC-18-AP (3665.00 g), DBC-75-KA (3080.00 g), DBC-38-HA (3165.00 g), DBC-13-BI (3032.00 g) and DBC-14-KA (3020.00 g) and all these differ for the shape and colour of the fruit.

The striped fruit genotype DBC-68-KA (2947.50 g) recorded significantly higher yield and three genotypes DBC-19-KA (2445.00 g), DBC-76-KA (2496.00 g) and DBC-80-KA (2710.00 g) were at par with it. These striped ones are the locally preferred ones.

PCV was higher than GCV for all the characters but, the degree of variation between the values of PCV and GCV was not much (except for number of fruits per cluster and fruit pedicel length thickness) indicating the role of environment and also the genetic make up in the expression of characters.

Higher heritability and genetic advance over mean was recorded for all the characters (except fruit pedicel thickness) indicating additive gene effect controlling the inheritance of their traits and simple selection schemes would be sufficient for the improvement of such traits.

The maximum contribution towards total genetic divergence was from yield (97.95%). All the 90 brinjal genotypes were grouped into seven clusters using Tocher's method and cluster I accounted for as many as 38 genotypes followed by cluster V (20), II (18), III (10), IV (2) and VII (1).

Intra cluster distance was minimum in cluster IV while maximum in cluster V. The inter cluster distance was maximum between cluster IV and VII and the genotypes of these clusters could be used in hybridization programme to develop heterotic hybrids.