

**Abstract of Thesis Accepted for Award of Post-Graduate Degrees in the  
University of Agriculture Science, Dharwad**

**DOCTOR OF PHILOSOPHY**

**Studies on *in Situ* Moisture conservation and Integrated Nutrient Management  
Practices in  
Rainfed *Herbaceum***

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**ABSTRACT**

Field experiment to study the "Effect of *in situ* moisture conservation and integrated nutrient management practices in rainfed *herbaceum cotton*" were conducted during 1998-99 and 1999-2000 at Agricultural Research station, Annigeri.

In a field experiment on the effect of *in situ* moisture conservation practices and organic manures, compartment bunding (CB), broad furrow and ridge (BRF) and tied ridges and furrows (TRF) increased the soil moisture content at different soil depths compared to flat bed (FB) and contour cultivation (CC). CB ( $1022 \text{ kg ha}^{-1}$ ), BFR( $1014 \text{ kg ha}^{-1}$ ) and TRF ( $994 \text{ kg ha}^{-1}$ ) recorded significantly higher seed cotton yield than flat bed ( $902 \text{ kg ha}^{-1}$ ). The *in situ* moisture conservation practices increased the growth and yield parameters. Among different organic manures, farm yard manure (FYM) ( $1000 \text{ kg ha}^{-1}$ ) and poultry manure (PM) ( $991 \text{ kg ha}^{-1}$ ) recorded higher seed cotton yield than incorporation of cotton stalks ( $909 \text{ kg ha}^{-1}$ ). The synergistic effect of CB+ FYM and BFR + FYM resulted in 14.9 and 15.1 per cent higher seed cotton yield than FB + FYM ( $909 \text{ kg ha}^{-1}$ ). CB,BFR and TRF recorded higher net returns than FB and CC.

In another experiment on the effect of inorganics and organics, application of 100% RDF( $1052 \text{ kg ha}^{-1}$ ) recorded 6.4 and 15.4% higher seed cotton yield over 50 and 0% RDF respectively. Application of 100% RDF resulted in superior growth and yield components and increased the availability and uptake of major nutrients. The net returns were higher with 100% RDF (Rs.11808  $\text{ha}^{-1}$ ) than 0 (Rs.9772  $\text{ha}^{-1}$ ) and 50% RDF (Rs. 10974  $\text{ha}^{-1}$ ). Among different organic manures FYM+PM each at @ 2.5 t/ha recorded 10.5 per cent higher seed cotton yield than incorporation of cotton stalks @ 5.0 t/ha ( $910 \text{ kg ha}^{-1}$ ). Improved crop growth and higher nutrient uptake were observed with FYM+PM over cotton stalks. Combination of 100% RDF+(FYM+PM each at @ 2.5 t/ha) recorded 19.3 per cent higher seed cotton yield than 0% RDF+ cotton stalks, Inter crop effect of 100% RDF+ (FYM+PM each at @ 2.5 t/ha) recorded higher net returns (Rs. 12290/ $\text{ha}^{-1}$ ) than 0% RDF+ cotton stalks (Rs.9327 / $\text{ha}^{-1}$ ).

## **Studies on Seed Production Techniques and Storage Potential in Inter Specific Cotton Hybrid DHB - 105**

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### **ABSTRACT**

The field experiments to study the seed production techniques in inter specific cotton hybrid DHB-105 were conducted at Agricultural Research Station, Bagalkot and Gangavati during 1997-1999 and laboratory experiment was conducted at Agricultural Research Station, Bagalkot from 1998 to 1999 to assess the storability.

Irrespective of locations, wider spacing (120 x 120 cm) recorded significantly low plant height (155.9 and 126.2 cm), higher number of sympodial branches (28.0 and 23.5) per plant, boll weight (4.51 and 4.42 g), boll set (52.5 and 48.0) , seed index (10.59 and 10.33g) seed yield per ha(1694.8 and 1613.9 kg), germination (83.6 and 81.4%), field emergence (75.10 and 73.80%) and vigour index (1686 and 1678) at Baglkot and Gangavati, respectively compared to closer spacing (90 x 90 cm).

Soil application of ZnSO<sub>4</sub> @ 5 kg/ha at sowing recorded significantly higher number of crossed bolls per plant (70.6 and 53.5), boll set (51.5 and 48.7%), boll weight (4.41 and 4.38 g), seed index (10.43 and 10.15g), seed yield per ha (1639.0 and 1361.4 kg), germination (82.00 and 81.90%), field emergence (74.4 and 74.20%) and vigour index (1702 and 1679) at both the locations, respectively and followed by foliar application of boron (0.1%).

Application of growth promoters (40 ppm GA<sub>3</sub>, 20 ppm NAA) and retardant (120 ppm cycocel) significantly increased boll set, boll weight, seed index, seed yield per plant and per ha (kg) besides seed germination, field emergence and vigour index at Bagalkot and Gangavati locations compared to other growth regulators and control.

The germination, field emergence and vigour index values decreased steadily with the progress in the storage period. First and second picking seeds recorded better storability compared to third picking. The delinted seed maintained higher seed quality up to 12 months, while linted seeds up to 16 months of storage. The seeds stored in polythene bag (700 gauge ) were superior over cloth bag for all the seed quality parameters throughout the storage period.

**Co-Application of Sewage Sludge and Fly Ash on Crop Yield and Soil Properties  
with  
Emphasis on Heavy Metal Contamination**

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**ABSTRACT**

Field experiments were conducted during 2000-01 on a permanent site at RARS Farm, Raichur on both red and black soils to study the effect of continuous application of sewage sludge and fly ash in different combinations (00: 100, 25:75, 50:50, 75:25 and 100:00) with or without NPK on crop yield and soil properties with emphasis on heavy metal contamination. The seed yield of sunflower with the application of fly ash @ 52 t ha<sup>-1</sup> in both red and black soils (855 and 861 kg ha<sup>-1</sup>, respectively) was significantly, lower than that of NPK control (923 and 945 kg ha<sup>-1</sup>, respectively) and sludge applied at the same level (1178 and 1168 kg ha<sup>-1</sup>, respectively). However, the yield with the application of sludge and ash in equal proportion was significantly higher (1120 and 1177 kg ha<sup>-1</sup>, respectively) than that of NPK control but at par with sewage sludge treatment. In the succeeding groundnut and maize crops significantly higher yield (1946 and 2871 kg ha<sup>-1</sup>, respectively) was recorded due to the residual effect of sewage sludge and fly ash applied in 75:25 proportion. The increase in yield due to co-application of solid wastes might be due to improvement in soil properties, available nutrients status and biological properties. Application of sludge, though increased the potentially toxic elements in plants, none of their concentration exceeded the reported toxicity limit, except Cu content in sunflower seed (>15 mg kg<sup>-1</sup>). Similarly, application of sewage sludge @ 52 t ha<sup>-1</sup> increased the total content of Zn, Cu, Ni, Pb, Cd, As, Cr and Co in both the soils significantly, but the concentration was below the maximum permitted metal loading in soil established by USEPA-503 regulations. Laboratory leaching study indicated that application of solid wastes did not influence the content of heavy metals in the leachate.

**Studies on Pigeonpea Cyst Nematode, *Heterodera cajani* Koshy and its  
Interactions  
with *Fusarium udum* Butler**

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**ABSTRACT**

*Herterodera cajani* was pathogenic to pigeonpea. Effects of various initial inoculum densities, viz.10,100,1000, 5000 and 10,000 juveniles per plant on pigeonpea growth were studied. The inoculum levels 1000 J<sub>2</sub> and above reduced the plant growth significantly when compared to control. In general, there was a progressive reduction in plant growth, as the inoculum density increased. This study revealed that 1000 juveniles per plant were pathogenic to pigeonpea and was associated with significant reduction in the shoot and root length, fresh and dry weights of shoot and root.

Inoculation of *H.cajani* seven days prior to *F. udum* resulted in maximum wilt symptoms (100%) at 75<sup>th</sup> day after inoculation in wilt-susceptible pigeonpea cultivar GS-1. While in wilt-tolerant (C-11) cultivar, hundred per cent wilt was noticed at 90<sup>th</sup> day after inoculation but in case of ICP- 8863, a wilt-resistant cultivar, no wilting symptom was recorded. Significant reduction in plant growth parameters was noticed in all the three cultivars. The lowest cyst numbers were recorded in ICP-8863 cultivar in *F.udum* inoculation seven days prior to *H. cajani* treated plants. In *H. cajani*-alone treatment, highest cyst number was recorded in GS-1 cultivar.

The histopathology and histochemical studies revealed that syncytia induced by nematode originated in the pericycle, endodermis or adjacent cortex frequently opposite protoxylem poles. *F.udum* fungal growth was confined to vascular tissue.

It was found that wall fragments within syncytia are thickened by even deposition of PAS positive granules and also, multinucleate condition was observed. Upon simultaneous inoculation of *H. cajani* and *F.udum* mycelial growth was recorded in the xylem vessel and the PAS positive granules were also observed.

In a field management study, a fungal bioagent, *Paecilomyces lilacinus*, as seed treatment, application of sugarcane press mud @ 1 t/ha., carbofuan 3G @ kg a.i./ha. as soil application (at sowing) and sorghum inter crop with pigeonpea (3:2) reduced the *H. cajani* population and gave higher crop yield compared to check.

# **A Critical Analysis of Joint Forest Management Programme on Knowledge and Perception Among Beneficiaries in Northern Karnataka**

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## **ABSTRACT**

The study was conducted in Dharwad and Belgaum districts to know the knowledge and perception about Joint Forest Management Programme among the beneficiaries during the year 2002. Totally 360 beneficiaries were selected from 18 villages. The important findings of the study were.

The socio-personal profile revealed that majority of the beneficiaries were in middle aged group (52%), primary education (38%), nuclear family (62%), big farmers (33%), below poverty line (97%), live stock possession w.r.t. bullocks (42%), medium extension contact (55%), low social participation (37%), high cosmopolitaness (48%) and medium level of aspiration (46%).

Majority of the beneficiaries had medium level of knowledge (39.17%) about Joint Forest Management Programme. JFM component analysis revealed that objectives of JFM with average score (4.08) ranked first and least knowledge about role of different departments with average score (1.61) ranked the least.

Majority of the beneficiaries had medium level of perception (47.73%). Perception towards the usefulness ranked first with an average score (11.24), and management plan with an average score (3.02) ranked the least.

Extension contact and employment generation were found to have a positive and significant association with the knowledge level of the beneficiaries.

Regression analysis revealed that extension contract was most important variable in influencing the knowledge and perception level of beneficiaries. Fodder, firewood and increase in employment were major benefits derived by beneficiaries.

Lack of confidence and uncertainty about the programme and lack of power to village forest committee member were some of the problems expressed by the beneficiaries. Suggestions for better implementation of Joint Forest Management Programme were views knowledge of local people while formulating management plan should be considered and follow up by senior forest officers about working of Village Forest Committee is appropriate.

## Investigations on Bacterial Wilt Resistance in Tomato

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### ABSTRACT

The "Investigations on bacterial wilt resistance in tomato" were undertaken during 2000 to 2002 in the Olericulture Unit, Department of Horticulture , University of Agricultural sciences, Dharwad. Out of 212 genotypes 57 genotypes screened were selected based on their *per se* performance and horticultural traits.

All the 50 hybrids developed using L x T design in the present investigations had wide range of resistance to bacterial wilt. Considerable magnitude of heterosis was expressed in F<sub>1</sub>'s for yield and yield influencing characters. The three hybrids Arka Alok x SP-2-2 and Arka Alok x L-101 and L-15 x Arka Vikas qualify to be of commercial value as they manifested significant heterosis for yield and yield components with higher *per se* yield during both years. Combining ability analysis for yield and yield components revealed that, yield is predominantly governed by non additive gene effects while, the yield components governed by additive gene effects.

The inheritance of bacterial wilt resistance in Arka Alok x Arka Vikas has fit into a digenic ratio 9: 7, suggesting a duplicate recessive gene interaction. Among the four F<sub>2</sub> populations, very high frequency of 39.96 and 6.08 per cent transgressive segregants for average fruit weight and yield observed in the F<sub>2</sub> population of Arka Alok x W.94 30.

An insight into the impact of soil amendment on bacterial wilt incidence revealed that the gypsum level 187.5 kg ha<sup>-1</sup> and other higher levels reduced the wilt incidence significantly compared to control and 125 kg ha<sup>-1</sup>. In both the years the calcium content was significantly higher in resistant variety (L-15) compared to Pusa Ruby. The histopathological investigations revealed the formation of cavities in the xylem vessels by cell wall degradation. When the two non host crops maize and sorghum were used in the crop rotation experiment, the wilt incidence has reduced to 45.72 and 43.57 per cent from its initial incidence of 67.14 and 67.85 per cent respectively.

## **Evaluation of Varieties and Effects of Planting date and Growth regulators on the Performance of Chrysanthemum (*Dendranthema indicum*)**

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### **ABSTRACT**

Studies were conducted to evaluate the genotypes for growth, flowering and yield and to standardise the date of planting and growth regulators in chrysanthemum (*Dendranthema indicum*) during the years 2000 and 2001.

Studies on the effect of dates of planting on vegetative parameters of cv. Karnool revealed that the plants of April followed by May plantings were tall, spreading, sturdy and had more number of branches, suckers, leaves and more leaf area per plant inturn more flower yield (15.03 and 14.91 t/ha, respectively). The flower yield gradually decreased right from April planting to December planting.

Among the seventeen different accessions, Saraval and harvest Home were vigorous in growth , while the cultivar Kirti was dwarf in growth habit. The plant spread was more in Harvest Home, Mutant No.9 and Selection 5 and it was minimum in spray purple. The cultivars Karnool, Kirti, Lohin Green, Pink cascade and Chandrika were early in flowering, whereas cv. Sarval was late variety. Cultivars Harvest Home, Mutant No.9. Karnool, Selection-5, Saraval and Chandrika produced higher number of branches, leaf area inturn higher flower yield.

Application of GA at 100 ppm and brassinosteroid at 0.75 ppm to pinched plants increased the plnat height. These two treatments and mepiquatchloride at 250 ppm exhibited excellent plant architecture (spread), relatively higher number of branches and increased leaf area inturn these parameters resulted in higher flower production. GA(200 ppm) induced early flowering, whereas paclobutrazol at 400 ppm, mepiquatchloride at 500 and 750 ppm levels delayed the flowering.

Growth regulators (GA, BA, paclobutrazol), chemicals (sucrose) and water spray significantly reduced the weight loss of chrysanthemum loose flowers.

## Development and Evaluation of Millet Based Composite Food for Diabetics

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### ABSTRACT

The study was undertaken to develop composite diabetic mix from regional millets (foxtail and little 80%) along with wheat (10%) and black gram dal (10%) and spice mixture (8%). The nutrient composition of the millets and mixes was statistically not significant except for fat and mineral content respectively. These millets increased four times its volume after cooking thus providing 19-22 per cent of dietary fibre. The traditional products prepared from developed diabetic mix were acceptable on basis of sensory attributes.

A significant increase in moisture and peroxide value of diabetic mixes stored in aluminium box compared to sealed packages (polyethylene bag and aluminium pouch) were evident during six months. There was no apparent change in sensory qualities of the products prepared from stored mix of all the three packages, highlights the best suitability of polyethylene bag from economical and convenience point of view.

The lowest glycemic index was noted for foxtail millet grain mix (54.39) followed by foxtail millet (57.91) little millet grain mix (58.75), little millet (61.98), foxtail and little millet composite flour (63.07 and 64.51, respectively) in six non diabetics when tested against 50 g carbohydrate load.

Intervention study of four weeks (80 g mix/day) revealed that the blood glucose in six non diabetics and nine diabetics reduced to 17 and 19 and HDL cholesterol increased to 2 and 6 per cent respectively. Besides, intervention with foxtail millet mix exhibited considerable reduction in *triglycerides* without apparent changes in total cholesterol values in experimental volunteers as compared to little millet mix. In feeding trial (4 weeks), 60 per cent of diabetics switched over to normal ratio at TC:HDL and LDL:HDL cholesterol along with maintenance of body weight. Thus therapeutically potential diabetic mix was *popularized* through print media exhibitions, melas, displays and seminars in many diabetic centres, health clubs and clinics reaching the target sales of four quintals mix within a year.



## **Genetic Study on Cotton Plant Types.**

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### **ABSTRACT**

To increase productivity of cotton there is a need for identifying plant types suitable for the situation concerned. Plant types of varieties were compared for productivity and plant type traits. These plant types were utilized in developing inter and intra plant type crosses to compare the influence of plant diversity on heterosis for different traits. Compact varietal plant types were superior than robust because of efficient packing of bolls, better utilization of three dimensional space and increased plant population per unit area. Intraplant type (robust x robust) crosses were developed through 10x 3 line x tester mating design.

Most of the inter and intraplant type crosses expressed significant heterosis over mid parent for the characters studied. GCA variance was found to be significant and higher in magnitude than significant SCA variances for all the characters. There were potential inter and interplant type crosses involving both parents with high gca effects for yield and yield component characters in desirable direction.

The robust parents RAB-5, RHA-223 and 4350504 were the most potential combiners based on percent gca method the lines 4350407, BCCH-3C3 and RAH-223 are recognized as the most potential parents and RACH-221 was recognized as the most potential tester in line x tester analysis. Among the crosses studied, robust x compact crosses were more potential, this is because there is blending of desirable traits coming from robust and efficient packing of bolls as observed in compact plant types.

Path analysis has revealed that lint yield followed by number of bolls per plant had highest positive direct effect on seed cotton yield.

## **Effect of Potassium and Sulphur on Growth, Yield and Quality Parameters of Onion (*Allium cepa* L.)**

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### **ABSTRACT**

A field experiment was conducted in black soil at Main Research Station, Dharwad during kharif 1999 to study the effect of potassium and sulphur on growth, yield and quality parameters of onion. The experimental design was split plot with 12 treatments and three replications.

Plant height, number of leaves and total dry matter production increased significantly with the application of potassium and sulphur. The highest plant height, number of leaves and total dry matter production were observed with the application of 125 kg K<sub>2</sub>O plus 30 kg S ha<sup>-1</sup>. Interaction effect of potassium and sulphur did not influence growth parameters.

There was increase in yield and yield parameters like bulb length with increasing levels of potassium and sulphur. The treatment, which received 125 kg K<sub>2</sub>O plus 30 kg S ha<sup>-1</sup>, recorded significantly the highest yield (25.45 t/ha), which was on par with K<sub>3</sub>S<sub>2</sub> (150 kg K<sub>2</sub>O plus 30 kg S/ha).

Increasing levels of potassium and sulphur significantly increased the TSS and pyruvic acid content of onion bulb. Higher TSS (12.83%) and pyruvic acid (3.733 mol/g) content of onion bulb was obtained in the treatments receiving 125 kg K<sub>2</sub>O plus 30 kg S ha<sup>-1</sup> and was on par with treatments receiving 150 kg S ha<sup>-1</sup>.

Total weight loss of onion bulbs was significantly reduced with increased potassium and sulphur fertilization and its interaction with potassium and sulphur did not show significant difference with respect to storage life in terms physiological loss in weight, sprouting and rotting.

Higher contents of potassium and sulphur in leaf as well as bulb were observed with the higher level of potassium and sulphur. The higher uptake of N (202.47 kg/ha), P (25.00 kg/ha), K (114.46 kg/ha) and S (43.44 kg/ha) were observed with 125 kg K<sub>2</sub>O plus 30 kg S ha<sup>-1</sup>.

Among all treatments combinations, fertilizers dose of 125 kg potassium and 30 kg sulphur per hectare was found most remunerative in respect of net returns.

In post harvest soil maximum available potassium (498.00 kg/ha) and sulphur (25.16 kg/ha) content was obtained in the treatment 150 kg K<sub>2</sub>O plus 30 kg S ha<sup>-1</sup>.

## **Effect of Agro-Ecosystems on Water Quality of Tungabhadra Irrigation Project.**

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### **ABSTRACT**

An investigation was carried out to know the effect of different agro-systems on water quality of Tungabhadra irrigation command. Water samples from each agro ecosystem viz, head-end, tail-end, ancient and rain fed were collected during kharif 2001 and rabi 2002. The samples were analyzed for different cations/anions and heavy metals (Cd, Pb) and other chemical properties. The results revealed that the quality parameters did not differ much with seasons in the agro ecosystems studied. However, variations among the agro ecosystems were observed in both the seasons. Electrical conductivity of the rain fed and head end agro ecosystems were marginally higher compare to others during both the seasons. Rain fed and tail end eco-systems registered sodium and SAR compare head end and ancient agro ecosystems. Cadmium content in all the agro ecosystems was higher than the permissible limits (0.005 ppm) with highest value recorded in rain fed system followed by tail end during both the seasons. Among the anions, chloride was the most dominant anion observed in different agro ecosystems with higher value recorded in rain fed agro eco system. Bicarbonate was more dominant than carbonates with a higher concentration noticed in rain fed agro ecosystem. Fluoride concentration plays an important role in drinking water quality with its higher concentration recorded in rain fed agro ecosystem.

# **Impact of Subsurface Drainage on the Physico Chemical Properties of Salt Affected Soils of Malaprabha and Ghataprabha Command.**

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## **ABSTRACT**

Evaluation of seven plots of subsurface drainage (SSD) taken up by CADA, M and G Belgaum and farmers by themselves and adjacent fields without SSD was carried out during October 2000 to January 2001 to assess the impact of SSD on the physico chemical properties of salt affected soils of Ghataprabha and Malaprabha command area. Drainage effluents were tested for the contents of N, P and K.

Among physical properties, percent aggregate stability was higher in the SSD plots when compared to control plots. Bulk density of the SSD plots was less than the control plots. Terminal infiltration rate of the soils of SSD plots was more than the control plots, water table was lower in SSD plots than that of control plots at all the locations studied except at Kapli site, where there was not much difference in the depth of water table between the SSD and non SSD plot due to poor functioning of the subsurface drainage system.

Among the various chemical properties studied pH and EC of soils in the SSD plots was lower than that of control plots at all the location except pH in Zunjarkoppa site.

Not much difference in the CEC of the SSD and control was recorded, However, ESP and SAR values control plots were lower than the soils of the corresponding control plots at all the locations studied. Drainage water had higher pH, EC, SAR than that of irrigation water. Among the N, P and K in drainage water SSD plot potassium was the dominant nutrient.

Looking to the results of physico chemical properties of soils, it is contributed that the laying of SSD will help in the reclamation of salt affected and water logged soils.

# **Impact of Chemical Industries on Farm Economy in Vadodra District of Gujarat State – An Economic Analysis.**

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## **ABSTRACT**

Chemical industries account for 7 percent of the total factories and 12 percent of the value added in the manufacturing sector. The industry has become a major area of deep concern because of its negative externalities on the environment. Vadodra and Karjan taluks of Vadodra district were selected and totally 90 respondent farmers were interviewed. Tabular presentation and compound growth rate analysis were carried out to study the land use pattern and cropping patterns. Hedonic pricing model and regression analysis were employed to study the land values and health costs respectively.

Total annual incomes of the farm families in the non polluted area were found to be higher (Rs.71630.03/annum) owing chiefly to higher incomes from agriculture. There was diversion of area from high value crops to low value crops in the polluted area. Hedonic of land values in the polluted area revealed that 92.3 percent of the variables selected were responsible for variation in land values. Health costs and health problems were also found to be higher in the polluted area.

## **Production and Utilization of Bamboo in Karnataka – An Economic**

L. MANJUNATH

2003

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Bamboo is found well distributed in Karnataka from Uttara Kannada and Belgaum districts in the north to Mysore and Chamarajnagar districts in the south. While the area under bamboo has been increasing in the state over years, its harvested quantity available to the end users has been decreasing considerably. In Karnataka, bamboo has assumed considerable importance as poor man's timber and as a raw material for different end-users. This paper assesses demand and supply potentials of bamboo in the state and investigates the future scenarios. The study also examined the pattern of utilization of bamboo by end-users. For this analysis, Bidar, Bellary and Koppal districts of eastern plane dry zone were selected. From each district a sample of 10 farmers, 10 medars and 10 construction agencies were randomly chosen. Further, the investigation also considered the two paper mills operating in the state. The time series data on the number of medars in these districts and their bamboo requirements were collected for 10 years. Using simulation techniques, growth rate was computed for the total production and demand in the state for bamboo by two major end-users, viz., paper mills and medars. It was found that with the passage of years, the harvested quantity of bamboo would fall short of the total demand and that the demand supply gap would keep widening, if suitable policy measures, suggested by the findings of the study, were not implemented. The findings also showed that only paper mills could get their bamboo requirement from the Forest Department to a considerable extent. Other categories of end-users could have only a small proportion of their requirement met by the department, and had to depend mainly on private traders, which led to larger expenses in procurement.

## Studies on Tar Spot Disease of *Dalbergia* Spp

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### ABSTRACT

*Dalbergia latifolia* Roxb., and *Dalbergia Sissoo* Roxb..are highly valuable for their strong and durable heart wood. Tar spot caused by *Phyllachora dalbergiae* Niessl. and *P.spissa* Syd., causing major problem during nursery stage.

In an experiment to find out the susceptible stage of the seedlings. spraying method of inoculation was found superior to other methods with maximum lesions and over all 38.33 per cent of *D.latifolia* and 33.33 per cent of *D. sissoo* showed tar spot symptom on 25th day" following inoculation. The disease incidence and Per cent disease index for both species of *Dalbergia* indicated that seedlings aged less than six months had fairly low incidence compared to those aged more than six months.

Epidemiological studies for tar spot of *D. latifolia* revealed that the maximum PDI was observed at 240 days (43.82%) when fairly low temperature with moderate rainfall and higher humidity prevailed while minimum was recorded at 360days (6.92%). The rate of disease development was highest at 180days (0.0112) and minimum' at 90 days (0.019) when the period coincided with heavy rain. The AUOPC value suggested the maximum area covered with disease at 240 days (25.08) when POI was highest (43.82%) while minimum at 360 days (4.78) when PDT was the lowest (6.92%).The maximum defoliation occurred at 180 days (34.19%) when disease intensity was moderate and the least defoliation was at 30 days (3.41%) when disease just initiated.

The correlation, coefficient (r) value in relation to meteorological parameters indicated that relative humidity had significantly positive influence on disease development while minimum and maximum temperature had a significantly negative impact on disease development.

The *in vitro* and *in vivo* studies on different fungicides. plant extracts and bio control agents recorded maximum growth inhibition and reduction in disease intensity, rate of disease development, AUOPC. defoliation with Bavistin (0.1 %), Tilt (0.05%), Neem kernel extract (10%), *P\$edomonas fluorescence*.( $10^7$  cfu /ml ) respectively and made positive influence on growth parameters (height, collar diameter, number of branches and number of leaves.)

# **Application of a Groundwater Model to a Sub-command area in Tungabhadra Project**

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## **ABSTRACT**

The groundwater model was used as regional models to study the effect of net recharge on the watertable behaviour in the area. The Standard Groundwater Model program (SOMP) was applied on a regional scale to the Gangavathi Command Area covering an area of 70,300 ha. For the groundwater model, a nodal network was prepared based on the network of 20 observation wells. Before studying the impact of water management interventions, the model was calibrated and validated. There was satisfactory match between the modelled and historical water levels.

Water balance analysis was carried out by the SOMP model itself. Water balance analyses can be used in land reclamation and drainage, to identify the sources of local groundwater flow, to identify the portions of rainfall and irrigation water that infiltrate at the soil surface, evapotranspiration from the surface; from the unsaturated zone or leave the surface as over land flow, to determine the quantity of groundwater flow and to determine the quantity of drainage surplus. From this study, estimates of the required drainage surplus, with or without drainage simulation can be made.

For drainage surplus, an average permissible depth to watertable (dewatering depth) of 1.0 m, 1.5 m and 2.0 m below the land surface was used. These results show that present study area needed drainage (drainage surplus is 0.3 mm/ d) based on the modeling study carried out for the historical period May 1985 to May 1998. The model developed offers an efficient way to refine the drainage surplus used for the design of the subsurface drainage systems needed in the region. The waterlogging conditions are expanding rapidly in the study area with 223.4 ha (0.32 per cent of the total area) per annum in the future when the water management practices remain the same.



# **Evaluation of Ginger (*Zingiber officinale rosc.*) Genotypes under Open and Shaded, Situation**

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2003 (Year submitted)

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## **ABSTRACT**

An attempt has been made to evaluate fifteen genotypes of ginger at Agricultural Research Station, Arabhavi (Tq. Gokak) during 2000. The field trial was laid out in a randomized block design in both open and under coconut shade (intercrop). Observations on growth parameters were recorded at monthly intervals starting from 60 days after planting.

Among different genotypes evaluated Humnabad recorded significantly higher plant height (41.53 cm in open and 45.20 cm in shade) and maximum leaf size in open and under coconut shade (41.80 cm<sup>2</sup> and 46.08 cm<sup>2</sup> respectively). The cured yield was higher in genotype Humnabad (6.23 t/ha in open and 5.12 t/ha in shade) closely followed by Rio-de-Janeiro (5.50 t/ha in open and 4.65 t/ha in shade) and the lowest was recorded in the genotype Mahim both in open (2.10 t/ha) and under coconut shade (1.83 t/ha).

The highest crude fibre content was recorded in Mahim under both open and coconut shade (5.18% and 4.95% respectively). while the genotype Basavakalyan recorded lower crude fibre content in both open and under coconut shade (3.10% and 2.86% respectively). Essential oil content was maximum in Rio-de-Janeiro (2.40% in open and 2.35% in shade), while the promising genotype Humnabad recorded 2.00 per cent in open and 1.9 per cent under coconut shade. The oleoresin content was maximum in Humnabad (8.70% in open and 8.60% in shade), while the minimum was recorded in genotype Mahim (3.20% in open and 2.45% in shade). Among the genotype studied higher fresh rhizome yield was observed in genotype Humnabad (24.42 t/ha in open and 21.32 t/ha in shade). Among the genotypes tried, Humnabad, Rio-de-Janeiro and Hirekerur are found to be promising with higher yield of acceptable quality under Arabhavi conditions.

## **Processing of Tomato**

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### **ABSTRACT**

An investigation was undertaken on processing of tomato fruits with seven treatments (popular tomato varieties / hybrids) by adapting completely randomised design in the Department of Post-harvest Technology of Kittur Rani Channamma College of Horticulture, Arabhavi during the year 2001-2002.

Tomato juice yield was maximum in tomato genotype Asha (71.07%) followed by Avinash-2 (69.43%) and Indam-9714 (67.63%). The TSS content of the fruits ranged between 4.93 per cent in Asha and 4.46 per cent in Utsav. Reducing sugars, non-reducing sugars and total sugars were also significantly high in Asha (1.81, 1.05 and 2.91 per cent, respectively). The pH of fruit juice was least (4.03) in Utsav followed by Avinash-2 (4.36) and Indam-9714 (4.44). Nutritionally important lycopene and ascorbic acid content were in the acceptable range (i.e. more than 5 mg / 100 g) in the fruits of Asha, Avinash-2 and Indam-9714.

Significantly highest puree yield was recorded from the fruits of Asha (36.0%) followed by Avinash-2 (33.0%) and Indam-9714 (31.5%).

The storage of puree prepared from the tomato genotypes for six months did not undergo much changes in pH and titrable acidity. At the end of six months storage, the puree lycopene retention was highest (17.53 mg/100 g) in Asha followed by Indam-9714 (15.60 mg / 100 g). Reducing sugar was also significantly highest in the puree of Asha (11.16%) followed by Avinash-2 (11.08%) and Indam-9714 (10.87%). Total sugars were higher in Asha (12.84%) followed by Indam-9714 (12.78%) and Avinash-2 (12.64%). At the end of six months storage, the puree from most of the tomato genotypes had negligible non-enzymatic browning as reflected in the little variation in the values (0.26 to 0.39) of optical density (OD).

Among the seven popular cultivated tomato genotypes studied, the fruits of Asha, Avinash-2 and Indam-9714 were found to be possessing the qualities suited for processing into puree. The fruits of these genotypes could be processed into puree

# Effect of VAM Fungi and Vermiculture on Growth, Yield and Stress Tolerance of Papaya

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2002 (Year submitted)

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## ABSTRACT

An investigation was carried out to study the effect of V AM fungi and vermiculture on growth, yield and stress tolerance during 2000-2001 in the Department of Pomology, Kittur Rani Channamma College of Horticulture, Arabhavi, University of Agricultural Sciences, Dharwad.

Inoculation of *Glomus fasciculatum* recorded significantly higher values for the vegetative parameters, yield, per cent root colonisation and spore count, while lower values were recorded for days taken for opening of first flower when compared to other treatments.

The plants grown with 75 per cent recommended dose of fertilisers (RDF) + vermicompost (2 t/ha) produced significantly higher values for plant girth and yield with minimum days for opening of first flower when compared to control and other treatments. The plants applied with 100 per cent RDF produced significantly higher values for plant height, number of leaves and petiole length.

Inoculation of *Glomus fasciculatum* coupled with 75 per cent RDF and vermicompost (2 t/ha) was found statistically on par to the inoculation of *Glomus fasciculatum* coupled with 100 per cent RDF with respect to vegetative parameters, days taken for opening of first flower, number of fruits per plant, mean weight of fruit, fruit yield per plant and fruit yield per hectare.

In pot culture experiment with *Glomus fasciculatum* + vermicompost (650 g/plant) found to be superior with respect to plant height, plant girth, number of leaves, fresh and dry weight of leaves, shoot and root, growth enhancement, chlorophyll content of leaves and leaf nutrients. After imposition of drought, *Glomus fasciculatum* inoculated plants along with vermicompost recorded maximum number of days for leaf abscission and complete wilting of papaya plants.

After imposition of water logging in pots, *Glomus fasciculatum* inoculated plants supplied with vermicompost took more number of days for showing symptoms with less mortality, while disease infected portion was less in *Glomus fasciculatum* inoculated plants.

## **Prevalence and Nutritional Epidemiology of Oesophageal Cancer Patients with Special Reference to Retinol Status.**

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University Library, UAS, Dharwad (Location)

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### **ABSTRACT**

Oesophageal cancer is an important public health problem in Northern Karnataka. Hence, a study was conducted to assess the prevalence and nutritional status in relation to retinol status of cancer patient. Thirty oesophageal cancer patients, an equal number of matched and unmatched controls were selected. The information regarding dietary and nutritional parameters of selected sample were collected through appropriate tools. The results of the study revealed that the incidence of different types of cancer recorded over 10 years from KCTRI, Hubli was higher in the year 1993 (2224 cases) followed by 1992 (2081 cases). Cancer of pharynx was found higher among males and in females genital tract cancer was high. The total number of oesophageal cancer cases recorded from 1977 to 2002 were 7426. Majority of the selected patients were found to have significantly lower body weight and MUAC. Majority of the patients (30%) belonged to CED Grade II. The mean daily food intake, nutrient intake and nutrient adequacy of patients was significantly lower as compared to controls. All the patients completely avoided hard rotis and fried foods. The frequency of consumption of carotene rich foods by patients was less compared to controls. Most of the patients experienced muscle wasting (46.67%). Dysphagia was common problem in patients. The mean hemoglobin level of patients was 10.39 g/dl, biurea, serum creatinine and alkaline phosphate value were within the normal range. The patients mean serum retinol level was 12.77 g/100 ml depicting 86.67 percent of patient was in low category level. The correlation coefficient indicated significant positive relationship between frequency and duration of illness with serum retinol level in patients particularly who were affected in middle third site.

## **Micronutrient Significance of Durum and Dicoccum Wheat Cultivars and Development of Enriched Flour Mix.**

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### **ABSTRACT**

The micronutrients are gaining importance in recent years and their deficiency are recognized as major public health problems in many developing countries. The micronutrients viz. b. carotene, iron, copper, manganese and zinc content of five each cultivars of durum and dicoccum wheat and effect of processing viz. roasting and malting on them was studied. The flour blend of durum, dicoccum and malted ragi (50:25:25) with dehydrated leaf powders of drumstick, fenugreek, gogu and shepu was tested for acceptability of chapatti. The composite flour was modified for ideal protein ratio. The most accepted leaf powder was tested for maximum level of incorporation. The developed enriched flour mix was tested for nutrient composition, supplementary effect on nutritional flour mix was tested for nutrient composition, supplementary effect of nutritional status and storage qualities. The mean b-carotene, iron, copper, manganese and zinc content of wheat cultivars were 5.35 ppm, 7.20, 2.93, and 2.70 mg/100g, respectively. Roasting decreased (8.62%) and malting enhanced (22.18%) b-carotene content while there was no significant influence on mineral contents. The composite flour with soybean (10 g) had ideal protein energy ratio (12.00) for adolescent girls. The chapattis from composite flour with addition of 10 g of dehydrated drumstick leaf powder was well accepted. The developed product had high protein, fat, fibre, b-carotene and mineral contents. Consumption of 60 g of enriched flour in the form of chapatti provided recommended daily requirements of b-carotene (125%), copper (104%), manganese (141%), fat (72%), iron (19%), protein (15%) and zinc (10%) for an adolescent girl. Consumption of enriched flour for 45 days by adolescent girls improved the hemoglobin and serum retinol levels, the improvement being more pronounced compared to wheat flour could be stored well for more than one month at ambient conditions. The developed flour was nutritive convenient mix and can be commercialized to improve the nutritional status of vulnerable group.

## **Epidemiological Study on Ascariasis of Cattle and Buffalo Calves in and Around Bidar**

SANDEEP HALMANDGE

2003

MAJPR ADVISOR : Dr. PRASANNA KUMAR

To know the prevalence of Ascariasis in cattle and buffalo calves, both prospective and retrospective studies were undertaken. In the prospective study, the faecal samples from cattle and buffalo calves upto 1 year of age were collected every month from villages surrounding Veterinary College, Bidar for a period of 1 year and examined for the presence of ova of *Toxocara vitulorum*. A total of 1777 calves were examined and the overall prevalence was 4.56%. In the retrospective study, the official records of the Veterinary College Hospital, Bidar of 4 years were utilized. During this period a total number of 301 cases upto 1 year of age were presented and the prevalence of Ascariasis was 18.27%. The prevalence of Ascariasis was significantly higher in buffalo calves when compared to cattle calves in both the studies. Further, these data were analysed to know the sex-wise, age wise, month wise and season wise occurrence of Ascariasis

In the haematological and biochemical study, the parameters like PCV, SGPT, SGOT, Plasma total proteins, Serum calcium, Inorganic phosphorus and Plasma triglycerides were significantly increased in Ascariasis affected buffalo calves. But plasma glucose was significantly decreased compared to healthy buffalo calves. There was no significant difference in Plasma total bilirubin and Plasma cholesterol of affected and healthy buffalo calves. Doramectin (0.2 mg/kg, *i/m*), Piperazine (200 mg/kg, orally) and Closantel (10 mg/kg, orally) were administered once and the percentage efficacy on 7th post treatment day was 99.71%, 97.46% and 0.62% respectively against Ascariasis of buffalo calves

To identify the risk/precipitating factors involved with the occurrence of ascariasis, the meteorological parameters and prevalence were used in the Correlation study. Probably Age, Temperature, Relative humidity, Wind velocity and Rainfall may be acting as precipitating factors