

Physiological Approaches for Yield, Quality Improvement and Value Addition in Chilli (*Capsicum annuum*, L.)

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ABSTRACT

An attempt was made to find out the effect of plant growth regulators, nutrients, organics and microbial inoculants on growth, development, physiology and quality attributes in two chilli cultivars. It was also intended to standardise the optimum stage of harvest/maturity, appropriate drying technique, flexible packaging and storage condition with respect to various quality attributes over a period of time and tried to elicit the reasons for the same. The investigations were conducted through four different experiments during kharif seasons of 2001 and 2002 at College of Agriculture, University of Agricultural Sciences, Dharwad. Results revealed that out of 16 treatments, RDF + miraculan (2000ppm), Bensulf (40 kg/ha), RDF + FYM (10 t/ha) and RDF+ *Pseudomonas striata* (200 g/acre) recorded significantly higher growth, photosynthetic rate, transpiration rate, stomatal conductance, intercellular CO₂ concentration, chlorophyll and carotenoid contents in leaves and fruits, C/C ratio, NRA and total soluble phenols, among PGR's, nutrients, organics and microbial inoculants, respectively. These treatments also had higher dry fruit yield and yield components over others. Among the genotypes, the performance of Byadagi Dabbi was superior over Byadagi Kaddi.

Ripe red succulent (fresh) and 1/4th dried fruits on plant harvested in four pickings, to standardize the optimum stage of harvest/maturity indicated that 1/4th dried fruits on plant of both the varieties I picking followed by II picking recorded significantly higher oleoresin yield, capsaicin content, E.O.A. colour value, per cent solids and moisture, thereby indicating their superiority over other pickings. Standardization of drying followed by electric tray drying (chemical treated) retained higher capsaicin content, oleoresin yield, E.O.A. colour value, per cent moisture and solids compared to seven other drying techniques studied. The aflatoxin content (AFB₁) in these treatments was within the permissible limit. The SHU(%) were double in Byadagi Kaddi (4,80,000) compared to Byadagi Dabbi (2,40,000) in all the treatments. Among different flexible packaging materials and storage conditions, it was observed that both whole fruits and powder forms of both the varieties retained higher oleoresin yield, E.O.A. colour value, capsaicin content and per cent moisture when packed in metallised polyester polyethylene (aluminum) and preserved under cold storage even upto eight months without much deterioration in all the above quality attributes.

Genetics Enhancement of Host Plant Resistance to *Spodoptera litura* (Fab.) in Groundnut

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ABSTRACT

In groundnut, *Spodoptera litura* a defoliating insect is a major pest causing substantial yield loss. Screening germplasm against *Spodoptera* and further evaluation under high infestation in the field revealed significantly low damage in Mutant (28-2), NC Ac 343, ICGV 86031, R 9227 and TAG 24. In laboratory, the genotypes 28-2, NC Ac 343, R9227 and ICGV 86031 affected various components of growth and development of the insect indicating antibiosis as the principal mechanism of resistance. Gain in weight of larvae was most efficient in differentiating the genotypes and was later proved to be a good criterion for screening segregating material in the laboratory. Though the genotype, TAG 24 suffered low damage in the field, the larval and pupal development was normal in the laboratory. Because of determinate habit of TAG 24, growth ceases at 55 days and lack of much preferred young leaves at peak pest activity lead to reduced damage in the field due to escapism/seasonal avoidance.

To combine high level of resistance with desirable agronomic features, 8 crosses involving resistant and susceptible genotypes were generated. Replicated evaluation of F₃ Progenies revealed continuous and unimodal distribution of damage indicating quantitative nature of resistance. Among the crosses TAG24 X NC Ac343 and TAG 24 X R9227 were found most potential for resistance. The crosses involving resistant parent 28-2 produced very low frequency of resistant segregates revealing its poor combining ability. Five progenies RN 3-17, RN 3-26, RN 4-4, RD 1-8 and TN 1-20 recorded enhanced level of resistance compared to the best parent NC Ac 343. The progeny RD 1-8 also combined resistance to late leaf spot with high yield. The segregate MR 1-7 combined resistance to *Spodoptera*, thrips and late leaf spot along with yield indicating multiple pest and disease resistant nature. These lines could be profitably exploited in breeding programme or registered as resistant germplasm after detailed evaluation.

Biochemical analysis of resistant genotypes for the known insect deterrent compounds revealed lack of any role of trypsin inhibitor and lectin activity in imparting resistance. RAPD assay of genotypes with varied level of resistance to *Spodoptera* indicated limited variability. But the resistant genotypes (28-2, NC Ac343 and R 9227) distinctly clustered away from the susceptible genotypes thus revealing scope for developing mapping populations by crossing with susceptible genotypes to identify markers associated with resistance to *Spodoptera*.

Phosphorus and Potassium Management under Intensive Rice Cropping in Tungabhadra Irrigation Command

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ABSTRACT

Field experiments were conducted to evaluate the effect of N,P and K levels under intensive rice-rice cropping system on crop performance, P-K availability, P-K uptake, P-K use efficiencies and P-K balance studies at Agriculture Research Station, Gangavati, Karnataka during 2000-01.

Application of NPK @ 200: 100:75 kg/ha (N:P:K ratio of 2.7:1.3:1.0) to BPT-5204 during kharif and 250:100:75 kg/ha (N:P:K ratio of 3.3:1.3:1.0) for IR-64 during rabi/summer was optimum and economically most remunerative. Though, higher NPK levels and ratios resulted in higher rice yields, the N:K ratios remained wider than the desired (<2.0:1.0). The farmers control (230:90:110 kg/ha of NPK) was equally remunerative as above and had more balanced N:P:K ratio (2.1:0.8:1.0) than in the above treatments. The RDF application resulted in sub-optimal rice nutrition resulting in significantly lower yield than the above. Phased application of NPK up to BGF stage to a mid-long duration variety BPT-5204 was beneficial. However, this advantage was not realized during rabi/summer with a mid duration variety like IR-64. The economic analysis also revealed similar trend.

A tissue P of 0.33 per cent for BPT -5204 and 0.30 per cent for IR-64 at AT stage was optimum. Similarly, a tissue K of 1.37 per cent of BPT-5204 and 1.55 per cent for IR-64 at PI stage was found ideal. Fertilizer N:P and N:K ratios were significantly related to tissue P (at AT) and K (at PI) but not P:K ratio. Leaching losses of P and K were significantly higher under higher level of NPK fertilization and under only N splits compared to NPK splits. Leaching losses of P and K were also significant under farmers control over RDF application.

The partial net P balance was positive with P application (RDP and beyond) during both the seasons. The partial net K balance was negative under RDK application (75 kg/ha K) during kharif and both RDK and 125 kg/ha of K application during rabi/summer. A higher fertilizer sustainability of such application practices on long term basis.

Occurrence of Entomopathogenic Fungi and Utilization of *Metarhizium anisopliae* (Metschnikoff) Sorokin in the Management of Selected Crop Pests in North Karnataka

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ABSTRACT

Investigation on the topic were carried out from 2000 to 2002 at the University of Agricultural Sciences, Dharwad. Ten insect mycopathogens belonging to seven genera were found naturally occurring on 18 insect pests in nine districts of northern Karnataka. Of these, *Nomuraea rileyi* was most predominant, followed by *M.anisopliae*. Fixed plot survey conducted at Dharwad and Bailhongal revealed that the period between August II fortnight to October I fortnight was ideal, groundnut and soybean crop ecosystem proved to be most favourable for *N.rileyi* epizootic. Studies revealed considerable variation among field collected isolates of *M.anisopliae* for various parameters. Isolate Ma2 and Ma1 proved superior to Ma3 and Ma4. Fungus (Ma2), found pathogenic to *Opisina arenosella*, *Achroentia styx*, *Alcidodes colaris*, *Eutectona mechaeralis* and *Apion emplum* for the first time in *in vitro*.

Against sugarcane root grub, *M. anisopliae* @ 1×10^{13} conidia/ha was found as effective as chlorpyrifos in reducing root grub population and increasing cane yield with ICBR of 7.59. Drenching of *M. anisopliae* @ 2×10^{12} conidia per ha against pigeonpea gall weevil, *A.collaris* was the best alternative to insecticide. In cowpea, application of *M. anisopliae* @ 2×10^{12} conidia per ha lowered the incidence of *M. testulalis* significantly. Mycopathogen @ 1×10^{12} and 2×10^{12} conidia per ha reduced the BPH population on paddy significantly. The fungus spared the spider population. Against diamondback moth on cabbage, the mycopathogen @ 2×10^{12} conidia per ha was as effective as carbaryl and Bt. Combined use of *M.anisopliae* and new molecules in Module-V provided better protection from *H.armigera* damage on cotton over other modules. In chickpea, pathogen @ 10^{12} conidia/ha protected the crop from *H. armigera* damage as effectively as Bt and HaNPV with an IBCR of 8.05.

Broken rice supported fungal growth and conidial production and therefore was identified as the most ideal substrate for mass production. Fungus growth was fast in saline and flat bottles with lowest contamination problem. Irrespective of the carrier material used, storage of conidia under refrigerator over a period of one year reduced viability to 62 per cent as against 84 per cent at ambient temperature. Among different carrier materials, attapulgit and kaolinite retained viability of conidia followed by sorghum flour and talc. Fungicides were most detrimental to the mycopathogen as the inhibition of mycelial growth touched 78 per cent compared to insecticides (44.23%). Weedicides and botanicals were less toxic to the fungus.

Studies on the Epidemiology and Management of Sigatoka Leaf Spot of Banana

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ABSTRACT

Survey was carried out during 2001-2002 and 2002-2003, which revealed that the Sigatoka leaf spot disease intensity was highest in Suldhal area of Gokak (64.99%). During 2002-2003, the highest Sigatoka leaf spot intensity (66.96%) was recorded in Sindogi area of Munavalli. The loss in yield due to Sigatoka leaf spot was maximum (24.44%) in control, while it was 14.54 per cent and 6.94 per cent in the treatment of one sprays of carbendazim 0.1 per cent, respectively.

Among six media tested for growth and sporulation of the fungus, maximum growth and sporulation was obtained on V-8 juice agar medium. The disease intensity was at an increasing trend from June month till October and with peaks in first week of September 2002 (60.93%) and second week of October (59.19%). The atmospheric spore load was maximum in second week of September (4.67/microscopic field). In stepwise regression equation, minimum temperature and rainfall were found to be crucial factors for disease outbreak in growth stage. In shooting stage, minimum temperature was found to play a key role for disease epidemic. In harvesting stage, maximum temperature and evening relative humidity with spore load were important factors for disease out break.

The germinability and discharge ability was preserved longest at 53.00 per cent relative humidity during the day and at night at 100 per cent relative humidity. The survivability of the fungus was longest in banana shades, glasshouse and storage at 5 °C and 15 °C.

Cultivar Sakkarebale, Pisangawk-3, Yangambi KM-5, Gold Finger, Ney Poovan, Bluggoe, Saba and Puttabale were found to be resistant to Sigatoka leaf spot. Three sprays of propiconazole 0.05 per cent at 15 days interval effectively reduced intensity of Sigatoka leaf spot disease followed by carbendazim 0.1 per cent + mancozeb 0.2 per cent.

A Study on Knowledge of Gram Panchayat Members about Improved Agricultural Technologies and their Role Performance in Konkan Region of Maharashtra

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ABSTRACT

The study was conducted in Ratnagiri district of Maharashtra during 2002-03 involving 95 female and 220 male members, a total of 315 member from 45 Gram Panchayats.

Majority of the respondents (69.84%) had medium knowledge level. The percentage of medium knowledge level possessed by male respondents was highest (72.73%) compared to female respondents (63.16%). More than half (51.11%) of the respondents were aware about the roles of animal husbandary programmes of the Panchayat followed by government like improvement of agriculture model agricultural farm, establishment of nurseries, grainaries, production of improvement seeds, crop production, cold-storage etc. were not known to any of the respondents. Animal husbandary roles like establishment of stray cattle pen and cross breeding of local breeds were performed by 15.15 per cent Panchayat. Tree-planting programmes in the village (8.88%) and planting sampling on Panchayat land were performed by 4.44 per cent Panchayat.

None of the Panchayat performed the activities like improvement of agriculture including provision of implements stores, establishment of model agricultural farm, nurseries, crop protection, land reform scheme, granaries and securing minimum standard of cultivation in the villages with a view to increase agricultural production.

Farming was the main occupation of 55.24 per cent respondents. Nearly half of the respondents (49.84%) had higher social participation, mass media exposure had a two third (66.35%) of the respondents while half of the respondents (50.16%) had medium leadership ability and 59.37 per cent respondents belonged to medium level of self-confidence.

The characteristics namely age, education, position, land holding, occupation, social participation, mass media exposure, leadership ability, self confidence and extension participation were positively and significantly correlated with knowledge level of Gram Panchayat members.

The variables like education, position, land holding, mass media exposure and extension participation contributed significantly in the knowledge level.

Stability Analysis and Standardization of Production Technology for Flower and Xanthophyll Yield in Marigold (*Tagetes* spp.)

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ABSTRACT

Marigold is one of the important commercial flower crops of India, which ranks first among the loose flowers. It is not only grown as a cut flower and in landscaping but also as a source of natural carotenoid pigment, Xanthophyll, used in poultry industries to intensify yellow-orange colour of egg yolk, broiler skin and many other industries as it is free from health hazards, safe and eco-friendly in nature. Hence, marigold xanthophyll is gaining lot of importance in the international market.

The study was conducted to identify a suitable, stable and high yielding genotype across the environments and standardization of production technologies for higher flower and xanthophyll yield in Alfisol at Floriculture Unit, department of Horticulture, University of Agricultural Sciences, Dharwad during kharif and rabi seasons of 2001-02 and 2002-03.

Fifteen genotypes of African and ten genotypes of French marigold were evaluated for phenotypic stability with respect to growth parameters, floral and xanthophyll yield. Among the African types, African Marigold Orange (AMO) and Orange Boy among French marigold recorded maximum number of branches, dry matter production, days to flower cessation, flower size, number of flowers per plant, flower, petal meal and xanthophyll yield per hectare, which were found to be stable and statistically superior over check Orange double and Local Dwarf respectively.

Nitrogen at 225 kg and phosphorus at 120 kg per hectare was found to be optimum dose for all the vegetative, floral, flower and xanthophyll yield per hectare during both the seasons, which was significantly superior over the lowest dose of N and P (175 kg N and 50 kg P/ha). Among the pinching and chemicals spray treatments; the pinched crop sprayed with DAP @ 2% recorded highest xanthophyll yield per hectare. However, the maximum flower yield was obtained due to pinching plus CCC @ 1000 ppm followed by pinching plus DAP @ 2% , which were found to be the best treatment combinations during both the seasons.

ISOLATION CHARACTERIZATION AND IMMUNOLOGICAL STUDY OF MYCOPLASMA FROM RESPIRATORY TRACT OF GOATS

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2003

Major Advisor: Y. Hari Babu

A total of 450 samples consisting of 348 nasal swabs, 23 tracheal fluids and 79 lung pieces were collected from goats that were apparently healthy and suffering with pneumonia and screened for isolation of mycoplasma. Six mycoplasma isolates were obtained: four were from pneumonic lungs and two from apparently healthy goats. Morphologically two distinct types of mycoplasma were described. Biochemical studies of mycoplasma isolates showed that none of the six isolates fermented glucose nor utilized urea. Three isolates utilized arginine (isolate Nos. 3, 5 and 6).

Further mycoplasma isolates were subjected to different immunological tests by using known hyperimmune serum raised in rabbits against *M. agalactiae*. Isolate Nos. 1, 2 and 4 were found to be positive for growth inhibition and growth precipitation test, agar gel immunodiffusion, single radial immunodiffusion and immunoelectrophoresis, whereas isolate Nos. 3, 5 and 6 were found to be negative.

Sodium dodecyl polyacrylamide gel electrophoresis (SDS/PAGE) was conducted for isolate Nos. 3 and 4. The protein bands having molecular weights from 23 to 176 Da and 8 to 215 kDa respectively. The protein bands having molecular weights 176, 143, 125, 90, 78, 57, 48 and 45 kDa were found common for both isolates.

Pathological studies of mycoplasma goat pneumonia were conducted. The gross lesions were characterized by reddish grey to purple consolidation of both the lungs. Histopathological lesions shown alveoli round cells, bronchial epithelium was lymphoblastic, exudation in alveoli and focal areas of calcification and fibrosis.

The results, in the present study indicated that there is occurrence of pneumonia in goats due to mycoplasma. Based on their colony morphology, biochemical, immunological tests, SDS-PAGE and histopathological studies indicated the isolates of mycoplasma as *M. agalactiae* and *M. arginini*.

**Nutrient Management in Green Manure Sunnhemp (*Crotalaria juncea* L.) –
Wheat (*Triticum aestivum* L.) Sequence Cropping under irrigation**

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ABSTRACT

A field experiment was conducted at Agricu 'dl (l"~r nncl ml1i RenRon of 2002-200J to know the rCRponRC of whcnt (Triticum aestilJJJm)to green manure, macronutrients and zinc levels under irrigation. There were 18 treatments comprising of combinations of six graded levels of fertilizers applied to green manure and wheat and three zinc levels. The experiment was laid out in split-plot design with three replications. Application of 25 per cent RDF of wheat to green manure followed by 75 per cent RDF to wheat recorded significantly higher grain (35.72 q ha.1) and straw yield (54.78 q ha-1) and it was on par with the incorporation of green mnnurc alone followed by 100 per cent RDF to wheat. The higher grain and stl'lw yield wus nltributed to higher growth and yield componentA (cur length, cur weight and number of grains spike.1 etc.). Soil application of ZnS04 @10 kg ha-\ recorded significantly higher grain yield (27.72 q ha-l) when compared to rest of the treatments and it was attributed to significantly higher growth (dry matter production, LAI and LAD) and yield components (ear length, ear weight, 1000-grain weight and number of grains spike.l).

With regard to interaction effect, application of 25 per cent RDF of wheat to green manure followed by 75 per cent RDF to wheat + soil application of ZnS04 @ 10 kg ha-1 recorded significantly higher grain yield (37.81 q ha.l), straw yield (56.00 q ha.1), higher gross returns (Rs. 35,203 ha-l), net returns (Rs. 26,856 ha-l) and B:C (3.21).

Validation of CERES Wheat Model for Response of Wheat Varieties to Nitrogen Levels

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ABSTRACT

A field experiment was conducted to validate CERES wheat model for response of wheat varieties to nitrogen levels, at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad during rabi 2002-2003. The experiment was laid in a completely randomized block design with three replications comprising of 16 treatments combination of four varieties viz. DWR 162, GW322, DWR 185 and MACS2846 and four nitrogen levels viz. 75, 100, 125 and 150 kg ha⁻¹.

The variety DWR 162 has recorded significantly higher yield S (3907 kg ha⁻¹) over DWR 185 and MACS 2846 but it was on par with GW322. The growth and yield components were significantly higher with DWR162 over DWR 185 and MACS2846. Where as 1000 grain weight and protein content were significantly higher with DWR 185 over DWR 162 and GW322. Total nitrogen uptake was significantly higher with DWR162 over DWR 185 and MACS2846.

Application of 150 kg N ha⁻¹ had recorded significantly higher yield (4059 kg haa⁻¹) over 75 and 100 kg N ha⁻¹, which was mainly due to significantly superiority of growth and yield component with 150 kg N ha⁻¹ over the 75 and 100 kg N ha⁻¹.

Significantly the net returns were higher with DWR 162 applied with 150 kg N ha⁻¹. Which were on par.

CERES wheat (DSSAT V.3.5) model simulated more precisely and actual date of phonological events showed deviations of only one day. The predicted yield deviations were 210 to 294 kg ha⁻¹ over observed values. The model predicted more closely with respect to single gain weight, biomass at harvest, final leaf number and harvest index with observed values. The nitrogen uptake by grain and biomass, number of grain earhead⁻¹ and number of grain m⁻² showed more deviations between observed and predicted values.

Crop Acreage and Yield Estimation Studies in Chilli Remote Sensing

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ABSTRACT

Chilli crop acreage and yield estimation in Kundgol and Hubli taluks of Dharwad district, Karnataka was carried out by selecting 62 ground truth sites in both the taluks, using IRS ID LISS III imagery of 14th November 2002.

The acreage estimation was done by running the supervised classification with maximum likelihood algorithm and yield estimation by developing yield models using the relationship between crop cutting experiment yield data NDVI and LAI of chilli crop.

The spectral reflectance of chilli crop was low in blue region (16%-19%), slightly higher in green region (62-87 per cent), minimum in red region (385-58%) followed by steep rise in near infrared region (58%-99%).

The analysis of soil samples from the selected ground truth sites revealed that the soils are neutral to alkaline in reaction with normal electrical conductivity, low to medium organic carbon content, low to medium available nitrogen medium to high available phosphorus and high available potassium content.

The estimated acreage under chilli crop in Kundgol taluk was 29, 159 ha and 14, 224ha in Hubli taluk. The acreage estimates using remote sensing data when compared with acreage estimates reported by Department of Horticulture, showed a relative deviation of -18.56 per cent and -7.27 per cent in Kundgol and Hubli taluks, respectively.

The yield models developed using NDVI and LAI showed significant coefficient of determination $R_2 = 0.85$ and $R_2 = 0.87$. These models can explain 85 per cent and 87 per cent of variability in yield estimation in Kundgol and Hubli taluks, respectively.

The average yield of chilli crop was estimated to be 471 kg per ha in Kundgol taluk and 419 kg per ha in Hubli taluk. The total production of dry chillies in Kundgol taluk was 13,734 tonnes and 5,960 tonnes in Hubli taluk.

Nitrogen Management Through Sunnhemp Green Manuring in Castor (*Ricinus Communis* L.)

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ABSTRACT

A field experiment was conducted during late *kharif* season of 2002-2003 at Agricultural College farm, Raichur to study the response of nitrogen management through sunnhemp green manuring in castor (*Ricinus communis* L.). There were 15 treatment combinations with three replications laid out in split plot design.

Among the green manures, green leaf manuring recorded significantly higher seed yield (10.23 q ha^{-1}). The increase in seed yield of castor due to green leaf manuring was attributed to significant increase in number of spikes per plant, length of main spike, number of capsules per main spike, number of seeds per plant, test weight and increased uptake of nitrogen by vegetative and reproductive parts of castor.

Among the graded levels of nitrogen (0, 20, 40, 60 and 80 kg N ha^{-1}), significantly higher seed yield was obtained with the application of 80 kg N ha^{-1} (10.09 q ha^{-1}) over the control (7.07 q ha^{-1}), application of 20 kg N ha^{-1} (8.50 q ha^{-1}), 40 kg N ha^{-1} (9.44 q ha^{-1}) and was on par with the application of 60 kg N ha^{-1} (10.07 q ha^{-1}). The significantly higher oil yield and oil content were also recorded with the application of 80 kg N ha^{-1} .

Significantly higher net returns (Rs. 10031.18 ha^{-1}) and BC ratio (1.553) were recorded with green leaf manuring of sunnhemp when compared to sole castor and *in situ* green manuring. Among the fertilizer levels, application of 60 kg N ha^{-1} was found economically superior, which recorded significantly higher net returns (Rs. 9742.17 ha^{-1}) than other levels except with the application of 80 kg N ha^{-1} .

Response of Green Chilli (*Capsicum annul L.*) to Irrigation Schedules and fertility Levels In Vertisols

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ABSTRACT

A field study was conducted to find the effect of irrigation schedules and fertility levels on the growth and yield of green chilli (*Capsicum annum L.*) in medium deep black clayey soils of Main Agricultural Research Station, Dharwad during rabi 2002. The combination of three irrigation schedules (0.7, 0.9 and 1.1 IW/CPE) each at two depths of five and six cm with three fertility levels (150:75:75, 200:100:100 and 250:125:125 kg NPK ha⁻¹) were tried in split plot design replication thrice. The results revealed that irrigation scheduling at 1.1 IW/CPE with 6 cm depth along with 250:125:125 kg NPK ha⁻¹ dose was significantly higher in green chilli yield (8537 kg ha⁻¹) over rest of the treatment combinations. The growth and quality parameters like plant height, number of branches, number of fruit per branch, average weight of fruit and ascorbic acid content in fruit, nutrient status at harvest were also significantly higher for N at 50 per cent flow ring (10.26 kg ha⁻¹ in 1.1 IW/CPE-6cm+200:100 kg NPK ha⁻¹). P uptake at harvest was significantly higher in 0.9 IW/CPE with 6 cm depth along with 250:125:125 kg ha⁻¹ (8.74 kg ha⁻¹). Similarly, K uptake was significantly higher in 0.9 IW/CPE with 6 cm along with 200:100:100 kg NPK ha⁻¹ (96.76 kg ha⁻¹) over rest of the treatment combinations. The seasonal consumptive use of water was highest (573 mm, 483 and 576 mm) in 1.1 IW/CPE ratio with 6 cm depth, 250:125:125 kg NPK ha⁻¹ fertility level and combination of these two treatments respectively. Highest WUE of 15.49 kg ha⁻¹ mm⁻¹ were recorded in treatment combination (9.0 IW/CPE-6cm with 200:100:100 kg NPK ha⁻¹) respectively. Soilmoisture extraction was highest in the top layers irrespective of irrigation treatments and decreased with increasing depth of soil (37.33, 33.59 and 29.18 per cent in 0-15, 15-30 and 30-60 cm depth respectively). The maximum net return and B:C ratio were also high (2.53) in the treatment combination of 1.1 IW/CPE with 6 cm depth along with 250:125:125 kg NPK ha⁻¹ fertility level.

Response of Sunflower Hybrid (cv.DSH 1) to Ratios and Levels of Nitrogen, Phosphorus and Potassium

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ABSTRACT

A field experiment was conducted to study the Response of sunflower hybrid (cv.DSH 1) to ratios and levels of nitrogen, phosphorus and potassium” at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad under rainfed condition on medium black clay soils during kharif 2000. The experiment consisted of ten treatments comparing different N/P fertilizer ratios (0.66,0.80,1.00,1.20 kg P₂O₅ ha⁻¹) and potassium (45 to 60 kg K₂O ha⁻¹). The experiment was laid out in RCBD and the treatments were replicated three times with an individual gross plot size of 21.78 m².

Results of the experiment indicated that, the sunflower seed yield was increased (1305 to 1865 kg ha⁻¹) with increasing N/P fertilizer ratios from 0.66 to 1.60 with potassium fertilization either @ 45 or 60 kg K₂O ha⁻¹. application of nitrogen and phosphorus in 75 kg P₂O₅ and 60 kg K₂O ha⁻¹) recorded lowest seed yield (1305 to 1319 kg ha⁻¹) compared to the fertilizer management practice involving the application of nitrogen and phosphorus at N/P fertilizer ratios of either 1.00 or >1.00(1357 to 1865 kg ha⁻¹). Application of nitrogen, phosphorus in N/P fertilizer ratio of 1.60 with fertilizer levels of 120 kg n, 75 kg P₂O₅ and 60 kg K₂O ha⁻¹ recorded highest seed yield (1865 kg ha⁻¹) and oil yield (732 kg ha⁻¹) of sunflower. The seed yield tended to decrease with decreasing potassium fertilization from 60 kg K₂O ha⁻¹ at all N/P fertilizer ratios. Similar trends were noticed with respect to growth, morphology and yield parameters of sunflower.

The economic analysis of the different treatments revealed that higher gross returns, higher B:C ratio and higher net return were obtained in treatments receiving N/P fertilizer ratios of 1.00 and >1.00 either @ 45 or 60 kg K₂O ha⁻¹ compared to N/P fertilizer ratio of <1.00 (0.66 and 0.80) with potassium fertilization @ 60 kg K₂O ha⁻¹.

Effect of Sowing Time and Fertilizer Levels on Seed Production of Sunnhemp in Northern Transitional Zone of Karnataka

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ABSTRACT

A field experiment was conducted to study the effect of sowing time (second fortnight of June, first fortnight of July, second fortnight of July and first fortnight of August) and fertilizer levels (0:0:0, 12.5:25:12.5, 25:50:25 and 37.5:75:37.5 kg N, $P_2O_5K_2O$ ha⁻¹) on seed production of sunnhemp in the Northern transitional Zone of Karnataka at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad, using Split Plot Design with three replications on black clayey soil with pH 7.7. Among the dates of sowing, second fortnight of June recorded higher seed (2263 kg ha⁻¹) and stalk (9074 kg ha⁻¹) yield than the delayed sowing. The various growth (Plant height, number of branches, leaf area, leaf area index and total dry matter production) and yield components (number of pods per plant, number of seeds per pod, seed weight per plant and test weight) of sunnhemp were significantly higher in early sowing than delayed sowing. The growth and yield of sunnhemp increased with increase in fertilizer levels. High fertilizer level (37.5:75:37.5 kg N P_2O_5 , K_2O ha⁻¹) recorded significantly higher seed and stalk yield than control (no fertilizer) and low fertilizer levels (12.5:25:12.5 kg N P_2O_5 , K_2O ha⁻¹). However, medium fertilizer level (25:50:25 kg N, P_2O_5 , K_2O ha⁻¹). Was comparable to high fertilizers level. Interaction effects between dates of sowing and fertilizer levels were found significant were in early sowing of sunnhemp during second fortnight of June with high fertilizer level (37.5:75:37.5 kg N, P_2O_5 , K_2O ha⁻¹) recorded significantly higher seed and stalk yield than other treatment combinations. Sunnhemp sown during second fortnight of June receiving medium fertilizer level was on par with it. Economics also clearly revealed higher gross return, net return and B:C ratio with early sowing of sunnhemp fertilized with high fertilizer level.

Influence of Plant Growth Regulators and Micronutrients on growth, Physiology and Yield in Okra (*Abelmoschus esculentus*(L.) Moench)

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ABSTRACT

A field experiment was conducted at College of Agriculture, University of Agricultural Sciences, Dharwad during kharif 2002 to study the influence of plant growth regulators and micronutrients on growth, physiology and yield in okra. The experiment was laid out in randomized block design with three growth promoters viz., NAA (40 and 20 ppm), GA₃ (50 and 25 ppm) and miraculan (2000 and 1000 ppm) and three micronutrients viz., MnSO₄ (0.3 and 0.6%), MgSO₄ (0.5 and 1.0%) and FeSO₄ (0.25 and 0.50%) with three replications. Results revealed that among various treatments the application of GA₃ (50 and 25 ppm) and NAA (40 and 20 ppm) were effective and significantly increased LAI, CGR, SLW, LAD, AGR and BMD. The fruit yield possessed a significant positive association with CGR, SLW, AGR, LAD and BMD.

Among the biochemical parameters tested the chlorophyll content (a, b and total) both in fruits and leaves and NRA in leaves were significantly higher with GA₃ (50 and 25 ppm) followed by NAA (40 and 20 ppm), miraculan (2000 and 1000 ppm), FeSO₄ (0.5 and 0.25%), MnSO₄ (0.6%) and MgSO₄ (0.5%) as compared to control. All the yield contributing characters viz., per cent fruit set, fruit length, total dry matter of fruits, seed number and seed weight per fruit were increased significantly due to both growth regulators and micronutrients. The benefit : cost ratio was higher with GA₃ @ 50 and 25 ppm (5.00 and 4.52) followed by NAA 40 ppm (4.28) and miraculan @ 2000 ppm (4.15).

Meso-structure of Leaf in Relation to Photosynthesis and Productivity in Cotton (*Gossypium* spp.) Under Salt Stress

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ABSTRACT

Investigation on meso-structure of leaf in cotton was made with six cotton genotypes, belonging to *Gossypium hirsutum* (NHH-44 and LRA-5166), *Gossypium herbaceum* (RAHS-14, Dhumad and Jayadhar) and *Gossypium arboreum* (AK-235) under four levels of salinity in pot experiment. The objective was to study the changes in meso-structure of leaf, biochemical and biophysical parameters, yield potential and their relationship under varying salinity levels and finally to find out the mechanism of salt tolerance in relation to meso structure of leaf in cotton.

The results showed that seed germination, shoot length, root length, shoot vigour index, root vigour index, leaf area and total dry matter (30 and 60 DAS) decreased with increase in salinity level. The relative decrease was lower in NHH-44 and AK-235 as compared to other genotypes.

Salinity increased stomatal density while decreased stomatal size, stomatal conductance, transpiration rate, photosynthetic rate in all the genotypes. The genotypes RAHS-14 and AK-235 showed lower reduction in these characters whereas maximum reduction was observed in genotypes Jayadhar and Dhumad.

In general, chlorophyll 'a', chlorophyll 'b' and total chlorophyll content decreased with increase in salinity, whereas, free proline content and sugar content increased in all the genotypes.

Mesophyll surface area increased with increase in salinity, AK-235 and NHH-44 showed comparatively minimum increase in this character.

Seed cotton yield and yield components such as, number of bolls and boll weight were reduced with increase salinity.

Based on the study, the genotypes NHH-44, AK-235 and RAHS-14 were found to be tolerant to salinity stress. Lesser reduction in germination, shoot and root growth, shoot and root vigour indices, leaf area, total dry matter and chlorophyll content and proline accumulation can serve as selection criteria for identification of salinity tolerance. In addition anatomical character mesophyll surface area can also be considered as one of the important criteria for salinity tolerance in cotton.

Influence of Organics, Biofertilizers and Plant Growth regulators of Growth and Physiology in Chilli (*Capsicum annum* L.)

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ABSTRACT

A field experiment was carried out at College of Agricultural, University of Agricultural Sciences, Dharwad during kharif 2002 to study the influence of organics, biofertilizers and PGR's on growth and physiology in two chilli cultivars (Byadagi Kaddi and Byadagi Dabbi) under rainfed condition. The experiment consisted of ten treatments laid out in factorial randomized block design with three replications. Results revealed that the treatments significantly influenced all the growth, yield and biochemical parameters. Among the treatments, RDF + FYM (20 t/ha) recorded maximum plant height, higher fruit set per cent, number of branches, total dry weight (leaf, stem and reproductive parts). This treatment also had higher values for LAI, LAD, AGR, CGR and BMD compared to all other treatments. The growth parameters, AGR, CGR, LAI, LAD and BMD showed significant positive relationship with yield.

The biochemical parameters viz., total chlorophyll content, nitrate reductase activity and ascorbic acid content in fruits increased significantly due to the application of organics, biofertilizers and PGR's and the higher values were recorded with RDF+FYM (20 t/ha). This treatment also had higher number of fruit per plant and fruit yield over others. Among the genotypes, Byadagi Dabbi excelled in all the parameters including yield components over Byadagi Kaddi. However, the application of RDF+cytozyme (2 ml/l) was found to be economical due to higher B:C ratio. Laboratory experiment conducted to know the degree of stress tolerance indicated that Byadagi Kaddi had higher stress tolerance over Byadagi Dabbi. The germination percent and the seedling characters decreased with an increase in the stress level and beyond-2 bars, no germination and growth were observed in both the varieties.

Influence of microbial Inoculants and Nutrients on Morpho-Physiological Traits and Yield Potential in Tomato (*Lycopersicon esculentum* L. Mill)

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University, UAS, Dharwad (Location)

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ABSTRACT

A field experiment was conducted at College of Agriculture, University of Agricultural sciences, Dharwad during kharif 2002 to study the influence of microbial inoculants and nutrients on morpho-physiological traits and yield potential in tomato cv. Megha (L-15). The experiment consisted of three levels of nitrogen (30, 45 and 60 kg/ha), three levels of phosphorus (25, 37.5 and 50 kg/ha) and inoculation with *Azospirillum brasilense*, *Pseudomonas striata* individually and in combination to seed, seedling and soil application laid out in randomized block design with three replications. Results revealed that the treatment receiving RDF + *Azospirillum* + *Pseudomonas* recorded significantly higher morphological and growth parameters viz., plant height, number of branches per plant, number of leaves per branch, leaf area, LAI, LAD, TDM, CGR, AGR, NAR and RGR. The biochemical parameters viz., total chlorophyll content and nitrate activity (NRA) improved significantly due to the dual inoculation of *Azospirillum* and *Pseudomonas* along with RDF.

The fruit yield increased to the extent of 8.63 t/ha due to dual inoculation of *Azospirillum* and *Pseudomonas* as compared to RDF. The increased fruit yield was due to higher 100-seed weight, number of fruit per plant, fresh weight per fruit and fruit yield per plant. The quality parameters such as, lycopene content, ascorbic acid content, TSS and juice per cent were significantly higher with the dual inoculation of *Azospirillum* and *Pseudomonas* with RDF over other treatments. It is thus inferred that to get higher yield and better quality fruits, the crop has to be inoculated with *Azospirillum brasilense* and *Pseudomonas striata* along with the application of recommended dose of nitrogen, phosphorus and potassium.

Biological Management for Postharvest Fungal Disease of Major Fruits

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ABSTRACT

Investigations were carried out on the postharvest diseases of mango, citrus, banana, grapes and pomegranate for development biological control methods of managing them.

In mango, anthracnose, stem end rot, Aspergillus rot and Rhizopus rot were observed. Anthracnose, crown rot, finger rot, black tip diseases were commonly observed in banana. Post harvest diseases observed in citrus are anthracnose, black root rot, stem end rot, Fusarium rot, Aspergillus rot sour rot. Major postharvest diseases of pomegranate observed were Aspergillus rot, Penicillium rot and Colletotrichum rot, In grapes, Aspergillus rot and Rhizopus rot were frequency observed.

In vitro evaluation of plant extracts against post harvest pathogens reveled that 10% chromolaena leaf extract and garlic bulb extract were effective in inhibiting the mycelial growth and spore germination of *Alternaria alternata*. Garlic bulb extract at 10% was most effective in inhibiting the mycelial growth and spore germination of *Aspergillus niger*. Mycelial growth and spore germination of *Botryodiplodia theobromae* was inhibited maximum by 10% garlic bulb extract and neem leaf extract. Mycelial growth and spore germination of *Colletotrichum gloeosporioides* was most inhibited by 10% garlic bulb extract. Neem extract and garlic bulb extracts were also effective in inhibiting the mycelial growth and spore germination of *Colletotrichum musae*. Thulsi leaf extract and neem leaf extract were effective against *Fusarium moniliforme*.

Among the different biocontrol agents tested in vitro, *Trichoderma harzianum* was most effective against *A. alternata*. *Bacillus subtilis* and *T.harzianum* were effective against *A.niger*. Against *C. gloeosporioides*, *B. subtilis* and *Pseudomonas fluorescens* were found to be effective. *C. musae* was inhibited to maximum extent by *b. subtilis*, *P. fluorescens* and *T. viride*. *T. viride* and *T. virens* (isolate 1) were effective against *B. thobromae*. *F. moniliforme* was most inhibited by *b. subtilis* and *T.harzianum*.

Invivo evaluation of biocontrol agents and plant extracts against postharvest diseases of mango revealed that. *T.viride* spore suspension and garlic bulb extract were effective in reducing the per cent disease index. Neem leaf extract and *T.viride* spore suspension were effective in reducing the Aspergillus rot of pomegranate. Botryodipodia rot of citrus was effectively reduced by *B. subtilis* and garlic bulb extract. Garlic bulb extract and neem leaf extract were most effective in restricting the spread of corown rot of banana.

Influence of Sulphur and Magnesium on Morpho-Physiological Traits and Keeping Quality on Onion (*Allium cepa* L.)

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University, UAS, Dharwad (Location)

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ABSTRACT

A field experiment was conducted at Collage of Agricultural, University of Agriucutrlua Sciences, Dharwad during kharif 2002 to assess the influence of different levels of sulphur and magnesium on morphophysiological traits and keeping quality in onion. The experiment consisted of eight levels of elemental sulphur and four levels of magnesium in the form of $MgSO_4$ and Magnesia laidout in randomised block design with three replications. The variety used was Nasik Red. Results revealed that the number of leaves, length and width of leaf, leaf and bulb dry weight, leaf area, LAI, CGR, AGR, RGR, NAR, LAD, SLW,SLA,LAR and BMD significantly increased due to both sulphur and magnesium compared to control. Among treatments, RDF + sulphur @ 80 kg/ha among sulphur and RDF+ $MgSO_4$ @ 40 kg/ha among magnesium were superior in all the above parameters compared to other treatments. These treatments also had higher chlorophyll content, NRA, total soluble solid and pyruvic acid content in addition to yield and yield attributes over other treatments.

Keeping quality parameters viz., sprouting and rotting loss and physiological loss in weight differed significantly among the treatments and the treatment RDF + sulphur @ 80 kg/ha recorded lowere values followed by RDF + $MgSO_4$ @ 40 kg/ha over other treatments thereby indicating the role of sulphur and magnesium not only in enhancing the productivity but also in extending the keeping quality.

Influence of Magnesium on Physiology, Biochemistry, Disease Resistance and Quality Parameters in Soybean (*Glycine max* (L.) Merrill)

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ABSTRACT

A field experiment was conducted at University of Agricultural Sciences, Dharwad during kharif 2002 to assess the influence of different levels of source of magnesium on morpho-physiological, biochemical, disease resistance and quality parameters in soybean. The experiment consisted of five levels of MgSO_4 and four levels of magnesite laidout in randomized block design with three replication. The variety used was JS-335. Results revealed that the plant height, number of leaves, number of branches, root : shoot ratio, leaf area, LAD, CGR, AGR, RGR and NAR significantly increased due to magnesium treatments compared to control to control. Among the treatments, RDF + 50 kg ha⁻¹ MgSO_4 was superior in all the above parameters compared to other treatments. This treatment also higher leaf chlorophyll, NRA, nitrogen, phosphorus, potassium and magnesium contents. The per cent disease index (PDI) differed significantly between treatments with RDF+50 kg ha⁻¹ MgSO_4 having lower values.

Yield parameters viz., pod yield, seed yield, 100 seed weight and harvest index differed significantly among the treatments and the treatment RDF+50 kg ha⁻¹ MgSO_4 recorded higher values followed by RDF +250 kg ha⁻¹ MgSO_4 magnesite over other treatments. The quality parameters viz., oil and protein contents also recorded higher values in treatment RDF+50 kg ha⁻¹ MgSO_4 followed by RDF+250 kg ha⁻¹ magnesite over treatments. Thereby indicating the role of magnesium not only in enhancing the productivity but also in disease resistance and quality of seed.

Physiological Investigation on Square Drying in Cotton

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ABSTRACT

A field experiment was conducted on medium black soils to Agricultural Research Station, Dharwad, during kharif 2002-03, to study the morpho physiological parameters associated with square drying in cotton genotypes as influenced by different agrochemical and locations (Dharwad, Shimoga and Bagalkot). The experiment was laid out in a split plot design comprising of five main plots (agrochemicals) and nine sub plots (genotypes) with three replications. Observation on various parameters pertaining to growth, phenology, biophysical, yield and yield components were recorded at different time intervals and their inter relationships were worked out. At Dharwad anatomical studies were done in square dried and non petiole and stem.

The percent square drying was maximum at Bagalkot which represents relatively a warm climate and minimum at Dharwad. The plant height, number of branches, number of green squares, dry matter production, growth parameters, LAI, biophysical parameters, yield and yield components increase significantly by the application of NAA (10ppm). Application of NAA (10 ppm). Application of NAA (10 ppm) reduced the percent square drying (6.68%) compared to control (10.47%). Significantly highest square drying was observed in SB (YF)-425 (30.94%) where as least square drying was observed in Sahana (3.47%) and LRA-5166 (3.50%).

Anatomical studies in dried petioles, showed increased size, loose arrangements of mesophyll and pith cells and swollen condition after processing. Dried petioles were having more starch accumulation and more protein staining compared to normal petioles and stem.

Comparison of Mating and Selection Schemes for Improving Productivity and its Related Traits in Greengram (*Vigna radiata* (L.) Wilczek)

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ABSTRACT

An investigation was carried out to compare efficiency of mating and selection schemes in F_3 progenies of five selected crosses at green gram viz., i) CM x TM 98-50, ii) SL-4 x ML-3, iii) SL-4 x PB, iv) CM x ML-3 and v) CM x PB. Biparental (BIP) along with bulk, IPS and SPD progenies were compared for mean, range and genetic variability parameters like PCV, GCV, heritability and genetic advance estimates in first three crosses where as in last two crosses only SPD, bulk and IPS progenies were compared.

The mean values of BIPs were higher those of SPD, bulk and IPS progenies in C-1 cross for all the Characters under study whereas in remaining crosses SPD progenies exhibited higher mean values for seed yield and its important yield components traits like clusters per plant and pods per plant. The magnitude of GCV and PCV values were enhanced in biparental progenies of C-1 for all the characters under study whereas, in remaining crosses SPD progenies exhibited higher PCV and GCV estimates for important yield contributing characters like clusters per plant, pods per plant, pod length and seed yield per plant. Similar trend was also recorded for heritability and genetic advance estimates.

In general biparental progenies exhibited significant association between seed yield and its component traits under study in C-I, C-II and C-III except for plant height in C-II, In C-IV and C-V SPD progenies exhibited I Significant association with greater correlation coefficient values between seed yield and its contributing characters under study compared to bulk and IPS progenies. Among the different characters pods per plant followed by hundred seed weight contributed directly for seed yield per plant whereas clusters per plant and plant height contributed indirectly through pods per plant in majority of progenies under study.

Biparental progenies produced higher frequency of transgressive segregants followed by SPD, bulk and IPS progenies for individual traits as well as for combination of important component traits in first three crosses, whereas in C-IV and C-V SPD progenies produced higher frequency of transgressive segregants.

Standardization of In Vitro Regeneration Protocol for selected Genotypes of Sunflower (*Helianthus annuus* L.)

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ABSTRACT

An experiment was conducted in sunflower (*Helianthus annuus* L.) to standardize in vitro regeneration protocol for selected genotypes. The four genotypes used in the study were DSH-15B (Parental line of DSH-1), RH-857 (Restore line DSH-1), 6D-1 (Parental line of KBSH-1 and a popular Open pollinated variety (Morden).

The various explants used were lower cotyledon, upper cotyledon, shoot tip and hypocotyls which were dissected from one week old seedlings aseptically germinated on half strength Murashige skoog (1962) medium. Initially, Kinetin and BAP were tried alone for direct regeneration but only callus was induced. Then, at various combinations of Kinetin and IAA, different types of calli (light green, white, green compact, golden yellow colored modular) were induced. Among the explants, lower cotyledon was most responsive both for callus induction and shoot regeneration. The highest shoot regeneration was induced from lower cotyledon in both 6D-1 (33%) and Morden (30%) at 0.05 mg/1 IAA+1.0 mg/1 kinetin and 0.1 mg/1 IAA + 1.0 mg/1 kinetin respectively At 0.5 mg/1 kinetin +0.5 mg/1 IBA, elongation was observed in both the genotypes. About 30% of the tubes kept for elongation precocious flowering, which is frequently reported in sunflower. Further, of the different combinations tried for rooting, profuse rooting was induced at MS basal + 1 mg/1 IBA in both 6D -1 (95%) and Morden (91%) genotypes. The rooted plantlets were transferred to plastic cups for hardening. The direct regeneration was not observed in DSH 15 B and RH-857 in any of the concentrations tried. However, the results observed in Morden and 6D-1 were confirmed in repeated experiments. Histological study carried out showed meristematic center amidst of the normal cells of the explants confirming direct regeneration.

Genetic Diversity among Indigenous Aromatic Rice (*Oryza sativa* L.) Cultivars

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ABSTRACT

A field experiment was conducted at the Agricultural Research Station, Siruguppa during Kharif 2002 in Randomized Block Design with two replications, to study the genetic divergence among 67 indigenous aromatic rice genotypes. Observations were recorded on 29 metric characters. The correlation study revealed that grain yield was significant and positively correlated with plant height, total dry matter and harvest index.

Path analysis between yield and yield components indicated that plant height was the single major character, which exhibited highest positive direct effect on grain yield followed by test weight, productive tillers and days to 50% flowering. Path analysis between grain yield and physiological traits indicated that harvest index; leaf area index and total dry matter had positive direct effect. However, total leaf area exhibited significant positive correlation, their direct contribution was negative. The clustering of the genotypes indicated high variability among the genotypes studied. Total leaf area was major contributing character towards divergence followed by flag leaf area, grains per panicle and plant height. It was inferred from D^2 statistic technique that variety P-1142-98-3-5-1 was most divergent among the genotypes studied.

The intra and inter cluster D^2 values among the eight clusters indicated that, cluster VII which comprised seven genotypes revealed the maximum genetic diversity among themselves, which was followed by cluster V, III, I, VI, VIII and cluster II. Cluster IV had no intra cluster distance as it forms solitary cluster. Highest inter cluster distance was observed between cluster II and VI while the lowest between cluster VI and III.

For improvement of yield and quality, the genotypes Huggibhatta, Thurunbhog, KLS-27, P-1142-98-3-5-1, K-44-1. Vasane sanna bhatta, Mahisugandha, Heeriga sambha, Badshah bhog, Gandhasala, HUR-FG-78, were found better and also they can be used as base material for further breeding programme.

Assessment of Genetic Variability in Niger (*Guizotia abyssinica* Cass) Germplasm

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ABSTRACT

The investigation was carried out during kharif 2002 at the Department of genetics and Pant Breeding, University of Agricultural Sciences, Dharwad. The material comprised of 100 germplasm lines obtained from AICRP on Sesamum and Niger, Jabalpur. The analysis of variance revealed that considerable variability exists for all the characters studied. GCV and PCV values were found to be high for seed yield per plant, number of capitula per plant and number of seeds per capitulum while it was moderate to low for other characters studied. Heritability in broad sense was higher for all the characters studied. Genetic advance was high for seed yield per plant, number of capitula per plant and number of seeds per capitulum and it was moderate for harvest index, number of primary branches per plant, capitulum diameter and plant height. A significant and positive association was noticed between seed yield per plant and all the other traits studied except days to 50 per cent flowering and days to maturity at both genotypic and phenotypic levels. Path coefficient analysis revealed that plant height, number of primary branches per plant, number of capitula per plant and test weight had higher magnitude of direct effect on seed yield per plant at both genotypic and phenotypic levels. Grouping of genotypes by Tocher's method resulted in formation of seven clusters. Plant height, days to 50 per cent flowering and days to maturity were observed to be the major contributors to genetic divergence in the germplasm. Maximum intra cluster distance was shown by cluster IV while clusters I and II showed highest inter cluster distance. GA₃ proved to be the most potent gametocide for inducing male sterility to the extent of 80.21 per cent compared to 2, 4-D and surf excel.

Genetic Analysis of Quantitative Traits and Assessment of Molecular Diversity in F3 Populations of Single and Multiple Crosses of (*Arachis hypogaea* L.)

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ABSTRACT

The present investigation was carried out involving segregating population of three single with their corresponding three way crosses and two multiple crosses in order to know the magnitude of variability released in each of these crosses and were compared for assessing the superiority in release of total variability. The three way and single crosses were also assessed for change in the nature of inter relationships and path effects of different characters towards pod yield.

In general, the three way crosses had higher magnitude of genetic variability as measured by GCV and PCV over single crosses for shelling (%), number of Kernels per plant (NKP), 100-seed weight (HSW) and days to first flowering (DFF). The increase in genetic variability in these crosses was also coupled with increase in heritability and genetic advance for above traits. However, multiple crosses were known for releasing greater magnitude of variability specifically for foliar disease resistance and serve as a better material for selection of resistant genotypes.

The RAPD assay was carried out in order to know DNA polymorphism which indicated considerable amount of polymorphism in parents and selected segregants of one of the crosses studied (DH-40 x (GPBD- 4 x Dh-22). ICGV87165, GPBD-4 and Dh-22 were more diverse resistance parents, can be crossed to any susceptible parent like JL-24, RL-10 and RL-11 to develop mapping population for foliar disease resistance.

The three way crosses exhibited better response for breaking tight linkages and altering character single crosses. The important alterations in correlation were noticed in respect of pod yield with other component traits like HSW, SWK (%) and DFF. Kernel yield and its component traits like shelling (%), HSW and association between SMK (%) and HSW. Among the characters studied, NKP, HSW and SMK (%) are important traits having positive direct effect on pod yield.

Molecular Markers, in vitro Pollen Response and Their Association with Wilt Resistance in Chickpea (*Cicer arietinum* L.)

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ABSTRACT

In the study, 100 F₅ progenies of the cross JG-62 (susceptible) x WR-315 (resistant) were evaluated for wilt reaction in wilt sick pots. Of these 100 progenies, 28 showed early wilting, 43 late wilting and 29 no wilting. The 100 F₅ Progenies were assessed by analyzing the PCR product using ASAP marker CS-27 which amplifies a fragment (700 bp) linked to H1 locus. Of the 100, 53 showed presence of amplicon. Based on the marker and wilt reaction, the progenies were categorised into 4 groups of digenic inheritance and the probable genotypes of each group was suggested.

The progenies were also studied for the RAPD marker A-07 linked to h₂ locus. But this did not show 1:1 segregations. The study also confirmed that the pod nature (double/single seededness) as monogenic. The pod-nature and resistance/susceptibility showed independent assortment.

The effect of fusaric acid on in vitro pollen germination and tube growth of 14 F₅ progenies and parental genotypes was examined. Those 16 genotypes were also scored for ASAP marker and wilt reaction. The addition of fusaric acid to the medium decreased the pollen germination and tube growth and it was not uniform across genotypes. The progenies P-4, P-79 and WR-315 had high LD₅₀ for pollen germination and tube growth inhibition was high for late wilters compared to early wilter. The mean pollen grain germination and tube growth inhibition due to pathotoxin was more in genotypes showing positive for ASAP marker compared to inhibition observed in genotypes without ASAP marker. The mean LD₅₀ for pollen germination and tube growth inhibition was significantly higher in case of genotypes without molecular marker. The trend indicates that there was a relationship between pollen response to pathotoxin under in vitro condition and sporophytic response to wilt on one hand and the pollen response and susceptible allele via ASAP marker on the other.

Relationship of Phenological Traits with Productivity in Chickpea (*Cicer arietinum* L.)

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ABSTRACT

An experiment was conducted to elucidate information about the nature and amount of variability, for traits related to phenology and productivity in chickpea. A field experiment was conducted during post rainy season of 2002-03 using 132 RIL's (Recombinant Inbred Lines) generated from cross ICCV-2 x JG-62. The experiment was laid out in RBD with two replications. Analysis of variance indicated highly significantly variation among genotypes for all the traits. Very high variability, habitability and genetic advance were observed for number of pods, seed yield and 100 seed weight. Among the phenological traits days to 50 per cent flowering and days to pod initiation showed high variability. Genotypic correlation coefficient values revealed that seed yield per plant exhibited significant positive correlation with number of pods, number of branches and plant height. Among the phenological traits, reproductive period and days to maturity showed significantly positive correlation with seed yield. Path coefficient analysis revealed that pods per plant, 100 seed weight, plant height exerted high direct effect on Seed yield. Whereas reproductive period showed high indirect effect on seed yield via number of pods.

The diversity studies indicated that enormous diversity was present among genotypes under consideration. The 132 RIL's fell into 15 clusters. Maximum intra cluster distance was shown by cluster I while clusters X and XII showed maximum inter cluster D2 value. The character that contributed maximum to diversity was number pods per plant. All the 132 genotypes were evaluated for field reaction to fusarium wilt under natural infestation. A total of 45 genotypes showed high degree of resistance to wilt. Based on these studies 10 genotypes were identified as relatively performers with respect to seed yield when compared to check varieties. The better performance of these potential RIL's was found to be mainly due to higher number of pods and higher duration of reproductive period.

Genetic Variability for Seedling Vigour and its Association with, Yield, yield Components and Drought Tolerance in Greengram (*Vigna radiata* (L.)

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ABSTRACT

Field experiments were carried out at university of Agricultural Sciences, Dharwad during 2002-2003 to elucidate information on the nature and magnitude of genetic variability for seedling vigour and its association with yield, yield components and drought tolerance. Evaluation of 120 genotypes in rain season indicated presence of highly significant variability among the genotypes for all the traits studied.

The traits such as early vigour parameters (SL, L, VI), seed yield, number of clusters per plant, pod length and number of seeds per pod recorded moderate GCV and PCV values. High variability was observed for plant height, pod length, test weight, seed yield, shoot length and vigour index.

Seed yield recorded significantly positive associate with number of clusters per plant, pod length and seeds per pod. The early vigour parameters showed positive but non significiation with seed yield. Number of clusters per plant exerted maximum direct effect on seed yield followed by pod length and number of seeds per pod. The genotypes GG-45, GG-13 and GG-30 were found to be superior over the check TAP-7 for seed yield.

In the second experiment, the eleven genotypes selected based on vigour test were screened for drought tolerance under residual soil moisture condition during summer season. The study revealed significant reductions in mean of all the morphological, yield and yield components studied. At physiological maturity RWC decreased by 15- 20 per cent due to drought stress compared to no stress environment. Seed yield decreased drastically in all the genotypes as crop was subjected to progressive drought stress under receding soil moisture situation.

The mean values of high vigour genotypes under both stress and no stress environment were found to be superior over low vigour genotypes for most of the traits studied. The mean α -amylase enzyme mobility was more in high vigour genotypes compared to low vigour genotypes. But the difference in mean mobility values were not high enogough to be significant. The genotypeDLGG-11 was found to be superior over check for grain yield under moisture stress environment.

Genetic Analysis for Quantitative Traits, Starch and oil in Single Cross Hybrids of Maize (*Zea mays* L.)

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ABSTRACT

The study was conducted to assess the magnitude of heterosis, combining ability, nature of gene action, nature and extent of association between quantitative traits, starch and oil in single cross hybrids of maize. A line x tester (L x T) set was obtained by crossing 26 line as with three testers. Seventy eight new crosses along with their parents and five commercial checks were planted in randomized block with two replications in kharif, 2002 at AICMIP, Agricultural Research Station, Arabhavi, University of Agricultural Sciences, Dharwad.

Hybrids exhibited significant variability for 15 characters studied. The computed variance ratio ($2GCA/2SCA$ and $*2A/2D$) revealed the predominance of non additive gene action in the inheritance of all the traits studied. The study on the combining ability revealed that the lines; HYD-SEL-9, KDMI-6 and the tester; KDMI-10 was found to be best general combiners than the rest. Regarding SCA effects, HYD-SEL-9 X CM-111 showed significant highest SCA for grain yield and starch content, while KDMI -6 X CM-111 and KDMI-13-1-29 X KDMI-10 showed highest SCA effects for oil content. The crosses; HYD-SEL-9X CI-5, for grain yield and starch content whereas, NG-14 x CM-501, for oil showed the highest heterosis percentage. These crosses were from parents with high x high and low x low GCA combinations, respectively.

The correlation studied depicted that plant height, ear length, number of kernels per row, 100-grain weight, grain yield per plant were positively associated with yield per ha and starch content, while they had negative association with oil content. Maturity characters were found to be negatively associated with yield and starch content, but positive association was observed with oil content. On the other hand, yield had positive correlation with starch content and negative correlation with oil content. These results revealed the possibility of realizing higher yield, starch and oil content through heterosis breeding.

Molecular Characterization of cry IA (a) in Native *Bacillus thuringiensis*

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ABSTRACT

The focus of the present study was to characterize native *Bacillus thuringiensis* isolates for cry IA (a) through bioassay, specific PCR for cry IA (a), plasmid profile analysis and to clone the cry IA (a) specific amplicon (1.2 kb) into the p TZ57R/T vector having T overhangs. Among the ten isolates (P1, SI3, D1, D21, PP9, PP7, PP6, HD1, HD73, Bt42) which were used in the study, isolates D1 (LC₅₀ 1124.27 ppm), PP9 (LC₅₀ 1283.76 ppm) and P1 (LC₅₀ 1541.22 ppm) were found to have least LC₅₀ value for *Spodoptera litura* and hence can be used for direct field applications. Among the isolates which are characterized for presence or absence of Cry 1A(a) through specific PCR, only HD1, D1, PP9, SI3 and P1 were found positive for Cry 1A (a), isolates HD1, D1, HD73, PP9, PP6, SI3, P1 and PP10 showed plasmid bands varying in number (1-10) and size (1.5 kb>29 kb).

The cry 1A (a) specific amplicon (1.2 kb) from *B.thuringiensis* PP9 plasmid DNA was cloned into linear p TZ57R/T with T overhangs. The recombinant clone pSP500 was positive for specific amplification of cry 1A (a), which was further confirmed by the restriction of recombinant pSP500 with Eco RI and PstI that released insert of size 1.2 kb. However, SDS-PAGE studies and bioassay studies showed that there was no expression of recombinant fusion protein. The sequence data of pSP500 does not match with already established cry 1A (a) sequence, but it is found to have 93 per cent homology with *B. thuringiensis* serovar israelensis pGILG1 and 90 per cent homology with *B. cereus* ATCC 14579 plasmid Pbc lin 15. The functions of pGILG1 and pBC lin 15 is not known.

Cloning and Expression of Cry IA (b) gene and Field evaluation of Native *Bacillus thuringiensis* (*Berliner*) Isolates

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ABSTRACT

Considering the present scenario and importance of bioinsecticides the present study was conducted to evaluate the potent isolates in the field against *Helicoverpa armigera*, characterize the cry IA (b) gene distribution in native *Bacillus thuringiensis* isolates and clone it from potent isolates. Based on the previous study P-1, D-1, PP-10, Bt-42, T-2, SI-3 and HD-1 were selected. Bioassay indicated wide variation of toxicity among the native isolates with P-1, D-1 and PP-10 recording per cent mortality of 94.6, 93.3 and 90.6, respectively at 72 h.

Among the fermentation media tested viz., starch based commercial medium, glucose yeast extract medium, tryptone yeast medium and Luria broth for cultivation of three isolates starch based medium was better on cost considerations for mass cultivation.

The need for frequent harvesting in many fruit and vegetable crops like okra necessitates the use of bioinsecticides. Native *B.thuringiensis* isolates P-1, D-1, PP-10 and HD-1 were field evaluated against okra borer complex and P-1, D-1 and PP-10 were effective with 32.9, 29.2 and 25.1 percent reduction in fruit damage as compared to control where 1.7 per cent increase was recorded.

The cry IA (b) specific primers deduced and custom synthesized were used to detect the presence or absence of cry IA (b) gene among the native isolates. PP-11, PP-6, PP-9, PP-10, D-1, R-5 and PP-12 were positive for the presence of cry IA (b) with a characteristic 1.3 KB amplicon.

The characteristic 1.3 kb PCR product was cloned in pTZ57R cloning cum expression vector and sequenced. Blast search with the sequence showed that it has high percentage of sequence homology with already sequenced cry IA (b) genes in the database. It has 98 per cent homology with cry IA 16, pUC Bt S93 crystal endotoxin of *B.thuringiensis*. The analysis also indicated that the 1.3 kb amplicon has a strong open reading frame (ORF).

Influence of Micronutrients, Organics and Growth Regulators on Growth, Seed Yield. Quality and storability of Chilli (*Capsicum annum*) cv. Byadagi kaddi.

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ABSTRACT

Two field experiments were conducted at Main Agricultural research Station, University of Agricultural Sciences, Dharwad during kharif 2002 to study the influence of Micronutrients, organics and growth regulators on growth, seed yield, quality and storability of chilli (*Capsicum annum*) cv. Byadagi Kaddi. The seed quality parameters were tested in the Department of Seed Science and Technology, university of Agricultural Sciences, Dharwad.

The results of the study indicated that seed yield and its components viz., number of fruits per plant (17.3), fruit set (88.6%), number of seeds per fruit (85.1) and seed yield (187.8 kg/ha) were higher in ZnSO₄ (0.1%) followed by Borax (0.1%) foliar spray compared to other micronutrients. Higher 1000 seed weight, germination and vigour index were recorded in ZnSO₄ (0.15) with lower EC of seed leachate in Borax (10kg/ha) compared to control.

Among the organics, higher seed yield per ha (198.9 kg) was recorded in Vermicompost (2.5 t/ha) followed by FYM 10 tonnes per ha (185.9 kg) and mycorrhizae 2.5 kg per ha (153.0 kg) compared to control (132.8 kg). Germination and vigour index were higher in vermicompost followed by FYM application compared to control. Maximum number of fruit per plant (24.0), fruit set (78.0%), number of seeds per fruit (101.0), seed yield (195.5 kg/ha) and 1000 seed weight (5.24 g) recorded in GA₃ 100 ppm followed by GA₃ 50 ppm and NAA 20 ppm compared to control (water spray). Higher germination and vigour index recorded in GA₃ 100 ppm with lower EC of seed leachate followed by NAA 10 ppm compared to control.

Higher cost benefit ratio (1:5.0 each) was noticed in ZnSO₄, Borax and MgSO₄ when sprayed with each at 0.1 per cent and NAA 20 ppm (1:5.9).

Among the pickings, higher germination percentage, seedling vigour index and with low EC of seed leachate was recorded from first and second picking seeds over third and forth picking.

Based on the results, it was concluded that, ZnSO₄ (0.1%) foliar or Vermicompost (2.5 t/ha) soil application or GA₃ (100 ppm) or NAA (20 ppm) spray with first and second picking fruits gave higher seed yield with better quality.

Influence of Spacing, Nutrition. Pinching and Hormones on Plant growth, seed Yield and Quality of Coriander (*Coriandrum sativum* L.)

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ABSTRACT

The experiments were conducted at Main Agricultural Research Station. University of Agricultural Science, Dharwad to study the influence of spacing nutrition, pinching and hormones on plant growth, seed yield and quality of coriander cv. DWD-3, during kharif 2002.

The wider spacing (30 x 10 cm) recorded significantly less number of days to 50 per cent flowering (38.44) and higher number of branches per plant (7.3) and seed yield per plant (2.55 g). On the contrary, narrow spacing (22.5 x 10 cm) recorded significantly higher seed yield (957 kg/ha). The seed quality parameters viz., germination (78.58%) and vigour index (1136) were also significantly higher with S₂, N₂ nutrition level (44:44:44 NPK kg/ha) recorded significantly higher growth, yield parameters and seed yield (1230 kg/ha). N₂ also took significantly less number of days to 50 percent flowering (36.17) and maturity (79.17). Similarly, 100 seed weight (9.54 g), germination (83.38%), seedling dry weight (57 mg) and vigour index (1369) were significantly higher seed yield (1429 kg/ha) and seed quality parameters viz., 1000 seed weight (9.65 g) and vigour index (1408).

The pinched plants (P₂) recorded significantly higher growth and yield parameters besides early in 50 per cent flowering (34.67 days) and maturity (77.17 days). Similarly the seed quality parameters were also significantly higher for germination (83.42%) and vigour index (1536). Spraying of GA₃ 20 ppm (H₃) recorded significantly higher seed yield and quality characteristics like seed yield per plant (3.20 g), per ha (1000 kg), germination (82.62%) and vigour index (1497) when compared to other treatments. Pinching in combination with GA₃ 20 ppm spray (P₂H₅) recorded significantly higher seed yield (1187 kg/ha) and vigour index 1703.

Influence of Provenance, Storage Locations and Containers on Storability of Rabi/Summer Groundnut (*Arachis hypogaea* L.) Seeds

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ABSTRACT

Two laboratory experiments viz., to study the influence of provenance and storage locations on storability of groundnut Cv. TMV-2 and to study the influence of storage containers and locations on storability of groundnut Cv. KRG-1 were conducted at two storage locations viz., Raichur and Dharwad.

In the first experiments, three months old TMV-2 pods products during rabi/summer season of 2001-02 were collected from six different agro-climatic zones (1, 2, 3, 8, 9, and 10) of Karnataka and stored in gunny bags under ambient conditions. The biometric observations were recorded at monthly interval till the germination percentage of seed lots meets the minimum seed certification standard (MSCS) for groundnut. Initial values for all seed quality parameters like germination. Initial values for all seed quality parameters like germination, root length, shoot length, vigour index, seedling dry weight and field emergence were higher in the seed produced at Bijapur (Zone-3) followed by Raichur (zone-2) and Dharwad (zone-8). Among the provenances, the seeds produced at Bijapur retained germination above MSCS up to four months after storage and recorded better quality parameters throughout storage period. In storage location, the seed stored at Raichur performed better throughout the storage period by recording better quality parameters compared to Dharwad. Interaction of provenance and storage location, seed produced at Bijapur and stored at Raichur maintained the MSCS up to four months after storage and recorded higher values for all the quality parameters.

In the second experiment, KRG-1 pods produced at Raichur and stored in GLPB with either of desiccants (silicagel or CaCl₂) performed better throughout storage period recording better quality parameters. The germination was maintained better quality parameters. The germination was maintained above MSCS up to five months of storage in the seed stored in GLPB with either of the desiccants. The seeds stored at Raichur maintained better quality parameters compared to Dharwad. Interaction of storage containers and locations, pods in GLPB and HDPF with desiccants and stored at Dharwad recorded higher values for all seed quality parameters compared to Raichur, while pods stored in other containers without desiccant and stored at Raichur Recorded higher values for all the quality parameters compared to Dharwad throughout storage.

Effect of Seed Treatment and Containers on Seed Storability of Garden Pea (*Pisum sativum* L.)

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ABSTRACT

The laboratory experiment to study the effect of seed treatment and containers on seed storability of garden pea Cv. Arkel was conducted in the Department of Seed Sciences and Technology UAS, Dharwad. The experiment consisted two types of storage containers © viz., cloth bag and polythene bag ten seed treatments (T) viz., calcium oxychloride, DDVP, quinolphos, captan, bavistin, neemleaf powder, lakke leaf powder, neem oil, castor oil and untreated control. The garden pea seeds were treated as per the above treatments schedule and packed in cloth bag and 700 gauge polythene bag and stored at 9.00per cent initial moisture under ambient storage condition for 10 months. Bimonthly observations on seed infection and quality parameters were recorded. Irrespective of containers and seed treatments, a significant rise in seed infestation and quantitative losses was seen as the storage period advanced upto 10 months, whereas, seed quality parameters showed a reciprocal significant declining trend. Among the containers, 700 gauge polythene bag recorded increased seed quality parameters like germination (69.48%), field emergence (45.73%), root length (15.96 cm), shoot length (5.89 cm), vigour index (1523) and seedling dry weight (183.47 mg) by recording less seed infestation (16.80%), moisture content (9.37%) and EC value (1.321 dSm^{-1}) compared to cloth bag at the end of ten months storage period irrespective of seed treatments. Seed treatment with captan @ 2 g per kg recorded higher germination (70.33%), field emergence (48.33%), root length (15.90 cm), shoot length (6.38 cm), vigour index (1573) and seedling dry weight (189.83 mg) with less seed infestation (17.33%) and EC value (1.312 dSm^{-1}), whereas these parameters recorded significant reciprocal values control (60%, 40.01%, 14.77 cm, 4.763 cm, 1237, 150.83 mg, 1.518 dSm^{-1} and 28.50%). The next best seed quality parameters were seen castor and neem oils @ 5 ml/kg and neem leaf powder @ 10 in months storage. In general, the captan treated seeds stored in polythene bag (CxT) recorded numerically less quantitative and qualitative losses of seeds followed by castor oil and neem oil treated seeds stored in polythene bag as compared to control during 10 months period.

Studies on Spacing and Phosphorus Levels on Seed Yield and Quality and Varietal Identification in French Bean

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ABSTRACT

Three experiments were carried out at University of Agricultural Sciences, Dharwad. In first experiment, the spacing levels of 30 x 10, 45 x 10, 30 x 20 and 45 x 20 cm were combined with three phosphorus levels of 75, 100 and 125 kg P₂O₅ per ha to study the seed yield and quality. Maximum plant dry weight (14.18 g) at harvest was observed at spacing level of 45 x 20 cm in combination with 125 kg P₂O₅ per ha. Maximum seed yield (2454 kg/ha) was obtained with 30 x 20 cm in combination with 125 kg P₂O₅ per ha which was on par with 30 x 10 cm coupled with 125 kg P₂O₅ per ha which was on par with 30 x 20 cm in combination with 125 kg P₂O₅ per (2259 kg/ha). The seed quality parameters like hundred seed weight (37.83g), germination percent (93.75) and reduced electrical conductivity (1.127 dSm⁻¹) were recorded with spacing of 45 x 20 cm combined with 125 kg P₂O₅ per ha which was on par with 30 x 20 cm and 125 kg P₂O₅ per ha.

In second experiment, seven French bean varieties namely RSJ-288, IHR-909, MFB-1, Contender, Arka Komal, MFB-2, and MFB-3 were screened for seed yield and quality parameters. variety RSJ-288 produced maximum number of branches per plant (11.20), seed weight per plant (18.90 g), hundred seed weight (38.93 g) and low electrical conductivity value (0.969 dSm⁻¹) over other studied varieties.

In third experiment, the above mentioned varieties were identified through morphological analysis and electrophoresis techniques. Seed, seedling and plant morphological characters were recorded. Total protein electrophoresis resulted with three electrophoretic phenotypes due to banding pattern at R_m values 0.045, 0.161 and 0.563. There was a monomorphic band at R_m value of 0.285 for peroxides isozyme for all French bean varieties. RAPD analysis for the same varieties was tried with OPF primer series. The four primer namely OPF-7, 10, 16 and 20 resulted with polymorphic bands identifying each varieties uniquely.

Studies on Seed coating, Containers and Pre-sowing Treatments on Seed Quality and Storability of Groundnut (*Arachis hypogaea* L.)

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ABSTRACT

Laboratory experiments were conducted on storability of groundnut in the Department of Seed Science and Technology, University of Agricultural Sciences, Dharwad during 2001-2002. Three months old seeds were stored under ambient conditions of Dharwad to investigate the effect of seed coating, containers and pre-sowing treatments on seed quality and storability. The seeds were coated with gypsum (12 g/kg), ammonium molybdate (2%), flyash (10%), sulphur (5g/kg), calcium carbonate (2%), polyethylene glycol (10 g/kg), red soil (15 g/kg) and neem cake powder (10 g/kg) were stored in gunny bag, high density polythene bag and gunny bag lined with polythene. Uncoated pods were also stored with these containers.

The results indicated that significantly higher germination (72.5%) was recorded in pod storage. Among kernels, gypsum coated kernels recorded higher germination (71.8%) which was on par with flyash (71.5%). Among the containers gunny bag lined with polythene recorded higher germination (71.1%), root length (6.94 cm), shoot length (2.74 cm), vigour index (644), seedling dry weight (744 mg), lower EC values (1.31dSm^{-1}), field emergence (55.5%) after ninth month of storage period. Pods stored in gunny bag lined with polythene recorded higher seed quality parameters and gypsum coated kernels stored in gunny bag lined with polythene recorded higher germination (75.1%) after the end of eighth month of storage period.

Among the pre-sowing treatments ascorbic acid (50 ppm), calcium chloride (1%) soaked seeds for 6 hrs recorded higher seed quality parameters throughout the storage period. Ascorbic acid soaked seed recorded higher germination (71.2%), root length (8.30 cm), shoot length emergence (59.3%) at the end of storage period as compared to the other pre-sowing seed treatments.

Studies on Parental Vigour and Pollen Use Efficiency on Seed Yield and Quality of Hybrid Sunflower DSH-1

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ABSTRACT

The field and laboratory experiments were conducted to know the effect of seed vigour of parents and pollen viability on seed yield and quality of DSH-1 sunflower hybrid during kharif 2002 at Department of Seed Science and Technology, University of Agricultural Sciences, Dharwad. While creating different seed vigour levels through accelerated ageing test, increasing ageing period significantly reduced the germinability, speed of germination, field emergence percentage and increased the electrical conductivity of seed leachate in both the parents. Further in seed production plot, seed vigour levels affected the plant growth parameters like as plant height, leaf number, days to 50 per cent flowering and maturity of both the parents. Hybrid and restorer seed yield were significantly decreased with reduction in capitulum diameter, filled seeds, seed set per cent and test weight due to decline in parental seed vigour. F₁ hybrid seed yield and quality attributes were declined significantly from V1 to V3 (49.53%) in all combinations of vigour levels of female and male parent except for the high vigour level combination. *In vitro* pollen viability study indicated that pollens were susceptible to ambient storage conditions as compared to storage in refrigerator or earthen pot kept in moist sand. Combination of 75 per cent pollen and 25 per cent filler mixture (99 g rice flour + 1 g boron) stored in refrigerator was equally better to fresh pollens followed by pollen stored in earthen pot over a period of one day exhibiting better pollen germination and tube growth. Seed yield as measured through seed setting percentage and test weight were maximum with pollen alone either as fresh or stored in refrigerator. Seed quality was also maximum with pollen application either as fresh or stored in refrigerator or earthen pot for one day when compared to other combinations.

Effect of Nutrition and Growth Regulators on Seed Yield and Quality of Bottle Gourd cv.Arka Bahar

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ABSTRACT

Two field experiments were conducted at the Main Agricultural Research Station, College of Agriculture, Dharwad during kharif, 2002 to study the effect of nutrition and growth regulators on crop growth, seed yield and quality bottle gourd cv. Arka Bahar.

The studies on plant nutrition revealed that application of 50:50:37.5 NPK kg per hectare with vermicompost (8 t/ha) significantly decreased the number of days to initiation of staminate (48.1) and pistillate (50.3) flower, sex ratio (2.9) and significantly increased the number of seeds per fruit (317.3), seed yield per hectare (965.4 kg) and 100 seed weight (16.2 g). Whereas, number of fruits per vine (4.2), fruit yield per vine (5.2 kg) and fruit yield per hectare (253.7 q) and seed quality attributes such as germination (89.00%), seedling length (51.2 cm), vigour index (4557) and seedling dry weight (7.99 mg) were significantly superior with application 50:50:37.5 NPK kg per hectare in combination with FYM (25 t/ha).

Among foliar spray of growth regulators MH 100 ppm significantly reduced the number of days for initiation of staminate (46.7) and pistillate (48.3) flower and days for fruit maturity (113.5). While ethrel 50 ppm recorded narrow sex ratio (2.6). Among the fruit yield and yield attributes, number of fruits per vine (5.2), fruit yield per vine (5.6 kg) and fruit yield per hectare (324.9 q) were higher with MH 100 ppm. The treatment NAA 100 ppm recorded significantly higher number of seeds per fruit (312.1) and seed yield per hectare (897.4 kg). However, 100 seed weight (16.1 g) was higher in MH 100 ppm and ethrel 50 ppm spray. The seed quality parameters such as germination (88.30%), seedling dry weight (8.08 mg) and vigour index (4310) were higher with NAA 100 ppm. While it recorded lower EC (0.317 dSm⁻¹) value.

Studies on Delinting Techniques and Storability of Hybrids Cotton Seeds

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ABSTRACT

A study was undertaken to standardize the dosage of H_2SO_4 and delinting time to delinting of cotton seeds. The seeds of DCH-32 cotton hybrids were subjected to delinting by using different quantity of H_2SO_4 (60, 80, 100 and 120 ml/kg of seed) with different delinting time (2, 4, 6, 8, 10, 12 and 14 min). The delinting of cotton hybrid seeds with the dosage of 100 ml H_2SO_4 /kg seed treated for 10 min found to be better as the fuzz removal was complete and the seeds recorded higher germination (82.9%) and other seed quality parameters were higher with this treatment.

In another experiment was to study the effect of delinting, seed treatment and containers on storability of cotton hybrid DHH-11. The delinted seeds exhibited better storability than the linted seeds upto the end of storage. It recorded higher germination and other seed quality parameters compared to linted seeds. The imidacloprid seed treatment showed positive effect on seed quality parameters throughout storage period. Among the containers the seeds stored in polythene bag recorded higher seed germination and other seed quality parameters compared to cloth bag throughout storage period of nine months. The delinted seeds treated with imidacloprid and stored in polyether bag recorded higher seed quality parameters throughout storage.

Studies on Seed Treatment. Containers and Forms of Seed on Seed Quality of Marigold During Storage

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Th7802 (Accession No)

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ABSTRACT

Studies were conducted to know the effect of seed treatment, container and forms of seeds on seed quality in marigold at department of Seed Science and Technology, University of Agricultural Science, Dharwad during 2002-03. The treatments included were two forms seed (dry flower and cleaned seed), five containers (cloth bag, single layer polythene bag with silicagel, single layer polythene bag with silicagel layer polythene bag without silica gel, double layer polythene bag with silicagel double layer polythene bag without silica gel) and four treatments (neem leaf extract, thiram, chlorax and control.) the experiment was conducted in completely randomized design in factorial concept in four replications stored for 10 months under ambient conditions.

The results indicated that significantly higher germination (49.25%), root length (4.13 cm), shoot length (3.51 cm), vigour index (376), seedling dry weight (4.02 mg), germination rate index (11.31) and filed emergence (43.25%) and lowest electrical conductivity of seed leach ate (1.292 dSm^{-1}) were noticed in chlorax treated seed stored in double layer polythene bag (400 gauge) at the end of storage period compared to other combinations. Among the forms of seed, seed stored in the form of dry flower and stored in double layer polythene bag with silicagel recorded highest germination (53.25%), root length (5.13 cm), shoot length (3.98 cm) vigour index (503), seedling dry weight (4.53 mg), germination rate index (11.41) and filed emergence (52.50%) and lowest electrical conductivity (0.898 dSm^{-1}) at the end of storage period compared to cleaned seeds.

Irrespective of treatments, moisture content of seed stored in polythene bag with silica gel decreased gradually and maintained constant after certain period, while it remain uncharged during storage in the seeds stored in polythene bag without silica gel. However, seed moisture content fluctuated in concomitant with the prevailing atmospheric relative humidity in seed stored in cloth bag.

**Effect of Pre-Harvest Insecticidal Spray on Seed yield and Quality and Post-Harvest Seed Treatment on Storability of Black Gram
(*vigna mungo* (L.) Hepper)**

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Th7803 (Accession No)

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ABSTRACT

Field experiment was conducted at the Main Research Station. University of Agricultural Sciences, Dharwad during kharif season of 2002 to ascertain suitable insecticide for controlling of the insect pests of black gram. Further, storage experiment to find out the effect of chemicals of botanicals on storability of black gram seeds was carried out in the laboratory of the Department of Seed Science and Technology, University of Agricultural Sciences, Dharwad.

Among pre harvest sprays, quinolphos 25 EC gave significantly higher seed yield per hectare (9.82) with lower insect infestation (5.66%) and better seed quality followed by malathion 25 EC and Neem Seed Kernal Extract (NSKE) (9.6 and 9.2 q/ha, respectively and 6.33% and 7.00%, respectively) compared to control (7.9 q and 1433%, respectively) with lower seed quality parameters. Post-harvest seed treatment with chemicals and botanicals differed significantly with respect to quality during the months storage ob black gram. Post-harvest seed treatment with combination of capatn (2 g) + Malathion (5g) and captan (4g/kg seed) alone recorded significantly lower bruchid infestation (12.67% and 14.53% respectively) with satisfactority germination (75%) as per the Indian Minimum Seed Certification Standards for 10 months. Whereas, control recorded significantly higher bruchid infestation (43.33%) and maintained satisfactory germination only up to six months of storage.

Effect of Growth Regulators and Micronutrients on Seed Yield and Quality of Female Parent (CPD 423) of Cotton Hybrid DHH-11

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Th7805 (Accession No)

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ABSTRACT

A field experiment was conducted at Main Agricultural Research Station, Dharwad kharif 2002-03 to find out the effect of growth regulators and micronutrients on seed yield and quality of female parent (CPD 423) of cotton hybrid, DHH 11. the experiment consisted fourteen comprising of three micronutrients and two growth regulators at different concentrations and combinations was laid out in randomized block design with three replications.

Significantly more number of monopodial and sympodial branches were noticed due to seed soaking with succinic acid (0.2%) for 6 hrs before sowing in combination with foliar application of MgSO_4 (1%) at 60 DAS and Boron (0.1%) at 75 DAS than control. The highest number of bolls per plant, average bolls weight, seed weight per plant, number of seeds per boll, seed cotton yield and seed yield were recorded when seeds were soaked with succinic acid (0.2%) for 6 hrs before sowing in combination with foliar application of MgSO_4 (1%) at 60 DAS and Boron (0.1%) at 75 DAS.

Significantly higher germination, shoot length, root length, vigour index, speed of germination, field emergence, seedling dry weight and lower electrical conductivity were observed when the seeds obtained from previous crop imposed to treatment, seed soaking with succinic acid (0.2%) for 6 hrs before sowing in combination with foliar application of MgSO_4 (1%) at 60 DAS and Boron (0.1%) at 75 DAS not only increases the seed yield but also seed quality so that, best commercial crop from such seed can be raised.

Soil Physiographic Relationship and Land Use/Land Cover Mapping in Kumta Taluk, Uttara Kannada District, Karnataka

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ABSTRACT

Morphological, physical and chemical properties of nineteen pedons from coastal zone on Karnataka were studied with the objective to characterize and classify them and to understand the soil physiographic relationship. Totally, seven physiographic units were delineated as hills, plateau, escarpments, pediments, valley, river alluvial plain and coastal alluvial plain by the interpretation of top sheets, satellite imageries and filed survey.

The pedons on higher topographic position exhibited more redder hue (2.5 YR to 5 YR) and those on lower landscape position were more yellowier (7.5 YR to 10 YR). The gravel content was high in all the pedons except those on coastal environment. Silt content was low in all the pedons.

Calcium was the predominant action followed by magnesium. Exchangeable bases were low at the surface layers. BaCl₂-TEA acidity was very high compared to KCl extractable acidity. CEC and dithionite extractable iron was highest in Bt horizons and followed the trend of clay.

Soil physiographic relationships played an important role in pedogenesis in these soils with climate and vegetation as the secondary. The soil classification revealed that the soils on hills were typic kanhaplustalf, typic Dystrustepts and Typic Haplustults. All the plateau pedons were classified into Ultisols with subgroup level classification as Typic Plinthustults, Rhodic Kandistults and Lithic Kanhaplustults. Escarpment pedons were classified into Typic Dystrustepts and Typic Plinthustults, pediment pedons as Kanhaplic Haplustults, Typic Plinthustalf and Typic Haplustults, valley pedons as Ultic Haplustalfs, alluvial plain pedons as Oxy aquic Ustifluents, Inceptic Haplustalfs and Typic Fluvaquents and coastal alluvial plain pedons as Typic Psammaquents, Typic Ustipsamments and Humaqueptic Psammaquents.

The land use/land cover mapping using remote sensing data revealed that 51.8 per cent of the total geographical area of the taluk is under forest. The plantation crops accounted for 10.8 per cent of the geographical area of the taluk.

Characterization and Monitoring of Soil and Water Resources in Mirjan Village of Coastal Agro Ecosystem of Karnataka

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ABSTRACT

A study was under taken in the Mirjan village of Morth Karnataka with the objectives to characterize and classify the soil resources, monitoring of soil and water resources and land evaluation of the area. A physiographic map was prepared based on the interpretation of satellite imagery, topographic maps and field survey. The different physiographic units identified were hills and hill ranges, low hills. Mid lands and low lands. Thirteen pedons representative of each physiographic were selected and examined.

There was gradation in colour from reddish at the higher topographic position to yellowish colour in the lower topographic position. The structure was predominantly sub angular blocky in all the pedons. Majority of the soils were sandy clay loam to sandy clay in texture.

The soils were acidic with low base status. CEC decreased with depth and followed the trend of clay. Soil physiography played an important role in the formation of these soils with the climate as the secondary factor.

The classification of these soils revealed that majority of pedons belonged to Alfisols followed by Inceptisols and Entisols. Classification was carried upto series level. Nine soil series were identified in the study area and mapped into 18 mapping units as soil series with different phases.

Land evaluation was carried out for the study area using land capability classification and land suitability classification and maps were prepared. In the study area 93.90 ha area was suitable for paddy, 253.53 ha area was suitable for coconut, cashew and rubber and 283.65 ha area was found to be suitable for areca nut.

Fertility status and ground water quality of the study area were assessed in two seasons and fertility maps were prepared. Available nitrogen, potassium and phosphorus status of these soils was low to medium. The ground water was suitable for irrigation in most of the sites.

Silt and Sand Mineralogy of Selected Associated Red and Black Soils of North Karnataka

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ABSTRACT

Six soil profiles from three sites of North Karnataka viz., Agricultural Research Station, Dharwad in Dharwad district, Bheemrayanagudi in Gulbarga district and Mantagani in Haveri district, were collected to identify and determine the secondary and primary minerals silt and sand fractions. Identification of primary minerals in silt and sand fractions was made by XRD and petrographic method respectively and determination of secondary minerals in the silt fraction through chemical methods.

It was revealed that structure in red and black pedons were predominantly sub-angular blocky and angular blocky in subsurface horizon on Bheemrayanagudi black pedon. Slickensides were common feature in black pedons and their intensity was more in middle of the column.

Free iron oxides content was more in red pedon compared to the associated black pedon. Among the three study sites Bheemrayanagudi had low amount of free iron oxides as it was devoid of iron bearing minerals while free calcium carbonate was more at Bheemrayanagudi sites than Main Agricultural Research Station, Dharwad and Mantagani sites.

Smectite and vermiculite content was more over other secondary minerals in the silt fraction of all the red and black pedons and little amount of Kaolinite was found in the pedons.

Among the primary minerals quartz, mica, potassium and sodium feldspars were dominant as identified by XRD in the silt fractions of all the pedons.

Fine sand fraction showed the dominance of light minerals like quartz, biotite mica, Na-Feldspars, K-feldspars and apatite. The abundance of these minerals is high at the surface layer of Dharwad black pedon compared to its counterpart indicating more weathering status of the associated red pedon. Whereas, these difference is not much conspicuous in other two sites. However, the presence of weathering resistance minerals like zirconium throughout the depths of both red and black pedons of Mantagani site indicated similar weathering status of the associated red and black pedon.

Effect of and Follar Nutrition (N, P, K, Ca and S) on Growth and Yield o Groundnut (*Arachis hypogaea* L.)

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ABSTRACT

A field experiments conducted Agriculture College Farm, Raichur during *khari!* season of 2002 to know the response of groundnut (*Arachis hypogaea* L.) to soil and foliarapplication of nutrients (N, P, K, Ca and S). There were 13 treatment combinations comprising of three graded levels of fertilizers applied through soil and foliar spray of nutrients at three crop growth stages. The experiment was laid out in a Randomized Block Design with three' replications. Foliar spray of nutrients at 60 DAS along with 100 % RDF recorded significantly higher pod (26.92 kg ha⁻¹) and haulm yield (47.53 q ha⁻¹) which was 11.66 and 6.86 per cent higher over application of 100 % RDF. However it was on par with the treatment receiving foliar spray of nutrients at 45 DAS along with 100 % RDF. The higher pod and haulm yield was attributed to higher growth and yield components

The concentration of N, P and S was higher in kernel, whereas concentration of K and Ca was higher in vegetative parts. Leaves contained higher concentration of nutrients (N, P, Ca and S) except K at all the crop growth stages. Foliar spray either at 45 or 60 DAS along with 100 % RDF recorded higher content of N, P, K, Ca and S in stem, leaves and kernel at harvest compared to absolute control.

Uptake of nutrients (N, P, K, Ca and S) was positively and significantly correlated to the pod yield of groundnut, wherein nutrient ratios (N:S, N:P, S:P and K:Ca) was negatively and significantly correlated. In the present investigation, 8.29, 8.95, 1.08 and 2.59 are the optimum N: S, N: P, S:P and K:Ca ratios for obtaining higher pod yield in groundnut.

Baseline Susceptibility to CryIAc Endotoxin and Molecular Diversity Analysis of Geographical Populations of Cotton Bollworm, *Helicoverpa armigera* (Hubner)

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ABSTRACT

The investigation was undertaken to assess the baseline susceptibility to CryIAc- endotoxin and molecular diversity of geographical populations of cotton bollworm, *Helicoverpa armigera* (Hubner) collected across the 12 geographical locations of South Indian cotton ecosystem.

CryIAc protein was purified from the 48 h grown hyper expression *E.coli* (JM 105) vector. Full length of 130 KDa was cleaved to 60-70 KDa active toxins with 50:1 ratio of protoxin to trypsin. Geographic variation in the sensitivity of cotton bollworm to CryIAc endotoxin protein was studied to establish a geographic baseline for comparing the future population response to the increased use of Bt transgenic cotton in south Indian cotton ecosystem. The bollworm populations were collected from 12 geographical cotton ecosystem. The bollworm populations were collected from 12 geographical cotton locations and the dose responses to CryIAc endotoxin was evaluated. The ranges of LC₅₀s among different geographical populations were 0.147 to 1.095 µg/ml and 0.149 to 1.155 µg/ml of diet during 2001-2002 and 2002-03 respectively.

RAPD profiles of all twelve geographic populations were generated with 40 primers indicating a total of 749 amplicon levels, of which 747 polymorphic loci (99.64% polymorphism) were revealing high level of polymorphism among the population. Similarly the primer OPD-13 produced minimum number of marker levels (07) and primer OPE 09 produced higher number of marker levels (35). The genetic similarity matrix pertaining to the pooled data revealed the highest genetic similarity of 0.15. Clustering of the *H.armigera* population indicated that Dharwad population formed a separate cluster. Populations from Coimbatore and Madurai formed a single cluster indicating that they are relatively similar. Nagpur, Parbhani, Nanded and Guntur formed another separate cluster. Kovilpatti, Mysore and Raichur populations formed a single cluster indicating that they are not diverse.

Seasonal Incidence and Management of Potato Shoot Borer, *Leucinodes orbonalis* Guenee

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Th7142 (Accession No)

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ABSTRACT

Investigations on seasonal incidence, date of planting, efficacy of bio-agents and botanicals and determination spray schedule against potato shoot borer, *Leucinodes orbonalis* Guenee were carried out during 2002-03 at Main Agricultural research Station, Dharwad.

The incidence of the pest during kharif season was noticed at 4th week after planting and there after the per cent shoot damage increased reaching the peak in September and there onwards it decreased. During rabi season incidence of the pest started at 5th week after planting reaching its peak during 2nd week of January and there after it declined.

During rabi season, the highest number of male moths were caught per trap during the 52nd standard week (60 DAP) and moth catches were in declining trend during 1st standard week. Among the two lures tested the black lure recorded more number on male moth catches per trap (72 moths/trap) than white lure (69 moths/trap).

The potato crop experienced highest mean percent shoot infestation (38.76%) during first planting (4th week of June) than subsequent planting. However, highest mean tuber yield of 14.67 q/ha was recorded during second planting (2nd week of July) compared to rest of the planting.

Among the bioagents evaluated, dipel 8L@ 2.0 ml/l sprayed three times and inundative release of trichogramma chilonis Ishii @ 2.0 lakh/ha were found significantly superior in reducing the shoot infestation and recorded higher tuber yields of 33.05 and 29.72 q/ha, respectively compared to untreated control (15.25 q/ha).

The effectiveness of botanicals imposed three times against shoot borer, indicated that nimbecidine @ 5 ml/l and NSKE 5% were proved significantly superior in reducing the shoot infestation and recorded higher tuber yields of 35.82 and 33.38 q/ha, respectively.

Among different spray schedules evaluated, spraying of carbaryl 50 WP @ 4 g/l three times at 30,50 and 70 DAP proved significantly superior on recording lowest per cent shoot infestation (30.00%) and highest tuber yield of 36.89 q/ha.

Biology and Management of Rice weevil *Sitophilus oryzae* (Linn.) in Maize Grains

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Th7168 (Accession No)

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ABSTRACT

Investigations on rice weevil *Sitophilus oryzae* (Linn.) with respect to survey, biology, host preference, Varietal resistance and efficacy of grain protectants were carried out at University of Agricultural Sciences, Dharwad during 2002-03.

Survey work was carried out at locations viz., Amminabhavi, Hebballi, Haveri, Shiggoan, Gadag, Naragund, Saundatti and Gokak revealed that incidence of the pest was more during grain storage compared to cob storage.

Biology of rice weevil *S.oryzae* was studied on maize grains under laboratory conditions. The incubation period was 4 to 6 days. There were three molts with four instars and total larval period lasted for 24 to 32 days. Pupal occupied 7 to 10 days. Total life cycle of the pest from egg to adult stage was 32 to 48 days with a mean of 41 days.

The host preference studied of *S.oryzae* indicated that rice and barley were most preferred host grains and foxtail millet and ragi were not preferred by the insects. Accordingly grain damage. Weight loss and population buildup in rice and barley were 75.0, 53.5 per cent and 466 weevils.

Among the 10 maize hybrid seeds screened against *S.oryzae*, indicated that DMH-11 was found to be relatively resistant to pest attack during 90 days of storage period, which exhibited lower susceptibility index (9.88), seed damage (15.18%) and weight loss (12.2%). On the other hand, SAT, Suraz and A-1836 were found to be susceptible for the pest attack during storage.

Efficacy of grain Protectants viz., sweet flag powder (1%), neem seed kernel powder (25), custard apple seed powder (5.00%), lakke leaf powder (5.00%) kaolinite clay (10.00%). Ash (30%) saw dust (10%) malathion (5.00%) dust (0.001%) against *S.oryzae* in Maize grains was evaluated under laboratory condition. Relative efficacy was assessed based on adult mortality, population buildup seed damage, weight loss and persistent toxicity. Among the different grain Protestants, sweet flag powder, neem seed kernel powder, custard apple seed powder and malathion (5%) dust found effective followed by in managing the pest.

Studies on the Population Dynamics and Screening of Bt Cotton Hybrids Against Insect Pests

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ABSTRACT

Studies on the population dynamics and screening of Bt cotton hybrids against insect pests under unprotected irrigated condition was undertaken at College of Agriculture, Regional Agricultural Research Station, Raichur- 584 101, Karnataka during 2002-03.

Results on the comparison studies revealed that there was no effect of Bt toxin expression on any of the sucking pests *viz.*, trips, leafhoppers, aphids, whiteflies, red cotton bugs and Dusky cotton bugs and the population recorded was more or less same in all the three hybrids. The number of bollworms eggs laid on growing top shoot did not differ much among hybrids, but the population of *H. annigera* and *E. vittella* larvae were significantly low in Bt hybrid as compared to non-Bt and popular hybrids. Similarly the incidence of PBW larvae as rosette bloom was also low in Bt hybrid. Bt cotton hybrid exhibited significantly less fruiting bodies damage by bollworms as compared to non-Bt and popular hybrid. Similarly the predatory population appeared more or less same in all three hybrids.

Screening of different Bt cotton hybrids against insect pests clearly revealed that there was no much difference with respect to population of sucking pests. However, MECH-162 and NHH-44 registered higher thrips population, whereas MECH-12Bt was more susceptible to leafhoppers and RCH- 12NBt hybrid recorded more aphid population. Whereas, MECH-184Bt as well as MECH-184NBt hybrids due to more leaf hairs recorded low population of sucking pests. The bollworms larval population was significantly less in Bt cotton hybrids as compared to their non-Bt versions and popular hybrid. The effect of Bt gene was much convincing in terms of damage caused to fruiting bodies by bollworms. The locule damage was also less in Bt genotypes. Among the different Bt hybrids RCH-2Bt hybrid recorded higher (25.62 q / ha) seed cotton yield followed by RCH-144Bt (22.88 q / ha), RCH-20Bt (18.91 q / ha) and MECH-184Bt (13.28 q / ha).

Biology, Seasonal Incidence and Management of Red Spider Mite, *Tetranychus urticae* Koch. (ACARI: Tetranychidae) on Jasmine

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ABSTRACT

Investigations on biology, seasonal incidence and management of red spider mite on asmine was undertaken at the Department of Entomology, College of Agriculture, Raichur, Kamataka during 2002-2003. The identification of red spider mite revealed the presence of mite, *etranych usrticae* Koch. on jasmine.

Biology of *T. urticae* indicated that males took on average of 10.70:f: 0.45 days and females took an average of 12.36 :f: 0.68 days to complete the life cycle from egg to adult. Similarly, the egg, larv.a, protonymph and deutonymph lasted for 4.30 :f: 0.43, 2.42:f: 0.41, 1.66:f: 0.37 and 1.30:f: 0.14 days for male 4.46 :f: 0.27, 2.72 :f: 0.18, 2.33 :f: 0.24 and 1.50:f: 0.28 days for female, respectively. The pre-oviposition period occupied 1.82 :f: 0.40 days with the average fecundity of 104 :f: 3.19 eggs with an ovipositional period of 14.50 :f: 2.55 days. The longevity for adult male was 12.10 :f: 1.57, 18.70:f: 0.74 days for adult female. Seasonal incidence of *T. urticae* revealed that higher incidence was observed between 19th standard week 9.36 mites/leaf which was followed by 8.50 mites/leaf 18th standard week and no population was observed during 47th to fifth standard week due to pruning of the crop. Correlation studies showed that only maximum and minimum temperature had a positive and significant influence on mite population. Rainfall, morning and evening relative humidity had negative but significant impact. The natural enemies viz., *Cheilomenes sexmaculata* Fab, *Cyrtorhinus lividipennis* Reu and one more predatory mite noticed.

Abamectin 1.9 EC followed by dicofol 18.5 EC were significantly superior to rest of the chemicals on overall basis. Maximum flower yield was obtained in abamectin 1.9 EC (2816 kg/ha) followed by dicofol 18.5 EC (2568 kg/ha). The highest net profit obtained from dicofol 18.5 EC followed by abamectin 1.9 EC treatments.

**Bio-Ecology, Crop Loss Estimation and Management of Pigeonpea, Pod Fly,
Melanagromyza obtus Malloch (Diptera: Agromyzidae)**

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ABSTRACT

Studies were conducted on biology, seasonal incidence, crop loss estimation and management of pigeonpea pod fly, *Melanagromyza obtusa* at Entomology Section, Agricultural Research Station, Gulbarga during 2002-2003.

Female pod fly laid a maximum of four eggs and the eggs were glistening white with mean egg period of 3.35 ± 0.61 days. The mean duration of first instar maggot was 2.70 ± 0.43 days, second instar maggot lasted for 3.17 ± 0.53 days and third instar maggot lasted for 4.07 ± 0.60 days. The total maggot period was 9.97 ± 0.77 days with the pupal period of 8.90 ± 1.23 days. The mean life span of male adult fly was 2.65 ± 0.59 days and the female fly with strong ovipositor lived for 3.10 ± 0.68 days with the average fecundity of 28.6 ± 3.80 eggs.

The incidence of pod fly was noticed from October and gradually increased in November and December with peak incidence in January and February, when the crop approached maturity. Pod fly damage was more in late maturing variety (ICPL-87119) compared to early maturing (ICPL-87) and medium maturing (ICP-8863) varieties. The activity of pod fly was influenced by weather parameters viz., morning relative humidity, maximum temperature and rainfall. A larval pupal endo-parasitoid *Ormyrlls orientalis* (Hymenoptera: Ormyridae) was recorded on pod fly. The damage caused due to pod fly was to the extent of 27 per cent in early, 29 per cent in medium and 32.9 per cent in late maturing variety.

Insecticides such as, imidachloprid, thiochloprid, acephate and oxydemeton methyl recorded lower damage due to pod fly, with better net profit. Botanicals such as neem seed kernel extract (5%), chilli + garlic extract (0.25% + 0.50%) was also found to be effective with greater B: C ratio.

Evaluation of Indigenous Products for the Management of Chilli Mite, *Polyphagotarsonemus Latus* (Banks) (Acari:Tarsonemidae)

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ABSTRACT

Investigation on the influence of biotic and abiotic factors on the population fluctuation of *Polyphago tarsonemus latus* (Banks) on six genotypes was carried out during 2002-03 at ARS, Annigeri. Investigations were also made at MARS, Dharwad on the efficacy under field conditions at both the locations.

The activity of *P.latus* and *Amblyseius* spp. was noticed throughout the cropping period. Peak population of the mite was observed in the month of November- December on all the genotypes. Of the genotypes evaluated against *p.latus*, KDSC-510.10, Arkalohit and GPC-80 were graded as promising once. Mite population was favoured by higher temperature coupled with lower humidity and lesser intensity of rainfall. The predator population was positively correlated with mite population.

The laboratory studies revealed that NSKE+GCK (2.5%+0.55) and GCK+CU (1%+16.66%) were the most effective treatments among indigenous products causing 80 percent mortality of the pest. However, synthetic acaricides like dicofol brought cent per cent mortality while fenpyroximate and fenazaquin caused 96.66 and 90.00 per cent mortality. The next best treatments included NSKE (5%), GCK (1%), NSKE+CU (5%+16.66%) VL+CU (5%+16.66%), GC+CU (1%+16.66%), GK+CU (1%+16.66%) and CSO+CU (1%+16.66%).

Investigations under field conditions at both locations revealed that indigenous products viz., NSKE+GCK, NSKE+CU and GSK+CU recorded minimum leaf curl index (0.55, 0.57 and 0.53) by inflicting higher mortality of the yellow mite. These treatments registered higher pod yield of 6.98, 6.50 and 6.82 q/ha at MARS, Dharwad and 9.50, 8.30 and 8.50 q.ha at ARS, Annigeri with higher IBC ratio compared to acaricides.

With respect to safety of acaricides and indigenous products to the natural enemy in chilli ecosystem revealed that indigenous products were considerably safer to the predatory mite when compared to acaricides. Hence, these promising indigenous products could be utilized in the effective management of chilli mite.

Seasonal Incidence and Management of Sawfly, *Athalia Lugens proxima* (Klug.) and Aphid, *Lipaphis erysimi* (Kalt.) on Mustard

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ABSTRACT

Investigations on the seasonal incidence, economic injury level, crop loss estimation and management of *Athalia lugens proxima* (Kalt) and *Lipaphis erysimi* (Klug) were carried out during kharif and rabi seasons of 2002-2003.

Studies on the seasonal incidence of *A. Lugens proxima*, *L. erysimi* and their predators on mustard revealed that, *A. lugens proxima* on mustard was in its peak activity on the crop sown during first fortnight of July. However, there was a decline in the sawfly population on the crop sown during subsequent periods. Whereas, *L. erysimi* incidence was nil on the crop sown during July but gradually increased with the advancement of sowing periods reaching peak during October. The seasonal abundance of predators was highest on the crop sown during October to other dates of sowing.

Varying number of sawfly larvae and aphids had significant impact on all the yield contributing parameters on mustard crop. The economic injury level of mustard sawfly and aphid was found to be 1.3 larvae per plant and 35.03 aphids per 10 cm terminal shoot per plant, respectively.

A maximum yield loss of 100 per cent due to sawfly was recorded in untreated check as well as in the treatment where sawfly larvae were left for natural infestation removing aphids mechanically compared to insecticide treated check. A loss of 4.70 and 16.43 per cent due to aphids was recorded in completely caged and aphid infested plots, respectively.

The evaluation of botanicals, bioagents and insecticides under field condition revealed that quinalphos 0.05 per cent was highly effective in reducing the sawfly population and also in recording highest grain yield. However, with respect aphid management, phosphamidon 0.04. Percent was very effective recording highest grain yield and Benefit: Cost ratio.

Bio-Ecology and Management of Sorghum Shoot Fly, *Atherigona soccata* Rondani

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ABSTRACT

Investigation on bio-ecology and management of sorghum shoot fly, *Atherigona soccata* Rondani was under taken at Dharwad, Karnataka during kharif 2002.

Studies on the seasonal incidence of shoot fly on sorghum revealed that, the pest was at its peak during 33rd standard week (second week of August) with a highest oviposition and dead hearts of 3.2 eggs per plant and 93.4 per cent, respectively.

In all the correlated weeks (1,2,3 and 4 week lead time and same week), the combined weather parameters of maximum temperature with afternoon and morning relative humidity were highly significantly and negatively correlated with egg load and dead heart formation. Whereas, the morning and afternoon relative humidity together exerted highly significantly positive relationship with egg load and dead hearts due to shoot fly. However the same week, these weather parameters influenced more on egg load (54%) and dead heart formation (44.7%) due to shoot fly.

The highest peak catch of 488 adults per trap was recorded during 35th standard week (last week of August). On an average of 92.69 per cent females and only 7.28 per cent of males were trapped. Among these females 39.39 per cent gravid, 47.98 per cent spent and 13.27 per cent were freshly emerged adults.

The egg load of one and two week after the catch was highly significantly with positive correlation. Similarly the dead heart formation of one. Two and three weeks after the catch were also positive with highly significantly correlation. The maximum temperature at two and three weeks prior to trap catch had highly significant positive correlation with population.

The comparative field biology was studied on CSH-16 (susceptible) and IS-2312 (resistant) sorghum cultivars revealed that, total life cycle was prolonged more (25.50 + 1.86 days) on IS-2312 while it was 20.39+1.5 days on CSH-16. The response of biological parameters showed that resistant genotypes IS-2312 had higher degree of antibiosis index (22.5) which influenced the biology of shoot fly.

Thiamethoxam 70 WS @ 4 g a.i/kg seed was effective against sorghum shoot fly by recording highest B:C ratio 4.35.

Among different intercrops tested against sorghum shoot fly, the sorghum intercropped with garlic recorded significantly lowest per cent dead hearts (58.68%) and maximum sorghum grain equivalent yield of 43.50.

Field Scale Evaluation of Bee Attractants for Their Efficacy in Sunflower

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ABSTRACT

Investigation made to study the pollinator fauna, efficacy of bee attractants in enhancing the yield and yield components were carried during kharif 2002 at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad and at Harthi (Gadag dist) during rabi. Pollinator fauna of sunflower at Dharwad constituted 13 species of hymenopterans, six species of lepidopteron and one species of dipteran, spraying of attractants had significant impact on time spent by *Apis mellifera* at Harthi.

At location I Heavier heads were recorded from the treatments that received attractant sprays of Bee-Q and Fruit boost at 10 and 50 per cent flowering (51.17 and 52.26g). Spraying of Bee-Q at 10 per cent flowering showed least per cent chaffiness (12.01%). Highest yield of 18.38 q/ha was obtained from the crop sprayed with fruit boost twice. However, fruit boost sprayed at 10 percent flowering, 50 percent flowering were also efficient in increasing yield. Application of attractants did not improve oil content, germination percentage and shoot length at location I. however, root length and vigour index were significantly enhanced due to one or two sprays of fruit boost and Bee-Q. Incremental benefit cost returns due to spray of attractants was to the tune of Rs. 3205 to 5100 per hectare.

At location II, significantly heavier heads were obtained from Fruit boost and Bee-Q treated plots. Filled rows were significantly high in Fruit boost treated plot, field seed weight was significantly high in both attractant sprayed treatments. Significantly higher yield of (11.55 q/ha) was obtained in Fruit boost sprayed treatment followed by Bee-Q (10.02 q/ha) and control (9.23 q/ha). No significant variation was noticed with regard to unfilled seed rows, unfilled seed weight, per cent chaffiness, oil percentage and root length. But application of attractants improved percent germination, shoot length and vigour index. Consequently an incremental benefit of Rs. 3480 per hectare was obtained from Fruit boost sprayed plot as against Rs. 1185 from Bee-Q treated plots.

**Resource Partitioning by in Honey Bees in Different Crops with Special
reference to Cucumber (*Cucumis sativa* L.) and Impact of Bee Pollination on
Cucumber Yield**

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ABSTRACT

Studies were made on resource partitioning by honey bees in different crops, influence of attractants on bee visitation to cucumber and role of if bee pollination in enhancing the productivity of cucumber at two locations viz., Mangalagatti and Main Agricultural Research Station, Dharwad UAS, Dharwad.

Apis dorsata was the major resource practitioner in most of the selected agricultural crops (sunflower, niger, sesamum and safflower) except sorghum wherein *A. florae* was the frequent visitor.

On fruit crops like mango and guava *Tigona indipennis* was the dominant share of resource. Whereas, on plantation crops like coconut and coffee *A. dorsata* was the major share holder (28.88 and 27.47%, respectively).

Among vegetable crops *A. dorsata* was the major sharer in cucumber and onion. While, on drum stick *A. cerana* was the predominant bee species (44.69%), however on carrot flowers more food was shared by *A. florae*.

A.dorsata was the major resource sharer of ornamental crops viz., tube rose and bottle rose, while *T.indipennis* was the dominant sharer in case of verbena (45.95%). On coral creeper *A. florae* was the major resource practitioner.

Spraying of cacambe (10%), Jaggery (10%) and Bee-Q (1.25%) had significantly in attracting more number of pollinators. Plots sprayed with cacambe (10%) recorded significantly more number of fruit (15.61 fruits/plats vs. 7.42 and 3.34 fruits/plant in open pollination without spray and caged plot without bees, respectively) and fruit weight (126.11 g/fruit).

The open pollinated crop which received cacambe (10%) recorded significantly least number of dropped fruit per plant (0.76 fruits/plant) and significantly higher yield (41.52 kg/plot as against 30.92 and 20.52 kg/plot in open pollination without spray and caged plot without bees, respectively). Thus there was an increase of 34.28 and 101.84 per cent increase in yield over open pollination without spray and caged plot without bees, respectively.

Comparative Biology and Management of *Callosobruchus* spp. Infesting soybean and other Pulses with Special Reference to *Callosobruchus analis* Fabricius

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ABSTRACT

Investigation on comparative biology of the three species of the pulse beetles on soybean and cowpea. Host preference, varietal resistance and management under laboratory conditions were carried out in the Department of Agricultural Entomology, UAS, Dharwad during 2001-03.

On soybean the incubation period, total larval and pupal period and total developmental period were 5.5, 18.0, 26.0 days respectively for *Callosobruchus analis* and Corresponding figures for *C. maculatus* were 4.0, 29.0 and 29.0 days and for *C. chinensis* 5.0, 28.5 and 30.0 days. And on cowpea the figures for *C. analis* were 6.0, 25.0 and 30 days, for *C. maculatus* were 5.0, 27.0 days and for *Chinensis* 5.0, 26.5 and 27.0 days respectively.

The pre-mating, mating, pre-oviposition period for the three species on soybean averaged 30.0, 4.0, 18.0 minutes and 6.5 days for *C. analis* and the same were 50.0, 5.0, 16.0 minutes and 5.5 days for *C. maculatus* and 40.0, 10.0, 20.0 minutes and 5 days for *C. chinensis* respectively. Whereas it averaged 40.0, 10.0, 20.0 minutes and 7 days for *C. analis*; 32.0, 6.0, 12.0 minutes and 4.5 days for *C. maculatus*, 25.0, 7.0, 16.0 minutes and 5.5 days for *C. chinensis* respectively on cowpea. Maximum number of egg laying was observed within first three days of oviposition and the sex ratio was approximately 1:1 for all the three species. The females lived longer than males in all three species. The females lived longer than males in all three species which averaged 8.5 and 7.5 days for females and males respectively.

Among the different pulses tested, based on the susceptibility index highest preferred host for *C. analis* was soybean and for *C. maculatus* and *C. chinensis* were greengram and redgram. Whereas French bean and lentil were the least preferred.

Among the soybean varieties, JS-335 and local black were most preferred for oviposition resulting in higher percent damage and grain weight loss while Monetta and PK-1029 were least preferred.

Sweet flag rhizome powder (0.5%) followed by custard apple seed powder (5%) and neem seed powder (5%) among the plant products and neem oil followed by soybean, pongamia, pundi and palm oil @ 0.5% gave good protection upto three months from the three species of pulse beetles. Ash treatment @ 30% completely inhibited the population buildup and allowed no damage and grain weight loss for all the three species.

**Management of Thrips, *Scirtothrips dorsalis* Hood and Mite
Polyphagotarsonemus latus (Banks) on Chilli Using Biorationals Imidacloprid**

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ABSTRACT

Field investigations were carried out to study the influence of organics, neem products and imidacloprid against leaf curl of chilli caused by thrips and mites during kharif season of 2002 at University of Agricultural Sciences, Dharwad.

Application of neemcake @ 500 and 1000 kg/ha, sunnhemp @ 1000 kg/ha and vermicompost @ 2500 kg/ha in combination with 50 per cent recommended dose of fertilizers (RDF) proved to be best in reducing thrips, mite population and leaf curl index (LCI). They also promoted growth and yield parameters and recorded higher yield being comparable to the standard chemical check + 100% RDF.

Application of neemcake @ 500 kg/ha + 50% RDF in combination with the three sprays of RPP was found to be as effective as standard check in reducing thrips, mite infestation, leaf curl index and registering highest dry chilli yield followed with neemcake + two sprays, thus reducing the usage of chemicals in crop ecosystem by 25 to 50 per cent.

Alternate sprays of natural neem products neem oil, NSKE, and neemcake extract with RPP recorded lowest incidence of trips, mite and leaf curl than the commercial and natural neem products. Among the natural neem products NSKE 5% and neem oil 5% were found to be superior while among the commercial neem products, Nimbecidine proved effective followed by neemarin. Significantly higher yield was also noticed in the same biorationals indicated as above.

The combined treatment of seedling dip and shoot smearing using imidacloprid at different intervals was found superior in reducing trips, mite and leaf curl incidence and was comparable with the standard check, RPP + 100% RDF. Growth and yield parameters and dry chilli yield were also found higher in these combined treatments.

Various organics and botanicals were found quite safe to coccinellid beetles and predatory mites in chilli ecosystem. Among the imidacloprid treatments, seed dress and seedling dip were found safer to the predators compared to shoot smearing.

Aflatoxin Contamination in Chilli and its Management

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ABSTRACT

A field survey conducted in Northern districts of Karnataka revealed maximum aflatoxin incidence in Bellary district under field and storage followed by Raichur and Gulbarga. But under market/ storage condition maximum disease incidence was recorded in Mandya followed by Bangalore and Raichur market. The higher aflatoxin incidence in Bellary and Mandya was correlated with temperature (27.46°C to 35.95°C), relative humidity (50.41 to 82.54 %) and ideal moisture content of fruits.

Sabour's agar was the best for growth and sporulation of aflatoxin fungi, *A. niger* followed by oatmeal agar. Among sixteen isolates of aflatoxin fungi, AFL4, AFL8 and AFL16 showed maximum growth. *A. niger* produced abundant growth and sporulation at temperature range of 30 to 35°C and relative humidity (85 to 95 %) with good response to higher moisture content ranging from 27.0 to 40.5 per cent of the total fruit weight.

Indirect competitive ELISA technique was employed for detection and screening of sixteen isolates of *Aspergillus* for toxigenic nature. Among the isolates, AFL10 and AFL14 were non-toxigenic, whereas AFL16 and AFL8 were highly toxigenic in nature producing AfBi 1652.2 $\mu\text{g/kg}$ and 1081.9 $\mu\text{g/kg}$ respectively.

Among the genotypes, variety LCA-206 and hybrids viz., HTL, GOLI and 9623 showed immune reaction against aflatoxin, whereas varieties viz., JCA-283, AAUDC-24, KA-2 and hybrid IND-10 were resistant. The popular cultivars of North-Eastern Karnataka region, Byadagi Kaddi and Byadagi Dabbi showed moderately susceptible reaction to aflatoxin.

Systemic fungicides viz., Carbendazim and Benlate and non-systemic fungicides viz., Captan and Mancozeb, bio-agent *Pseudomonas fluorescens* were very effective in inhibiting the mycelial growth of the fungus, *A. niger*. Post-harvest treatments of chilli fruits with Captan, neem seed kernel extract, Nimbicidin, pongamia oil, Rakshak, cooking soda water, salt water and hot water treatment at 52°C for 15 minutes showed 100 % inhibition of growth of *Aspergillus* species on fruits, indicating effective strategies available for managing aflatoxin contamination in chilli thereby producing quality chilli produce available for global trade.

Epidemiology and Management of Grape Powdery Mildew Caused by *Uncinula necator* (Schw.) Burt.

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ABSTRACT

Grape is one of the major fruit crops of Karnataka. Among the biotic stresses, powdery mildew caused by *Uncinula necator* (Schw.) Burr. is a major disease of grape. Roving survey conducted during *rabi* 2002-03 in Northern Karnataka revealed, maximum severity of the powdery mildew was noticed in Raichur followed by Bijapur, Koppal and Bagalkot districts. No sexual stage (cleistothecia) of *U.necator* was observed.

The mycelium is septate, hyaline, and the conidia are cylindrical produced in chain, measured 33.0- 39.6 X 13.2-23.1 μm . Maximum conidial germination (81.77%) was observed in 1.5 per cent glucose solution. Optimum temperature range of 20 to 25° C and 70 to 80 % RH were favourable for conidial germination. The autoregression model for the *rabi* 2002-03 ($Y_{t+1} = 1.3401 Y_t$) with 'R' value of 0.994 is a good fit for powdery mildew prediction. During late *khari*f 2002 powdery mildew development was positively correlated with three week lead time maximum temperature (+0.927), negatively correlated with rainfall (-0.711), RH-I (-0.811) and RH-II (-0.91). During *rabi* 2002-2003, maximum PDI showed negative correlation with four week lead time minimum temperature (-0.443), rainfall (-0.457) and zero week lead time RH-I (-0.820) and mean RH (-0.727).

The high rate of powdery mildew development was observed during *rabi* 2002-03 with more AUDPC values: The cultivars Thompson Seedless, Kali Sahebi, Sonaka and Manik Chaman showed fast mildew, whereas, Bangalore Blue showed very slow mildew mechanism. Chlorophyll content and total phenols were found maximum in healthy grape leaves compared to infected leaves. *In vitro* and *in vivo* evaluation of fungicides revealed that, hexaconazole, tridemorph, propiconazole, myclobutanil, karathane and wettable sulphur were found effective in management of the disease. The higher Total Soluble Solids was recorded in infected berries compared to healthy. Among twelve cultivars screened, Bangalore Blue was found resistant. Arka Hans, Arkavati and Beauty Seedless were found susceptible, remaining eight cultivars including Thompson Seedless were found highly susceptible.

Studies on Wilt Complex of Betelvine (Piper betle Linn.)

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Major Advisor: DR. S. LINGARAJU

ABSTRACT

A survey on the occurrence of root-knot disease in Haveri, Koppal and Bagalkot district revealed 0.0 to 86.7 per cent root knot disease incidence. The present survey also indicated the association of *Meloidogyne spp.* With fungi, namely, *Sclerotium rolfsii*, *Rhizoctonia bataticola* and *Fusarium solani* in most of the locations surveyed, with a high frequency of occurrence of both the groups of these pathogens (nematode and either of the three fungi) from soil and root samples collected from Haveri district.

Meloidogyne spp. were found to be the most predominant nematode pathogen associated with betelvine as revealed by a community analysis of plant parasitic nematodes. On the basis of perinreal patterns, prevailing root-knot nematode was identified as *M. incognita*.

Pathogenicity tests confirmed that *M. incognita*, *S. rolfsii*, *R. bataticola* and *F. solani* on growth of betelvine cv. Ambadi was additive in nature. However, when *M. incognita* was inoculated with all the three fungi, the resultant effect was more than simple additive effect.

Individually, *S. rolfsii* was the most aggressive pathogen followed by *R. bataticola*, *F. solani* and *M. incognita* in combination with *S. rolfsii*, *R. bataticola* and *F. solani*, not only increased the severity of disease but also shortened the incubation period for disease expression. A reduction in root-knot index and final nematode population was observed in various combinations of nematode and fungi inoculations.

In an integrated management study conducted in a naturally affected betelvine garden, it was found that a combined application of an organic amendment (Enriched farmyard manure) with a biocontrol agent (*Trichoderma viride*) and chemicals (Carbofuran, Carboxin and Carbendazim) was found to be efficacious in reducing the wilt-complex incidence, nematode population, number of galls and Competitive saprophytic Ability of *S. rolfsii* and *R. bataticola*.

Studies on Turcicum Leaf Blight of Maize (*Zea mays* L.) Caused by *Exserohilum turcicum* (Pass) Leonard and suggs

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ABSTRACT

Turcicum leaf blight of maize caused by *Exserohilum turcicum* (Pass) Leonard and Suggs is very important disease since it plays a major role in the loss of grain and fodder yield. Different aspects of turcicum leaf blight disease and its pathogen were carried out in the present investigation. During survey in two districts higher disease incidence was noticed in Dharwad taluk of Dharwad district and Gokak taluk of Belgaum district.

Growth of the fungus on different solid media was studied. Among the synthetic media Sabouraud's dextrose agar provided maximum mycelial growth of the fungus in case of non synthetic media potato dextrose agar supported maximum mycelial growth of the fungus. Among the liquid media potato dextrose broth gave maximum dry mycelial weight. The temperature of 30°C was found to be optimum for the best growth of the fungus, pH 6.5 was found to be best for the fungal growth.

Among the systemic and non systemic fungicides evaluated under laboratory conditions, Carboxin and mancozeb were effective in inhibiting the growth of the fungus. Among the bio-control agents evaluated *Trichoderma harzianum*, *T. renni* and *T. virens* were found to be effective antagonists to *E. turcicum*. In vitro studies showed that plant extracts like nimbidin and garlic bulb extract at 5 and 10 per cent concentration were effective against the pathogen. Of the 25 inbred lines screened, 6 inbred lines viz., CM111, CM 119, CM 501, CM106, CM 211 and CM 104 showed resistant reaction. In the integrated management of the disease under field conditions spraying of mancozeb 0.2 per cent at 30,40 and 50 DAS and combined spraying of nimbidin + *T. harzianum* gave best control of the disease and increased the grain and fodder yield.

Status and Management of Papaya Ringspot Virus Disease in Northern Karnataka

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ABSTRACT

Papaya is one of the important fruit crops of Karnataka. Among the biotic stresses, ringspot virus disease is a major disease of papaya. Roving survey conducted during November December 2002 in Northern Karnataka revealed, maximum severity of the disease in Kallur of Gulbarga district (98.00%) and minimum in Menajgi of Gulbarga district (43.20%). Various symptoms like mosaic pattern, chlorosis, shoestringing, blistering and vein clearing of leaves and streaks on petiole along with ringspot, oily spot and distortion of fruits were noticed among the fields surveyed.

Disease significantly reduced both physiological and quality parameters of papaya. Ringspot virus infection reduced chlorophyll 'b' (72.80%) drastically as compared to chlorophyll 'a' (33.80%) and total chlorophyll (47.70%). Quality parameters like total soluble solids reduced by 24.92%, reducing sugar by 41.41%, non-reducing sugar by 35.69%, total sugar by 35.28% and papain content by 30.45% of fruit in infected ones. Fruit length was reduced by 25.67% and fruit girth by 20.51% as a result of ringspot virus infection.

Groundnut oil, micronutrients, azadirachtin and insecticides alone and in combinations were evaluated for their efficacy to manage the disease under field condition. Treatment including groundnut oil, micronutrients, azadirachtin and insecticides spray recorded more number of normal leaves (36.67) per plant and minimum number of mosaic (3.56) and malformed leaves (1.78) and petioles with oily streaks (12.78) per plant. Treatment including groundnut oil, micronutrients and insecticides spray recorded more number of normal fruit (16.78) per plant. The number of ringspot (3.78) and oily spot fruit (1.00) per plant and diseased fruits in apical ten fruits (1.78) per plant were recorded minimum in treatment where groundnut oil, micronutrients, azadirachtin and insecticides sprays were imposed.

Physiological characterization of Safflower (*Carthamus tinctorius* L.) Genotypes for Growth and Yield

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ABSTRACT

A field experiment was conducted during rabi season of 2002-03 at MARS, Dharwad to evaluate twelve safflower genotypes for their morpho-physiological, growth parameters and yield and yield components under rainfed conditions. The genotypes 98-102, 98-3 and check A1 recorded higher plant height, number of primary and secondary branches per plant, whereas the lower plant height was noticed in the genotypes check A2, 98-51, 98-43 and 98-29. The seed yield was significantly and positively correlated with number of primary (0.501**), secondary branches per plant (0.476**), dry matter accumulation and its distribution, growth and biochemical parameters. The genotypes 98-102 (14.33), 98-3 (14.03) and 98-51 (13.33) had the maximum seed yield (q ha^{-1}), while the genotypes check A2 recorded least grain yield (8.01). The seed yield had positive and significant association with number of primary capsules (0.481**), secondary capsules (0.698**) per plant, harvest index (0.529**) and test weight (0.705**). Higher oil content was noticed in 98-64 (30.82%), 98-3 (29.62%) and 98-25 (29.31). The oil yield was significantly and positively associated with seed yield (0.745**). The total dry matter (0.835** and 0.815** at 90DAS and harvest) was very strongly associated with seed yield when compared to its components (leaf, stem and capsule dry matter) at all the stages. Both AGR and NAR were highly associated with their respective growth stages i.e., AGR and NAR at 30-60 DAS (0.821**), 60-90 DAS (0.909**) and 90 DAS to harvest (0.762**). The seed yield was significantly and positively associated at both 60 and 90 DAS with total chlorophyll (0.570** and 0.705**) chlorophyll 'a' (0.570** and 0.510**) and chlorophyll 'b' (0.719** and 0.775**, respectively). The RWC and accumulation of free proline in leaf was also significantly and positively associated with seed yield at 90 DAS only (0.390* and 0.641**, respectively), whereas, the epicuticular wax on leaf surface was significantly at 60 and 90 DAS (0.514** and 0.380*, respectively).

Studies on Leaf Blight Disease of Barley (*Hordeum vulgare* L.) Caused by *Helminthosporium sativum* Pam., King and Bakke

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ABSTRACT

Leaf blight of barley caused by *Helminthosporium sativum* Pam., King Bakke, is gaining more importance in recent years because of its severity. The experiments on this pathogen were conducted during rabi 2002-03 in the Department of Plant Pathology, College of Agricultural, UAS, Dharwad.

The survey revealed that, the incidence and severity of leaf blight of barley was more (recorded) in Gokak taluk. The pathogen city test showed that pathogen was more virulent and could produce clear symptoms after seventh day of inoculation. Among the several hosts tested, *Triticum aestivum*, *Triticale secalis*, *Zea mays*, *Sorghum bicolor* and *Avena sativa* served as collateral host to the pathogen. The inoculation studies revealed that isolates from all these were cross inoculable to barley.

Physiological studies revealed that temperature of 25°C, pH of 7 and barley leaf extract media supported maximum germination of conidia of *H.sativum*. The mode of entry of this pathogen was both direct by producing aspersorium on cuticle and indirect by penetration of hyphae through stomata. 62 day old plant stage was found to be more vulnerable to the disease. The pathogen found as seed born and transmitted from seed to plant systemically.

Priming agents like polyethylene glycol with quintal maximum seed germination and vigour index with least infection. Among biological agents tested. *Trichoderma harzianum*, *T.resssei* and *Aspergillus niger* were found to be antagonistic to *H.sativum*. In vivo studies showed that, the aqueous extract of *Duranta repens*, *Azadirachta indica* and *Ocimum sanctum* were effective against *H.sativum*. While screening of barley genotypes, the varieties like DWR-28, BH-613, PL-70 and Rd-2651 were found to be resistant. In vitro study indicated that propiconazole, Hexaconazole, Prochloraz, Quintal, Carboxin and Propineb were found effective pathogen under field condition Hexaconazole (0.1%) gave best control of the disease with higher incremental benefit cost ratio.

Composting of Wood Waste Generated in a Paper Mill and its Nutrient Enrichment

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ABSTRACT

As many as 88 representative microorganisms were isolated from soils, sludge samples and decomposing organic materials collected from forests dump sites of paper mills, wood yards etc. these were subjected to rapid screening method (Bavendamm test) for knowing their lignin degradation potential. They were inoculated on to different indicator media. Out of 53 fungi 13 showed positive reaction on all the three media and, hence, selected for further biodegradation studies. After nine weeks of composting studies, SS-3 and SS-5 were found to be efficient fungi in terms of C:N reduction. They brought down the C:N of wood waste to 29 and 30.17 respectively. Amongst the reference cultures *Pleurotus ostreatus* was found the best. And, hence, a consortium of these fungi was prepared and used in all the subsequent studies. The process parameters for maximum degradation of wood waste by this consortium were optimized. Glyricidia was adjusted the best blending material (at 1:1) based on the C:N reduction and availability. Turning the composting material once in two weeks was found to be optimum based on degradation of OC and reduction in C:N. Maintaining a moisture of 60 percent was found to be optimum. Field scale composting of wood waste was conducted under the optimized conditions. At the end of 90 days, the fungal consortium converted wood waste into a stable biocompost with a C/N ratio of 18.32. Further enrichment of the biocompost was accomplished by inoculating with *Azotobacter* and *Pseudomonas striata* (P-solubilizer). The final product was a highly stable, nutrient rich compost with 2.21% nitrogen, 2.06% P and 0.83%k and a C:N of 16.28. Higher microbial loads including those of free-living nitrogen fixers and P-solubilizers were detected in the biocompost. The biocompost was found to stimulate the root length, total height, root biomass, total biomass and girth of *Eucalyptus* seedlings.

Effect of Co-Inoculation of *Bradyrhizodium* and Phosphate Solubilizers on the Growth and Yield of Greengram (*Vigna radiate* (L.) Wilczek

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ABSTRACT

The effect of co-inoculation of *Bradyrhizobium* and phosphate solubilizing microorganisms on the growth, nutrient uptake, rhizosphere microflora and yield of greengram under field condition was studied in black soil of MRS, Dharwad. *Bradyrhizobium* sp. (Vigna) strains viz. GGR-8, GGR-10 and GGR-13. Among phosphate solubilizers *Aspergillus* sp. found more efficient than *S. marcescens* by in vitro Pi release. All inoculation treatment found superior over uninoculated control. All dual inoculation of *Bradyrhizobium* and phosphate solubilizers found to increase all growth parameters such as plant height, root length, number of leaves, number of branches, shoot and root dry weight, number of nodules and nodule dry weight. Among dual inoculation treatments GGR-10 + *Aspergillus* sp. Found dual increase all growth parameters and also resulted in highest seed yield (11.27 q/ha). Followed by CGR-10+s. *marcescens* c10.65 q/ha). All dual inoculation treatments also resulted significantly higher N and P uptake over their respective single inoculations. The rhizosphere population of bacteria, fungi and P-solubilizers were significantly higher in all dual inoculated treatments over uninoculated control at all stages of crop growth. Actinomyucetes did not show any definite trend of variation by inoculation. Instead of all these benefits trend of variation by inoculation. Instead of all these benefits dual inoculated treatments also resulted in increased available soil N and P content at the time of harvest.

Characterization of Endorhizosphere Diazotrophic Bacteria and Their Influence on Growth and Yield of Maize Plants

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ABSTRACT

An attempt was made to isolate and characterize endophytic diazotrophic bacteria from diverse crop plants grown in different river belts of Karnataka and analyse their potential to enhance growth, nutrient uptake and yield of maize plants.

Seventeen each of *Azotobacter* and *Beijerinckia*, nine of *Azospirillum* and five of *Acetobacter* were isolated from different crop plants. The amount of nitrogen fixed by the isolates ranged from 2.55 to 22.40 mg per g of 'C' source used. *Azospirillum* isolate ASAZP fixed the highest nitrogen (22.4 mg per g of malate) among the isolated diazotrophs. While, all the isolates of *Azotobacter* and *Azospirillum* produced both IAA and GA, two isolates of *Acetobacter* (RSRACT and MScACT) and one of *Beijerinckia* (AMBij2) produced only IAA. Among the isolates, four each of *Azospirillum* and *Acetobacter* isolates and two *Beijerinckia* isolates showed P-solubilizing ability. The amount of Pi released from tricalcium phosphate on 15th day of incubation ranged from 5.90 to 10.66 per cent.

In the pot culture experiment, treatment receiving inoculation of *Azotobacter* isolate RSrAZT₂ recorded maximum root length among the inoculated treatments, whereas *Azospirillum* reference strain ACD-15 showed maximum shoot length and number of leaves at 45 days of maize plant growth. Among the inoculation treatments, the one receiving inoculation of *Azospirillum* isolate ASAZP recorded the highest shoot drymatter, root dry matter and total dry matter at both 45 days of plant growth and at harvest of the maize plants and were on par with 25 per cent recommended dose of nitrogen application. The same strain (ASAZP) recorded the maximum shoot, root and total 'N' uptake at 45 days of plant growth whereas at harvest the reference *Azospirillum* strain ACD-15 recorded the maximum 'N' uptake in shoot, root and total 'N' uptake. Inoculation of maize plants with *Azospirillum* isolates ACaAZP, ASAZP increased the cob weight significantly over uninoculated control. The reference *Azospirillum* strain ACD-15 also recorded the highest grain weight among the inoculated treatments, which was comparable to the of 25 per cent recommended dose of nitrogen. The test weight of grain was also highest in treatments with ACD-15 inoculation. Among the Endorhizosphere bacteria, *Azospirillum* isolates increased the yield of maize more than other endophytic diazotrophs and the increase was almost equivalent to that of application of 25 to 50 per cent of the recommended dose of nitrogen.

Economic and Environmental Implications of Pesticide Use in Paddy in Shimoga District

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ABSTRACT

Plant protection plays a vital role in modern agriculture. In the absence of adequate plant protection, the positive contributions of these inputs could be completely and farmers may incur heavy losses. Compound growth rate was used to analyse the area. Production and productivity of paddy in Shimoga district. Cobb-Douglas production function was fitted to estimate pesticide use efficiency and multiple liner regression analysis was used to examine pesticide expenditure elasticity and also resistance externality. Chi-square analysis using contingency table was employed to study awareness of the farmers regarding the negative externalities of the pesticides use.

The growth rate of area and production in Shimoga district and Karnataka state were positive with 1.69 and 1.10 per cent for area and 0.87 and 2.69 percent for production in that order and growth in productivity were negative for Shimoga district. The area under paddy crop, pest intensity and total family income were contributing positively and significantly to the expenditure on plant protection chemicals. The resistance externality cost was influenced by cost on fertilizers and pest intensity and their regression co-efficient were 0.76 and 404.36 respectively. It was reported that about 92 percent of the farmers experienced health problems. Chi-square value (203.8) was found to be significant at one percent level of probability and hence it was concluded that the farmers were aware of the negative externalities of pesticide use.

Government may periodically evaluate the pesticides which are highly toxic and persistent and permit the use of only selective and non persistent, chemical in the country.

Impact of Watershed Development Programme on Socio-Economic Dimensions of Beneficiaries in Rangareddy District of Andhra Pradesh

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ABSTRACT

The planners national level had given top most priority to dryland development programmes, after the green revaluation as it occupied 67 percent of arable land. National Watershed development Programme for Rainfed Area (NWDPA) is one of major dryland development programmes in India. The watershed programme which envisages grate opportunity for improving the productivity, profitability and sustainability of dry farming areas is complemented in Rangareddy district of Andhra Pradesh. For evaluation of watershed programme, Manthangond and Mathangourelli villages which cover the entire watershed area and Patelguda and Mangalpally villages (non-treated area) with sample farmers of 120 were randomly selected. Linear programming techniques were employed for preparation of optimum crop plans. Lorenz curves were plotted and Gini concentration ratio was worked out to know the inequalities in income distribution among the sample farmers.

The watershed development had resulted in total cultural area in watershed area (4.48 ha) being higher than that of non-watershed area (3.49 ha.)

The cropping intensity was also higher (171.64%) in watershed area, compared to non watershed (131.69%) area. The input use, cost incurred and returns obtained in all the crops under watershed area were higher than those of non watershed area. The per household income generated from watershed area was found to be higher by 32.29 per cent than that of non watershed area. The Gini concentration ratio (0.31814) was relatively more for watershed area over non watershed area (0.266157) indicating lesser inequalities in income distribution in watershed area. The human labour employment generated in watershed area was significantly higher by 11.07 per cent than that of non watershed area. The optimum crop plans indicated additional net returns from crop enterprises over existing plans both in watershed and non watershed areas.

Economic Analysis of Chilli Based Farming Systems in Dharwad District

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ABSTRACT

Agricultural is a way of life, a tradition, which for centuries have shaped the thought, the out look, the culture and economic life of the people of India. Farming system (FS) research is any research that views the farm in a holistic manner and considers interactions in the system. The study was conducted in Dharwad district as it is one of the major chilli growing districts in the state. To identify the FS, to work out the economics, to develop optimum plans and to know the socio-economic constrains were the objectives of the study.

Major farming systems identified in the study area were FS-I (crop production + dairy enterprises), FS-II (crop production + poultry enterprises) and FS-III (crop production + sheep enterprises). The total gross returns of FS-I was Rs. 105662.34 while total cost was Rs. 63421.62. The total net returns were Rs. 42240.72. The total gross returns of FD-II was Rs 99159.75 with a total cost of Rs 70803.33 resulting in a total net returns of Rs. 28356.33 while the total gross return of FS-III was Rs 614111.06 with a total cost of Rs 43778.06 resulting in a net returns of Rs 17333.06. Higher net returns FS-III was due to the higher returns obtained through sale of eggs, manure, and culled birds.

The returns per farm over the existing plan was highest for large farmers of FS-1 (Rs.135589.60) as compared to FS-II (Rs.77981.63) and FS-III (Rs.66667.96). Lack of storage facility, pest and disease incidence, lack of transport facility, price fluctuation and lack of credit facilities were the socio-economic constrains faced by the farmers while non availability o green fodder during of season, difficulty in marketing and non availability of loan facility were the constrains faced by the farmers of dairy enterprise, poultry enterprises and sheep enterprises, respectively.

Management of Silk Processing Units in Bangalore Rural District in Karnataka

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ABSTRACT

Sericulture is a rural agrobased cottage industry and play an important role in Indian economy, present study was undertaken by selecting Bangalore rural district of Ramangaram taluk for reeling and Dodda Ballapur for weaving units. In the first stage, 30 charaka, 30 cottage and 2 multiend reeling units were selected randomly in Ramangaram Taluk and 20 power looms and 10 hand looms units were selected randomly in Dodda Ballapur. The analytical techniques are Averages, percentages and financial ratios used. The primary data was collected through personal interview method followed. The procurement pattern by reeling and weaving units were identified are channel-I Farmers Government cocoon market reelers and channel-I Government Silk exchange Weaver and channel-II Registered dealers Weavers.

The financial performance of reeling and weaving units showed relatively more efficient in charaka and cottage units that the multiend units and they maintained the specific trend throughout the year and liquid ratio did not affect the solvency position of the units.

The total cost of production of silk by three different types of reeling units were (Rs. 1261.4/kg) multiend, (Rs. 1183.50/kg of silk) in cottage and (Rs.881.60/kg of silk) in charaka respectively. Similarly, in weaving units, the total cost of production of per saree was Rs. 990 in power loom and Rs. 1866.00 in handloom respectively. The problems in all the stages of silk reeling and weaving processes are lack of quality cocoons/silk yarn, lack of institutional credit, owing the cottage based silk industry needs to entrepreneurs status by Government, restructuring industry with appropriate support for silk industry.

Brand Preference of Fertilizers by the Farmers in Haveri District

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ABSTRACT

The study on brand preferences of fertilizers by the farmers was undertaken in the year 2002-03 in six taluks of Haveri district. Tabular analysis was used for analyzing consumption pattern of NPK fertilizers in Karnataka as a whole, as well as in Haveri district. Regression analysis was used for estimation of variation in consumption pattern of fertilizers with respect to price variation and to estimate brand loyalty and dealer loyalty. Compound growth rate analysis was used for demand projections of different brands of fertilizers.

The findings of the study indicated that NPK usage pattern in Karnataka had positive growth rate (13.43%) over the years (1992-2002). Amongst all the three major nutrients, usage of nitrogenous fertilizer showed highest positive growth rate (14.75%) followed by phosphatic (13.09%) and potassic fertilizers (8.15%). In Haveri district, it was observed that usage of nitrogenous (7.24%) and phosphatic (4.03%) fertilizers had positive growth rates. But, potassic fertilizer showed negative growth rate (-1.27%).

It was noticed that levels of NPK usage under irrigated conditions in case of cash crops, cereals, pulses and oilseeds were relatively high as compared to rainfed conditions.

As far as market share of different brands was concerned SPIC fertilizer company had the major market share in urea, DAP (Indian) and DAP (imported), retained first position and was placed in second position in Mop and 20:20:0 types of fertilizers. In case of MOP, IPL had the highest market share, DMCC retained its first position in both SSP (granular) and SSP (Powder) fertilizer, ZIL, in 19:9:19, IFFCO in 14:28:14. RCF, DFPCL and GNFC companies had monopoly in supply of 15:15:15, 23:23:0 and CAN fertilizers, respectively in Haveri district.

Retailer was the main source of information about different brands followed by peer group and progressive farmer. Brand loyalty and dealer loyalty of farmers was mainly influenced by good quality followed by retailer suggestion.

A Study on Socio-Economic Profile of Drip Irrigation Farmers In Shimoga and Davanagere Districts of Karnataka.

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ABSTRACT

The study on socio-economic profile of drip irrigation farmers in Shimoga and Davanagere districts of Karnataka was carried out during 2002-03. By following random sampling 90 drip irrigation and 30 surface irrigation farmers were selected and data were collected by personal interview method.

The important findings of the study were: comparatively more number of respondents were middle aged (40%) and high school educated (31.11%). A high per cent of drip irrigation farmers belonged to semi-medium land holding (46.67%) and medium drip irrigated area (64.45%). Half of the respondents possessed high innovative proneness and one-third exhibited high risk orientation. While majority of respondents were having medium level of scientific orientation, social and mass media participation.

Less than one third respondents (28.89%) were noticed in high level of Knowledge about management practices of drip irrigation. However all the respondents possessed complete knowledge about selecting suitable soil for drip system, interval of opening laterals and desired quantum of water release through drippers. Similarly a high per cent of farmers possessed complete knowledge about measures taken before and after installing of drip system. In adoption of drip irrigation management practices more number of farmers were noticed in medium adoption level (55.55%). But all the respondents used end cap and found to repair the essential parts system. Where as, moderate per cent of farmers (21.11%) were followed the required management practices before installation of the system.

Majority of farmers had expressed the advantages like saving of water (95.55%), saving labour cost for irrigation (92.22%) and uniform application of water (91.11%). Drip irrigation had shown increased yield in arecanut and banana, increased return and high B:C ratio.

The major constraints faced by drip irrigation farmers were non availability of quality materials (95.55%) and no follow up services by drip agency (81.11%).

Involvement of Rural Women in Non-Timber Forest Product (NTFP) Activities

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ABSTRACT

The present study was conducted in the year 2002-2003 in Dharwad taluk with a sample size of 150 rural women engaged in NTFP activities and collected data on dependency on NTFPs, socio-economic characteristics, participation and time spent pattern in the collection, processing, storage, preservation, marketing and income earned by NTFPs, constraints faced and suggestions for improvement of NTFP activities with the help of pre-tested structured schedule.

The result of the study revealed that majority of the rural women middle age, married, illiterates, farm labourers, Landless, belonged to medium income group, backward caste, nuclear family with medium family size, living in mixed type of house and contact urban places once in a week. Majority of the rural women had low level of mass media participation, extension contact and high level of organizational participation.

Majority of the rural women (42.00%) were dependent on Muttala leaves (*Butea monosperma*) followed by fuelwood (20.67%), pongamia seeds (19.33%) and edible gum (17.33%).

Highest participation was noticed in the processing, storage, preservation and marketing of NTFP then the NTFP collection. Women spent maximum time of 251.17 minutes per day and 94.00 days in a year in the collection of forest produce.

Maximum income obtained from baskets per season was (Rs. 9150) followed by fuelwood (Rs. 5145), grassbrooms (Rs.2955) and leaf meal plates (Rs.2880).

Local and nearby city markets were the main marketing place whereas agents, wholesalers and selling on their own found to be the prominent marketing channels.

Major constraints faced by the rural women were lack of proper marketing system (96.00%) and depletion of flora (91.33%). Important suggestions were to avoid exploitation by middlemen (93.3%) implementation of programmes for forest regeneration and adequate trainings/demonstrations to develop value added products.

A Study on the Knowledge Level, Adoption and Marketing Behaviour of Chilli Growers in Guntur District of Andhra Pradesh

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ABSTRACT

The study was carried out in Guntur district of Andhra Pradesh during the year 2002-03. Following the simple random sampling 120 farmer respondents were selected from 12 villages of six mandals in two divisions of the district. The data was elicited through personal interview method.

The important findings of the study were; majority of the respondents possessed medium level of knowledge (72.50%) and adoption (68.33%) about recommended cultural practices of chilli-Less than half of the respondents cultivated recommended varieties (12.50%), topping of seedlings (35.83%) and application of FYM (41.67%). Most of the respondents had applied fertilizers like N (89.17%), P (90.00%) and K (84.17%) more than recommended. A considerable percentage of respondents educated upto primary schools (25.83%). Majority of the respondents (74.17%) possessed television sets. Among them considerable farmers regularly viewed the news (55.83%).

A positive and significantly relationship was observed between level of knowledge, adoption and personal, psychological and social characteristics like education, management orientation, risk orientation, scientific orientation, extension contact, extension participation and mass media participation.

Majority of the respondents expressed the problem of inadequate irrigation facilities (95.83%), high incidence of pests and diseases (82.50%) and price fluctuation (68.33%) were the constraints expressed by chilli growers.

Majority of the respondents (78.33%) market their produce in the regulated market followed by commission agents (39.17%). Majority of the respondents (80.00%) collected the information on market price from others who visited the market.

The benefit cost ratio in chilli cultivation worked out to 1:1:71.

Forecasting Models for Insect Pests and Disease in Soybean (Glycine max (L.) Merrill)

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ABSTRACT

Soybean is a major oilseed crop of India. Defoliators and rust have major threat for cultivation of soybean crop in India. So in considering the importance of these two insect pests and disease, the present study was envisaged. Experimental data were collected from AICRP on Soybean at Dharwad. Meteorological data were collected from Meteorological Observatory of Main Agricultural Research Station, Dharwad.

Several linear and nonlinear regression models were tried. The results revealed that simple linear regression model and non linear model were not of much informative in explaining the effect of weather variables in the development of defoliators and rust.

Since significance of single point linear model reveled that, weather variable are important in determining the disease severity of rust. But as R_2 , is very, these models cannot explain much about the variation in development of defoliators and rust. Therefore, multiple regression models were tried, these models were having high R_2 , both in case of defoliators and rust, hence it is best fit, in explaining the variation in development of defoliators and disease severity of rust.

The presence of insect pests and caused yield reduction, there exist some relationship between insect variables, disease variables and yield. In these cases it shows that there is linear relationship existed between the insects variable, disease variable and yield of soybean.

Studies on Leaf Spot and Twig Blight of Neem (*Azadirachta indica* A. Juss)

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ABSTRACT

Results of the investigation entitled "Studies on leaf spot and twig blight of Neem (*Azadirachta indica* A. Juss) revealed that August and October months were found most favorable for high incidence and severity of leaf spot and twig blight disease. Disease incidence and disease severity index were highest during September-October, 2002 in all the five nurseries compared to January-February, 2003. Shirahatti nursery had highest disease incidence (53.50%), disease severity index (2.61), mortality (55.60%) and Growth loss in collar diameter (50.32%) and height (88.15%) of seedlings. The estimated monetary loss was maximum (Rs 23,450) in Binkadakatte nursery and the rate of disease development was highest in Korlahalli nursery.

In vitro studies on fungicides, plant extracts and bioagents indicated that Indofil M-45 @ 0.10, Bavistin @ 0.05, and Bordeaux mixture @ 0.5 per cent were highly effective (with 100% inhibition). Among plant extracts and bio agents tried *Strychnos nux-vomica* bark extract (69.40%) and *Trichoderma vir ide* (56.95%) inhibited growth to a maximum extent.

Under nursery conditions treatment with Bavistin @ 0.05 per cent showed less disease severity and *Strychnos nux-vomica* @ 10 per cent. The rate of disease development and per cent increase in disease severity index were least (0.0040 and 12.19%, respectively) in Bavistin treatment @ 0.05 per cent after 150 days. Maximum increase in height and collar diameter was registered in Bavistin @ 0.05 per cent.

Disease severity index increased to its maximum when the rainfall was maximum and it had negative and significant effect on collar diameter and height growth of seedlings throughout the experiment. The regression equation fitted showed that for every 1 per cent increase in disease severity index there was 0.80 cm and 1.31 cm decrease in collar diameter and height respectively, in 150 days period. Seedlings from source 2 (Bailhongal) were completely free from leaf spot and twig blight disease.

Ecological Assessment of Bettalands in Uttrar Kannada District

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ABSTRACT

Ecological assessment of bettalands in Uttara Kannada district is generally aimed at identifying their present status with respect to vegetation components and management practices adopted in the bettalands. Three categories of *betta/and* holdings (small, medium and large) and one adjoining respective natural stand were evaluated among two vegetation tracts *viz.*, moist deciduous and evergreen vegetation tracts. The species diversity was found to be directly correlated with extent of land across different categories of holdings as such maximum number of species (53) were recorded in natural stands and least (22) in the small *betta/and* holding.

Among various component species *Terminalia tomentosa* – *Terminalia panicu/ata* - *Ougenia da/bergioides* were found to be most dominant in moist deciduous tracts and *Pterocarpus diversifolium* - *Garcinia gummigatfa* – *Olea dioca* were abundant in evergreen tracts. Among various categories of land holdings, natural stands recorded highest number of tree species (690 trees/ha) followed by large land holdings (635 *trees/ha*) in evergreen tracts and least was with the small land holdings (225 *trees/ha*) in moist deciduous tract. The species richness and species diversity were highest in natural adjoining stands and large *betta/and* holdings and lowest in small *betta/and* holdings. The management practices such as frequency of lopping, utilization of fuel wood, collection of dried leaves and setting fire to the *bettf/ands* were found to be optimum in large and medium *betta/and* holdings, whereas it was severe in small *betta/and* holdings.

Studies on Pink Disease of Acacia hybrid (*Acacia mangium* X *A. auriculiformis*)

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University Library, UAS, Dharwad (Location)

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ABSTRACT

Acacia hybrid (*Acacia mangium* X *A. auriculiformis*) is fast growing tree species, extensively growing in the high rainfall areas of Karnataka because of its multifarious uses. Among various biotic factors that limit the successful establishment and production of the crop, the pink disease caused by *Corticium sa/monic%* causes major threat to the crop.

Survey for pink disease in *Acacia* hybrid conducted during September November, 2002 in three divisions of Shimoga district (Hosanagar, Tirthahalli and Sagar) of Karnataka indicated that maximum incidence (38%) and DSI (0.83) was recorded in seven year old plantation of Varkodu in Hoasanagr division.

Estimation of losses due to pink disease in seven year old plantation of *Acacia* hybrid showed highest monetary loss of Rs. 1,39,081 \ ha in trees with disease severity scale "3". It was lowest in trees with disease severity scale "1" (Rs. 88,809 \ ha).

Among different *Acacia* hybrid clones tested for pink disease reaction, clone 87 recorded lowest DSI (0.16) and highest ORI (2.96) whereas clone 2K recorded highest OSI (1.16) and ORI was (0.84).

In the pink disease management under field conditions spraying with Calixin @ 0.1 per cent was effective (OSI 0.19) and *Trichoderma viride* (DSI 0.37) pasted on shoots also reduced the colonization by pathogen.

Calixin @ 0.1 per cent had maximum influence on growth parameters such as height (19.12 m), GBH (0.35m) and volume (252.54 m³ \ ha) followed by Chlorothalonil @ 0.2 per cent. The minimum extent of influence was observed in control (height, 16.65m; GBH, 0.292m and volume, 150.91m³ \ ha).

The plant extracts gave the highest C:B ratio (1 :36) as compared to fungicides. While Calixin (1:16), Chlorothalonil (1:7) and *T. viride* (1:8) though gave low C: B ratio but net income \ ha was higher (Rs. 2,16,208\ha, Rs. 1,89, 017\ha and Rs. 1,75,010\ha, respectively)

Reproductive Biology and Half-Sib Family Performance of *Dysoxylum malabaricum* Bedd: An Important Threatened Timber Species

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ABSTRACT

Dysoxylum malabaricum (Meliaceae) popularly known as 'white cedar' is an economically important endangered species prized, for its sweet-scented white colored timber. Natural populations of this endemic tree have been drastically reduced due to its illegal harvest through out the Western Ghats. The present study was undertaken to understand a few aspects of its breeding system, seed biology, extent of genetic variation among half-sib families for early vigour traits as well as to standardize a vegetative propagation protocol to aid its genetic improvement and conservation.

Under Sirsi conditions whitish, bisexual, thrips-pollinated flowers *D. malabaricum* appear during the second fortnight of February for a short period of 10 days. The immature green fruits appear in the first week of March and turned bright orange after maturation during June. The fruit fall coincided with the rainy season such that seed germination and establishment is facilitated. Hence seed collection can be done during months of June to August. Malabar Grey Hornbill (*Ocyrceros griseus*) feeds on the fruits of this species and regurgitates the kernel after digesting the outer fat-rich pulpy seed coat. The 'near-threatened' Malabar Grey Hornbills form the most effective seed disperser of *D. malabaricum* seeds and the association between these two species seems to be tightly co-evolved.

The natural fruit set per cent of *D. malabaricum* is poor (23.9 %). The seeds (average weight of 5.56 g) are recalcitrant with critical moisture content of 45 per cent. If seeds are stored at 45 per cent moisture content under aseptic conditions, their shelf-life could be extended. Half-sib families varied significantly with respect to seed mass, emergence percentage and root/shoot length. Vigour traits such as plant height, root length and number of lateral roots showed large phenotypic/genotypic coefficient of variation and recorded moderately higher heritability ($h^2 = 0.74, 0.66, 0.71$ respectively), suggesting that early selection can be made on these traits. Though the per cent sprouting of stem cuttings treated with powder form ISA at 2000 ppm was better (20 %), the stem cuttings did not initiate rooting.

Investigation on Solid State Fermentation of Cattle Dung in Fixed Dome Type Biogas Plant

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ABSTRACT

An experimental investigation was undertaken to Study the status of biogas plants in ten selected villages of Raichur district and to identify the constraints for functioning of biogas plants. Further experiments were conducted to evaluate the performance of cattle dung at different solid concentrations of 10, 12, 15 and 18 per cent in 75 litre capacity prototype digesters of 1:0.5, 1:1 and 1 : 1.7 HID ratio sized digesters to estimate the quantity and quality of gas production under batch fed system and to optimize the solid concentration. A pilot size fixed dome type biogas plant of 2 m³ capacity was constructed to evaluate the performance of cattle dung at optimized solid concentration under field conditions.

The survey analysis revealed that out of 95 biogas plants surveyed, 64.2 per cent (61) were floating drum type and the remaining 35.8 per cent (34) of fixed dome type. Further it was observed that only 27.37 per cent of total biogas plants were in working condition and the remaining 72.63 per cent were non-functional. The reasons attributed for improper /mal-functioning of biogas plants and for low gas production were due to damaged digesters, cracks formed inside the digesters, use of poor quality material for construction of dome and improper mixing of water to dung due to scarcity of water. The analysis of prototype digesters indicated that the maximum cumulative gas production was recorded in 1: 1.7 size digester followed by 1:1 size digester and minimum in 1:0.5 size digester among the treatments studied. On an average 27, 17 and 13 per cent more gas was produced from cattle dung at 15 per cent TS over 10, 12 and 18 per cent TS, respectively. It was observed that the average percentage of methane content was maximum (57.09 %) in the gas produced from cattle dung at 15 per cent TS in 1: 1.7 digester and minimum of 52.48 per cent in the gas produced from cattle dung at 10 per cent TS in 1 :0.5 digester. The results of performance of cattle dung at optimized solid concentration of 15 per cent TS in fixed dome type biogas plant revealed that the maximum weekly gas production of 11569.4 litres (2.89 m³/m³) was recorded during fifth week and minimum of 8685.6 litres (2.17 m³/m³) during third week of the experimental period. Further a total gas production of 53431.6 litres (13.35 m³/m³) was recorded for the entire retention period of seven weeks. The analysis of gas composition indicated that the average methane content of 61.67 per cent was recorded in the gas collected from the biogas plant during the retention period of third to seven weeks. The benefit cost ratio of fixed dome type pilot size biogas plant was calculated to be as 1.49: 1: The payback period for biogas plant worked out to be 11½ months.

Studies on Variability, Genetic Diversity and Heterosis in Chilli (*Capsicum annuum* L.)

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ABSTRACT

An investigation on chilli (*Capsicum annuum* L.) was under-taken at the AICRP (vegetable) plots in the Department of Horticulture during kharif 2002-03 with two experiments viz., 36 genotypes for variability, heritability, genetic advance, character association, path analysis and genetic diversity and 20 F₁s from line x tester (4 X 5) design to estimate heterosis and combining ability for 18 quantitative characters. There was considerable variability for the 18 quantitative characters as indicated by the analysis of variance. Moderate to high GCV and PCV and also high heritability with high genetic advance as per cent mean was observed for most of the characters.

Correlation studies indicated that significantly and desirable correlation between dry fruit yield per plant with most of the characters. Path analysis revealed that importance should be given to fruit weight and fruit per plant.

A wide ranging D² values indicated the high extent of diversity in germplasm, eleven clusters were formed among 36 genotypes. The cluster 1 had maximum number of genotypes (16). The maximum diversity was observed as intercluster distance between cluster I and II. Indicating that the cluster II was highly divergent from the cluster-I.

The heterosis and combining ability analysis revealed that significantly heterosis was noticed for all the characters over mid-parent, better-parent and standard check. RHRC 50-1 x AR-19 and DH-S x AR-19 were hi-het yielder. The parents DH-5, AR-19, RHRC 50-1, VN-2, PRM-57 and Phule Sai were-good general combiners for all yield related disease related traits. The crosses LCA-334 x PMR-57, LCA-334 x GPC-82 and DH-5 x AR-19 showed high SCA effects for fruit yield per plant. The cross DH-5 x PMR-57 was resistant for powdery mildew incidence. LCA-334 x Phule Sai for leaf curl complex incidence and the cross Pant C-1 x AR-19 was promising hybrid with resistance against the fruit rot and fruit borer incidence.

Integrated Weed Management Studies in Gerbera (*Gerbera jamesonii* H. Bolus)

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ABSTRACT

A field experiment was carried out to study the integrated weed management studies in gerbera (*Gerbera jamesonii* H. Bolus) at the Floriculture Unit, Division of Horticulture, Main Agricultural Research Station, University of Agricultural Sciences, Dharwad during 2002-2003. The experiment consisted of twelve treatments viz., seven different pre-emergent herbicides and two mulching Materials and these treatments compared with two hand weedings at 30 and 60 days after planting, weed free and unweeded control. The experiment was laid out in randomised complete block design (RCBD) with three replications.

Application of atrazine @ 1.00 kg a.i. ha⁻¹ was phytotoxic while, pendimethalin @ 1.0 kg @a.i. ha⁻¹ and alachlor @ 1.5 kg a.i. ha⁻¹ were not phytotoxic. The weed control efficiency was highest and weed index was lowest in weed free treatment, black polyethylene sheet treatment, application with pendimethalin @ 1.00 kg a.i. ha⁻¹ and alachlor @1.5 kg a.i. ha⁻¹.

The growth parameters viz., plant height, number of leaves, leaf area and spread of the plant were maximum in weed free treatment, pendimethalin @ 1.00 kg a.i. ha⁻¹, alachlor. @ 1.5 kg a.i. ha⁻¹ and black polyethylene sheet treatment.

The higher yield and more number of quality flower stalks were recorded in weed free treatment, pendimethalin Cw 1.00 kg a.i. ha⁻¹ and black polyethylene sheet treatment. However, the highest B:C ratio was obtained in weed free treatment, pendimethalin @ 1.0 kg a.i. ha⁻¹ and alachlor @ 1.5 kg a. i. ha⁻¹.

Evaluation of Daisy (*Aster amellus* L.) Genotypes

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ABSTRACT

An investigation was carried out to evaluate the performance of eight daisy genotypes with respect to various morphological characters and yield at Floriculture Unit of New Orchard Division of Horticulture, University of Agricultural Sciences, Dharwad during kharif 2002. The genotypes 'Purple Monarch', 'Dark Milka', 'Blue Moon' and 'White Prestige' showed good performance for growth attributes as well as yield attributes viz., plant height, number of suckers, number of leaves, leaf area, leaf area index, leaf area duration and total dry matter production and these genotypes produced more number of flowers per plant and flower spikes per plant.

The genotypes 'Milka Star' and 'Pink Milka' showed minimum plant height and the genotypes 'Painted Lady', 'Peter's White' and 'Pink Milka' produced less number of flower spikes per plant. Size of flower, length of flower spike and vase life was more in the genotypes 'Purple Monarch', 'Dark Milka' and 'Blue Moon'. This was due to accumulation of more carbohydrates.

Phenotypic and genotypic coefficient of variation were medium for plant height, number of leaves, number of flowers per plant length of flower spike and weight of flower spikes. High heritability with high genetic advance was observed for plant height, number of leaves, length of flower spike, weight of flower spike and weight of 10 flowers. It was noticed that flower yield per hectare had strong positive correlation with total dry matter, number of spikes per plant, weight of flower spike and weight of 10 flowers at both genotypic and phenotypic level.

Response of Seedless Grape Genotypes to Growth Regulators Under Transitional Tract of North Karnataka

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ABSTRACT

A field experiment was conducted to study the response of seedless grape genotypes to growth regulators under transitional tract of North Karnataka at Department of Horticulture, College of Agriculture, UAS, Dharwad during 2002-03. The experiment was laid-out in split plot design assigning three genotypes as main treatments and two growth regulators as sub treatments with three replication.

The highest leaf area, chlorophyll and dry matter contents of index leaf was recorded in Arka Neelamani due to application GA₃ (50 ppm) in combination with brassinosteroid (1 ppm) as compared to Thompson Seedless and Sharad Seedless genotypes over untreated control.

Application of growth regulators known to have significant influence on yield parameters also. The maximum bunch width, bunch weight, 100 berry weight, berry diameter and yield per hectare (32.57 t) was recorded in Arka Neelamani upon spraying GA₃ (50 ppm) in combination with brassinosteroid (1 ppm) as compared to Thompson Seedless and Sharad Seedless genotypes over untreated control.

Genotypes responded in better manner for application of GA₃ (50 ppm) in combination with brassinosteroid (1 ppm) as a result there was improvement in quality parameters. Thompson Seedless has recorded the highest total soluble solids, reducing sugar and total sugars while, Arka Neelamani recorded the lowest titratable acidity and highest juice content as compared to Sharad Seedless over untreated control.

Among the genotypes Arka Neelamani has given very good response with respect to different growth and yield parameters and it showed all the exportable quality characters as well as tolerance to downy mildew, powdery mildew and anthracnose diseases.

Among the pre-harvest treatments GA₃ (50 ppm) + BR (1 ppm) is the best treatment for better growth, yield and quality attributes as well organoleptic qualities, such as general appearance, taste and flavour firmness and overall acceptability.

Tissue Culture Studies in Tamarind (*Tamarindus indica* L.)

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ABSTRACT

An investigation on tissue culture studies in tamarind (*Tamarindus indica* L.) was carried out in the Tissue Culture Laboratory, Department of Horticulture, College of Agriculture, University of Agricultural Sciences, Dharwad during 2001-2003.

The highest aseptic culture establishment was observed when the explants were treated with HgCl_2 (0.1%) for 10 minutes. The various explants used in the experiment were from two different sources namely axenic seedlings and field grown mature trees. Shoot tip, cotyledonary node, epistem and hypostem were excised from axenic seedling, while shoot tip, leaves, axillary bud, stem segment and root tip were taken from mature tree of variety DTS-1. Cotyledonary nodes, shoot tips from axenic seedling and axillary bud from mature tree gave the quickest response and maximum survival percentage.

Cotyledonary explants from axenic seedling responded better to treatment combinations in MS medium with BAP 0.5 mg/l + coconut water (CW) 10% with maximum and earliest shoot induction, maximum number of shoots per explants (2.85) and maximum per cent explants with multiple shoots (100%). Similarly shoot tip explants from axenic seedlings gave the highest per cent shoot establishment (85.00%) and less number of days for shoot induction (5 days) with maximum shoot length (2.44cm) on medium containing BAP 0.5 mg/l + NAA 0.1 mg/l.

Axillary buds collected from mature tree gave highest per cent bud break (83.33%) and response to multiple shoot induction (75.00%) on medium containing BAP 2.0 mg/l + CW 10%.

Micro shoots obtained from cotyledonary node from axenic seedling and axillary buds from mature tree responded for rooting on half strength MS medium with IBA 2.0 mg/l.

Influence of vam, Vermiculture and Trichoderma Harzianum on Growth and Yield of Banana Ratoon Crop Cv. Rajapuri (Musa.AAB)

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ABSTRACT

An investigation was carried out on banana crop cv. Rajapuri to study the influence of VAM, vermiculture and *Trichoderma harzianum* on growth and yield during 2001-2003 at the Department of Pomology, Kittur Rani Channamma College of Horticulture, Arabhavi, University of Agricultural Sciences, Dharwad.

The VAM (*Glomus fasciculatum*) inoculated plants produced significantly higher values for the vegetative growth parameters, bunch characters (bunch weight, bunch length, bunch width, number of fingers per hand, number of hands per bunch, total number of fingers per bunch), finger characters (finger length, finger weight, pulp weight), quality parameters (days taken to maturity, shelf life, non-reducing sugar), yield, leaf N and P, per cent root colonization, spore count, while lower values were recorded for nematode population.

The *in-situ* vermiculture plants produced significantly higher values for finger girth, finger weight, total soluble solids and per cent root colonization, while lower values were recorded for titrable acidity. The plants received 75 per cent RDF + vermicompost produced significantly higher number of leaves, number of suckers, bunch characters (bunch weight, bunch width, total number of fingers per bunch), finger characters (finger length, pulp weight), quality parameters (days for opening, total sugars), yield and spore count. Application of RDF + *Trichoderma harzianum* recorded significantly higher number of fingers per hand, number of fingers per bunch, leaf N content and lower nematode population.

The plants cultured with *in-situ* vermiculture with VAM fungi produced highest finger girth and non-reducing sugar content. Inoculation of VAM fungi along with 75 per cent RDF + vermicompost produced significantly higher plant girth, number of suckers, bunch weight, number of fingers per hand, number of hands per bunch, yield and spore count. Plants applied with RDF + *Trichoderma harzianum* coupled with VAM fungi recorded significantly highest finger girth and lowest nematode population.

Effect of *Glomus fasciculatum* and Microbial Consortia on Growth and Yield of Banana Ratoon Crop, Cv. Rajapuri (Musa AAB)

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ABSTRACT

An investigation was carried out on banana ratoon crop, cv. Rajapuri (Musa AAB) to study the effect of *Glomus Fasciculatum* and microbial consortia on growth and yield in the Department of Pomology, Kittur rani Channamma College of Horticulture, Arabhavi During 2002-2003.

The inoculation of endomycorrhizal fungus, *Glomus fasciculatum* resulted in significantly higher values for the characters, viz., plant height, pseudostem girth, leaf area, number of leaves, bunch weight, bunch, number of hands per bunch, number of fingers per hand, total number of fingers per bunch, finger length, finger girth, finger weight, pulp weight, peel weight, pulp to peel ratio, total soluble solids, TSS: acid ratio, reducing sugars, yield per plot, yield per hectare, leaf P and K content, spore count and per cent root colonization by endomycorrhizal fungus, while significantly lower values for crop duration, acidity and nematode population were recorded. Further, on significant differences with respect to number of suckers, peel weight and non-reducing sugars were noticed.

Among the different sub-treatments, RDF recorded higher yields, which were statistically on par with the yields obtained from microbial consortia-II and combination of 75 per cent RDF and microbial' consortia-I.

Lower nematode population was recorded in microbial consortia-II, whereas it was higher in plants supplied with RDF.

Interaction effects were also found to be significant. *Glomus fasciculatum* inoculated plants registered maximum yield in sub-treatment with 75 per cent RDF + microbial consortia-I followed by RDF alone and microbial consortia-II, which were on par with each other. To the uninoculated plants, maximum yields were recorded in sub-treatment RDF followed by microbial consortia-II and combination of microbial consortia-I and 75 per cent RDF, which were on par with each other.

Genetic Variability Studies in African Marigold (*Tagetes erecta* L.)

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2003 (Year submitted)

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ABSTRACT

Field investigation with thirty one accessions was carried out to find information on genetic variability, character association and path coefficient analysis at Department of Floriculture and Landscape Gardening, Kittur Rani Channamma College of Horticulture, Arabhavi during 2002-2003.

Analysis of variance revealed significant ($p= 0.01$) differences among treatments for all the twenty three characters studied. The phenotypic and genotypic coefficient of variation were recorded high for the traits like flower yield per plant, flower yield per plot, flower yield per hectare and xanthophyll content, indicating existence of wide range of genetic variability in the germplasm evaluated and hence good scope for the improvement of these characters.

High heritability estimates coupled with high genetic advance over percentage of mean were observed for the traits like number of days for the first flower bud initiation, flower weight, flower yield per plant, flower yield per hectare, seed yield per plot, seed yield per hectare, shelf life of flowers and xanthophyll content indicating the predominance of additive gene component. Therefore, simple selection for these characters would be rewarding.

Correlation studies revealed significant and positive association of yield with plant height (90 DA1j), number of lateral branches (90 DA1j), plant spread (East-West, North-South) (90 DAT), duration of crop, number of flowers per plant, flower weight, flower length, flower diameter, number of seeds per flower and seed yield per plant, suggesting the possibility of simultaneous selection for these traits.

Path analysis for the flower yield recorded that flower weight and seed yield per plant have high direct effect indicated the possibility of increasing flower yield by selecting the accession for these characters directly.

Performance suggested that *Te-27*, *Te-29*, *Te-30* and Peruvian were found promising for flower yield and accessions Pusa Narangi Gaiinda, First lady, *Te-20*, *Te-30* and Orange Treasure for xanthophyll content

Standardization of Drying Techniques in Rose

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ABSTRACT

Experiments were undertaken on standardization of drying techniques for rose at the Department of Floriculture and Landscape Gardening, kittur Rani Channamma College of Horticulture, Arabhavi during 2002-2003.

It was evidenced from the present study that fluency of desiccants on drying was similar to dry of silica gel was superior with respect to color (4.52), shape (4.70), texture (4.24) and appearance (.35). Time taken for dry was also influenced by desiccants used. Drying of fully opened flowers or half opened flowers in silica gel required lesser number of days than drying in sand medium.

The flowers treated with 1:5 glycerol to water ratio were found to be the best color (4.60), shape (4.55), appearance (4.76) and texture (4.33). Flowers treated with 1:1 glyceol to water ratio for 24 hours required minimum number of days (4.16) when dried under shade with silica as embedding medium.

Drying of flowers in oven by embedding in silica gel at 40⁰C recorded better quality parameters, viz., color (4.68), shape (4.40), texture (4.22) and appearance (4.56). Time taken for drying was minimum in case of flowers dried without embedding and dried at 50⁰C (36.50) but quality of flowers could be maintained only in silica gel dried flowers.

Drying of flowers in microwave oven at low power out put level maintained the quality of silica gel embedded flowers. Quality parameters, viz., color (4.50), shape (4.16) appearance (4.58) and texture (4.27) were superior in the flowers embedded in silica gel and dried at low power output level for two minutes.

The results of the present study suggest that shade drying by embedding in silica gel would yield best quality dried rose flowers and was found to be on par with oven drying with silica gel embedding.

Studies on Genetics Variance and Heterosis in Okra [*Abeloschus exculentus* (L.) Moench]

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2003 (Year submitted)

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ABSTRACT

The investigations on genetic variance was carried out with 69 genotypes. High GCV and PCV were observed for number of seeds per fruit, number of branches per plant, plant height and total yield per plant. High heritability coupled with high GAM was observed for plant height, internodal length, number of nodes on main stem, number of fruits per plant and total yield per plant. For days to first and fifty per cent flowering, high heritability with low GAM was observed. Number of fruits per plant and average fruit weight had positive and very high direct effects on total yield. Totally 55 genotypes were evaluated for incidence of pest and diseases. Per cent fruit borer incidence ranged from 6.25 to 32.35, YVMV incidence ranged from 7.20 to 38.0 per cent and powdery mildew incidence ranged from 26.56 to 64.9 per cent.

The investigations on heterosis and combining ability was carried out with 42 F_1 hybrids derived from 14 lines crossed with each of 3 testers in line x tester mating design. The crosses viz., KA062 x KA063 (42.070/0), KA068 x KA063 (33.82%) and KA058 x KA063 (33.76%) exhibited maximum standard heterosis for total yield per plant. Comprehensive assessment of parents and hybrids by considering gca effects and heterosis for 17 characters resulted into identification of lines viz., KA058, KA059, KA060, KA061, KA062, KA064, KA065 and KA068 and testers viz., KAOO 1 and KA063 as good overall combiners and 23 crosses were identified as high heterotic. Among 23 heterotic crosses, 17 involve parents of high x high combiners. Non additive gene action was predominant for number of branches per plant, number of leaves, days to first flowering and fifty per cent flowering and average fruit weight. Additive gene action was predominant for plant height, total yield per plant, fruit length and number of fruits per plant.

Genetic Variability and Divergence Studies in Tomato (*Lycopersicon Esculentum* Mill)

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ABSTRACT

Sixty-seven tomato types were evaluated in Randomised Block Design with three replications to study genetic variability and divergence at K.R.C. College of Horticulture, Arabhavi during 2002-2003. Analysis of variance revealed, highly significant (at $P=0.01$) differences among genotypes for thirty-seven out of forty seven growth, yield and quality characters. Broad genetic base was evident as the values of genotypic and phenotypic co-efficient of variations were high for number of primary branches, number of fruits per plant and number of seeds per fruit. High heritability coupled with high genetic advance over mean was observed for number of fruits per plant, average fruit weight, polar and equatorial diameters of the fruit, pericarp thickness, number of locules per fruit, TSS and lycopene content, indicating predominance of additive gene action for these traits.

Correlation studies revealed significant and positive association of total yield per plant with early yield per plant, equatorial and polar diameter of the fruit, average fruit weight, fruit volume, number of fruits per plant, percent fruit set, number of locules per fruit, plant height and pericarp thickness. Path analysis studies revealed high direct effects of early yield per plant, number of flowers per cluster, average fruit weight and number of fruits per cluster on total yield per plant.

By following Mahalanobis D^2 analysis, sixty-seven genotypes of tomato were grouped into seven clusters. The cluster IV showed maximum intra-cluster distance and the maximum inter-cluster distance was observed between cluster V and VI. Among the 21 characters included in D^2 analysis, number of seeds per fruit contributed maximum to genetic diversity followed by average fruit weight, number of fruits per plant and fruit volume.

Post harvest Studies in Lemongrass Varieties (*Cymbopogon Flexuosus* nees)

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University Library, UAS, Dharwad (Location)

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ABSTRACT

An Investigation was carried out to study the effect of various post harvest treatments on lemongrass varieties prior to distillation on the oil yield, oil content and citral content of essential oil at the Department of Medicinal and Aromatic plants, Kittur Rani Channamma College of Horticulture, Arabhavi, during 2002-03.

Chopping of lemongrass to different lengths significantly increased the oil yield and oil content. Among the different chopping lengths, the highest recovery of the oil and the oil content (1.22%) was obtained in 3 cm chopping length. However, these treatments did not affect the citral content of oil significantly.

Among the various periods of storage of lemongrass, storing of the lemongrass for a period of 72 hours resulted in highest oil yield and oil content (1.37%). However, these treatments did not affect the citral content of oil significantly.

Dipping of lemongrass in different concentration of sodium chloride solutions (0.5% to 2%) for 24 hours did not show any significant influence on the oil yield, oil content as well as citral content.

Irrespective of varieties, there was significant difference between the treated grass and untreated control with respect to oil yield and oil content. Among the varieties, the highest mean oil yield and oil content (1.03%) was recorded in variety krishna. However, the citral content of oil was unaffected by either varieties or treatments.

From the present investigation, it is concluded that the treatment consisting of dipping of grass in 2.0 per cent sodium chloride solution for 24 hours, followed by storage of grass for 72 hours and then chopping of grass to length of 3 cm before distillation can be adopted for better oil recovery as well as quality.

Evaluation of Fenugreek (*Toenum foenum-graecum* L.) Genotypes

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ABSTRACT

Field investigation was undertaken to evaluate fenugreek genotypes and to elicit information on genetic variability, character association and path analysis at Department of Spices and Plantation Crops, Kittur Rani Channamma College of Horticulture, Arabhavi during 2002-2003.

Eight fenugreek genotypes with diverse geographical origins are planted in randomized block design with three replications. The growth and yield characters were studied.

Based on per se performance, the genotypes Belgaum Local (13.75 g/ha), Ghataprabha Local (10.76 g/ha) and MRL-1 (10.51 q/ha) were identified to be superior in respect to grain yield and growth parameters.

High estimates of genotypic coefficient of variation and phenotypic coefficient of variation for number of branches per plant (51.09, 54.06), number of pods per plant (44.36, 46.44), pod length (31.46, 32.03), number of seeds per pod (23.49, 32.03) and thousand seed weight (36.38, 37.03) indicated the major part of variability in these characters were due to genetic constitution.

High heritability coupled with high genetic advance as per cent of mean was found for number of pods per plant (91.30, 87.30), number of branches per plant (89.40, 99.45), thousand seed weight (96.50, 73.62), pod length (96.50, 63.70) and harvest index (89.90, 70.61).

The characters pod length (0.846, 0.728), number of seeds (0.925, 0.823), thousand seed weight (0.930, 0.813) and harvest index (0.939, 0.903) exhibited positive association with the grain yield per plant in both genotypic and phenotypic level.

Path coefficient analysis showed that pod length, number of seeds, thousand seed weight and harvest index were major constituting factors in determining the grain yield per plant.

Evaluation and genetic Variability studies in chilli Genotypes (*Capsicum annum* L.)

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ABSTRACT

Field investigation with 27 chilli accessions was undertaken to elicit information on evaluation, genetic variability, character association and path analysis at Department of Spices and Plantation Crops, Kittur Rani Channamma College of Horticulture, Arabhavi during 2002-2003.

Hybrid 9646 and other varieties like GPC-80, 9639, Pusa Jwala, Arka Abir, HPCL-99-10 and Arka Lohit recorded higher dry chilli yield (9.71, 9.46, 9.44, 8.77, 8.18, 8.22, 7.31 q/ha, respectively). Analysis of variance revealed highly significant ($P=0.01$) differences among treatment for all twenty growth and yield characters in chilli genotypes.

The values of genotypic and phenotypic coefficient of variation were moderate for the characters like fresh red chilli Yield (30.27% and 38.04%) and dry chilli yield (33.50% and 42.29%), harvest index (36.77% and 45.00%) indicating the existence of little variability in the germplasm evaluated. High heritability coupled with moderate genetic advance over mean were observed for fruit length (92.10% and 38.87%), pedicel length (91.20% and 40.65%), fresh fruit weight (90.40% and 61.89%), dry fruit weight (99.90% and 60.79%), number of seeds per fruit (84.50% and 42.94%), ascorbic acid (76.90% and 33.10%), indicating additive gene action for these traits. Therefore, selection for these traits would be gainful.

Correlation studies revealed significant and positive association for dry chilli yield with per cent fruit set (0.436), secondary branches (0.492), number of fruits per plant (0.635), harvest index (0.722), dry fruit weight (0.597), fresh red chilli yield (0.894), suggesting possibility of simultaneous selection for these traits.

Path analysis for dry chilli yield revealed that the direct selection on number of fruits per plant (1.382) and dry fruit weight (1.027) for dry chilli yield would be gainful as they had direct effect.

Standardization of Processing Technology for Banana Fruits

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ABSTRACT

An investigation was carried out to standardise the protocol for preparation of dehydrated banana slices and juice based beverages from banana fruits cv. Robusta at the Department of Post-harvest Technology, Kittur Rani Channamma College of Horticulture, Arabhavi during the year 2002-2003.

The dehydrated banana slices obtained from pre-treatment of steeping in 0.5 per cent KMS + 0.5 per cent calcium chloride for 10 minutes received better organoleptic scores for- colour- and appearance (4.833), texture (4.333), taste (4.333), flavour (3.250) and overall acceptability (4.500) followed by slices steeped in 500Brix sugar syrup containing one per cent calcium chloride for six hours. Recovery of dehydrated slices was maximum (27.200/0) in control. The time required for drying was minimum (19.040 hours) in slices steeped in 600Brix sugar syrup containing one per cent calcium chloride for six hours.

Among the different methods of drying, the highest recovery (23.016%) of dehydrated slices, minimum time (22.749 hours) for dehydration and least 00 value (0.293) for non-enzymatic browning were observed in electric drying. However, sun dried slices were found to have better organoleptic scores for all the parameters (4.074 for colour and appearance, 3.602 for texture, 3.519 for taste, 2.805 for flavour and 3.741 for overall acceptability).

The organoleptically good quality dehydrated banana slices were obtained by steeping the slices in 500Brix sugar syrup containing one per cent calcium chloride for six hours under sun drying. The scores were more than four in all the parameters indicating that these slices were highly acceptable.

RTS prepared from 10 per cent banana juice + 0.1 per cent citric acid + 1.0 per cent ginger + sugar adjusted to TSS of 100Brix scored better for colour and appearance, taste, flavour and overall acceptability (3.803, 3.848, 3.512 and 3.518, respectively).

Standardization of Drying Techniques in Fig Fruits

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ABSTRACT

An investigation was carried out to standardise the techniques in fig fruits at the Department of Post-harvest Technology, Kittur Rani Channamma College of Horticulture, Arabhavi during the year 2002-2003.

The dehydrated fig fruits obtained from pre-treatment of blanching for 4 minutes + dipping in 2 per cent KMS solution for 30 minutes recorded better organoleptic scores for colour and appearance (4.59), flavour (4.08) and overall acceptability (4.45). The highest organoleptic scores for texture (4.68) and taste (4.50) was recorded in steeping fruits in 60⁰Brix syrup for 24 hours. Recovery of dehydrated fig fruits was maximum (25.27%) in treatment of steeping fruits in 60⁰Brix sugar syrup for 24 hours. The lowest moisture content of dehydrated fig fruits was recorded in dipping fruits in 2 per cent dip oil + 1.5 per cent K₂CO₃ solution for 3 minutes (14.40%). The highest total sugar (55.20%) and ascorbic acid (1.85 mg/ 100 g) content were recorded in fruits steeped in 60⁰Brix sugar syrup for 24 hours. The OD value for non-enzymatic browning of dehydrated fig fruits was lowest (0.200) in blanching + sulphitation treatment.

Among the different methods of drying, the highest recovery (22.84%) of dehydrated fig fruits was recorded in sun drying. The minimum drying time was observed in electric drying (25.67 hours) followed by solar drying (36.89 hours) and the maximum in sun drying (47.61 hours). The OD value for non-enzymatic browning was the lowest in sun dried fruits (0.324). The highest scores for organoleptic evaluation were observed in dehydrated fruits obtained from electric drying, 3.13 for colour and appearance, 3.48 for texture, 3.78 for taste, 3.72 for flavour and 3.18 for overall acceptability.

Organoleptically accepted dehydrated fruits were obtained In blanching + sulphitation treatment and dried in electric drier.

Dehydration of Aonla (*Emblica officinalis Gaerth*) Fruits

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ABSTRACT

The studies on dehydration of aonla fruits and standardisation of recipe for aonla RTS from drained aonla syrup were conducted at Kittur Rani Channamma College of Horticulture, Arabhavi during 2002-2003.

The dehydrated aonla slices were obtained after giving different pre-treatments and drying either in open sun or solar dried or electric tray drier.

The organoleptically acceptable good quality dehydrated aonla slices were obtained by blanching the whole fruits followed by steeping the slices in 60°Brix syrup containing 0.2 per cent Potassium meta bisulphate for 24 hours and drying in an electric tray drier. The organoleptic scores (out of 5.00) were 4.23 for colour of appearance, 4.16 for texture, 4.17 for taste and 4.78 for overall acceptability. The recovery of dehydrated aonla slices was 55.59 per cent with a dehydration ratio of 1.80. The time required for drying was 14.08 hours in electric tray drier, 21.02 hours in solar drier and 26.47 hours in sun drying. Electrically dried aonla slices showed higher values for reducing sugar (10.31%), non-reducing (34.27%), total sugars (46.52%), ascorbic acid content (401 mg/100 g) and lower values for non-enzymatic browning (0.108 OD at 440 nm).

The RTS prepared using drained aonla syrup adjusted to 17°Brix containing 2 per cent lime juice + 1 per cent ginger was found to be acceptable with organoleptic scores (out of 5.00) of 3.86 for colour and appearance, 3.35 for flavour, 3.47 for taste and 3.35 for overall acceptability.

Standardization of Processing Technology for Sapota [Manilkara achras (Mill) Fosberg] Fruits

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A.K. ROKHADE (Major Advisor)

ABSTRACT

An investigation was carried out to standardize the protocol for preparation of dehydrated sapota slices and recipe for preparation of sapota RTS from drained sapota syrup at the Department of Post-harvest Technology, Kittur Rani Channamma College of Horticulture, Arabhavi during the year 2002-2003.

The dehydrated sapota slices (without skin) obtained from pre-treatment of steeping in 70⁰B syrup containing 0.2 per cent KMS + 1.0 per- cent citric acid for 12 hours received better organoleptic scores for colour and appearance (4.50), texture (4.32), taste (4.44) and overall acceptability (4.37) followed by the same treatment with 60⁰B syrup. Moisture recovery (34.78%) and total sugar content (65.380/0) of dehydrated sapota slices were recorded in treatment of sapota slices (without skin) steeped in 70⁰B sugar containing 0.2 per cent KMS + 1.0 per cent citric acid for 12 hours. The time required for drying was highest (30.76 hours) in this treatment while it was minimum in (24.53 hours) in control (with skin).

Among the different methods of drying, the highest recovery of dehydrated *slices* (31.69%), *minimum time for dehydration* (23.32 hours) and least OD value for non-enzymatic browning (0.167) were observed in electric dryin8 as compared to 30.06 per cent, 32,40 hours, 0.232 OD value, respectively in sun drying. However, sun dried slices were found to have better organoleptic scores for all the parameters (4.02 for colour and appearance, 4.03 for texture, 4.12 for taste, 4.10 for overall acceptability).

The organoleptic evaluation of different recipes of RTS prepared from drained sapota syrup revealed that the sapota syrup adjusted to 12⁰B was acceptable with scores of 4.63 for colour and appearance, 4.79 for taste, 4.56 for flavour and 4.25 for overall acceptability.

Dyeing of UAS Sheep Breed Wool With Acacia Catechu Leaves

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ABSTRACT

The present study was carried out during the period 2002-03. The main objectives of the study were to optimize the dyeing conditions with Acacia catechu leaves. To ascertain the physical properties of UAS sheep breed wool yarn dyed with Acacia catechu leaves and to assess the colourfastness of the dyed samples.

UAS sheep breed wool was selected from Poultry, Sheep and Goat Farm, Main Research Station, University of Agricultural Sciences, Dharwad. The wool sample was cleaned, Carded and spun into yarn at Wool Research Association, Thane, Mumbai. Later it was scoured and dyed with Acacia catechu leaves extract. The effect of scouring and dyeing on wool was determined by assessing the physical parameters of wool yarn before scouring and after scouring and dyeing. Colourfastness testes to washing, rubbing, sunlight and perspiration were carried out and assessed using grey scale and standard wool pattern. The results obtained were statistically analyzed using completely randomized design and correlation test.

Results revealed that 6 per cent dye concentration, 45 minutes dye extraction time, 45 minutes dyeing time and 15 minutes mordanting time were optimized at 640 Hz wavelength for dyeing wool with Acacia catechu leaves. Scouring enhanced the dye absorption rate. The strength, elongation and yarn count of scored and dyed samples in acidic media were found to be decreased compared to the undyed samples. Colourfastness of all the dyed wool samples were ranged between good to excellent. Wool sample premordanted with 1 percent ferrous sulphate exhibited excellent colourfastness in acidic media.

STUDY ON SEROPREVALENCE OF BLUETONGUE IN SHEEP AND GOATS IN NORTH KARNATAKA

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2003

Major Advisor: Dr,Y Hari Babu

A seroepidemiological study was conducted in North Karnataka in sheep and goats to estimate the prevalence of bluetongue virus (BTV) antibodies and to look for biological characterization and quantification of the seropositive samples. A total of 851 serum samples were collected from indigenous Deccani, Bandur and Kenguri sheep (775) and non-descript goats (96). Agar gel immunodiffusion (AGID) test and counter immunoelectrophoresis (CIE) test were used to detect BTV positive reactors. The prevalence of BTV antibodies in North Karnataka was 2.33 per cent comprising 2.19 per cent and 2.63 per cent in sheep and goats respectively.

All indigenous breeds had low seroprevalence viz sheep (2.19%) goats (2.63%). Higher seroprevalence was detected in sheep (4.6%) and goats (6.45%) of 6-12 months age group. Seropositive reactors revealed low concentration of immunoglobulin (Igs) (1.5 mg to 1.85mg/ml) on single radial immunodiffusion (SRID). Sodium dodecyl sulphate-polyacrylamide gel electrophoresis (SDS-PAGE) used for biological characterization showed polypeptide bands of 45 kD and 88 kD were unique to seropositive reactors and hyperimmune sera. Western blot used as a confirmatory test detected polypeptide bands of 45 kD and 88 kD which were related to BTV.

COMPARATIVE STUDIES ON GROWTH AND MEAT CHARACTERS BY FEEDING COMPLETE DIETS WITH LIVE YEAST CULTURE IN LOCAL NON- DESCRIPT AND UAS SHEEP

Chandrashekar Patil

2003

Major Advisor: Dr. B. Ramachandra

Ten female sheep each from local non-descript and UAS were randomly allotted into two treatments (T_0, T_1) comprising 5 animals each and were fed with complete diet with roughage to concentrate ratio of 50:50. The treatment group was fed with complete diet supplemented with live yeast culture @5g/day/sheep. The dry matter intake, body weight, body weight gain and feed conversion efficiency were nonsignificant among all the groups. The pH and ammonia nitrogen were found to be significantly ($P < 0.001$) lower and volatile fatty acid was significantly ($P < 0.01$) higher in yeast fed groups. Hematobiochemical parameters such as hemoglobin, packed cell volume, total erythrocyte count, total leukocyte count, calcium phosphorus total protein, albumin, globulin, albumin: globulin were nonsignificant among the treatments and groups whereas period mean was significantly ($P < 0.01$) higher. The digestibility coefficient of all the nutrients were not affected except organic matter and crude protein which were significantly ($P \leq 0.01$) higher in UAS sheep. The digestible crude protein, total digestible nutrient, metabolisable energy intake were found to be nonsignificant among all the groups except UAS sheep. The digestible crude protein, total digestible nutrient, metabolisable energy intake were found to be nonsignificant among all the groups except UAS sheep which had significantly ($P \leq 0.01$) higher intake. The digestibility of forage fibre fractions such as cell content, acid detergent fibre, neutral detergent fibre and hemicellulose were nonsignificant in all the groups whereas cellulose digestibility was significantly ($P \leq 0.01$) higher in treatment group. The meat study revealed non significant effect with supplementation of live yeast culture in this study. Hence, it can be concluded that supplementation of yeast culture with complete diet was found to be non beneficial for growth, nutrient digestibility and meat quality and quantity in both local and UAS sheep. However, in this study UAS sheep for mutton quality was found to be superior.

INCIDENCE OF CANINE TRANSMISSIBLE VENEREAL TUMOUR IN NORTH KARNATAKA AND EVALUATION OF SURGERY AND DOXORUBICIN THERAPY

Sharanabasappa .G. Ron

2003

Major Advisor:S.M.Usturge

The incidence of Canine Transmissible Venereal Tumours (CTVT) was studied amongst the total number of dogs presented with surgical problems at various Veterinary Institutions of North Karnataka during the period of January 2002 to December 2002. CTVT was diagnosed based on symptoms, history and histopathological examinations of the tumour specimens. The second stage of study involves treatments aspect of CTVT. The clinical cases presented at various veterinary institutions during the study period were divided into three groups for evaluation of the efficacy of various treatments viz., surgical excision alone (GroupI), combination of surgical excision with Doxorubicin therapy (GroupII) and Doxorubicine therapy alone (GroupIII). The evaluations of treatments were made based on post operative observations on clinical physiological, haematological and biochemical estimations.

The Incidence of Canine Transmissible Venereal Tumour revealed 0.33% among total canine cases, 1.79% among the total surgical cases and 75.86% among the total number of tumours reported during the study. All the canine Transmissible Venereal Tumour cells were polyhedral with pale to pink cytoplasm having vesiculated nucleus placed centrally and some were of mixed type (27.72%).

Surgical excision with Doxorubicin used at the dose rate of 30 mg/m² BSA was an effective treatments regiment for CTVT as compared to Doxorubicin therapy alone or surgery alone and can be considered as superior treatments regimen for CTVT in dogs. Physiological and haematobiochemical parameters were within normal range after the treatment

EPIDEMIOLOGICAL STUDY AND COMPARATIVE EFFICACY OF SOME INDIGENOUS AND ALLOPATHIC DRUGS AGAINST ASCARIASIS OF BUFFALO CALVES

M.C. Anilkumar

2003

Major Advisor: Dr. S. Prassanna Kumar

In the present study, preliminary trials of indigenous drugs like *Azadirachta indica*, *Butea monosperma*, *Embelia ribes*, *Magnifera indica* and *Allium sativum* were conducted in buffalo calves having natural infection of *T. vitulorum*. Then *A. indica* and *B. monosperma* seed powder which gave encouraging results in the preliminary trials were used for detailed drug trials and was compared with allopathic drug Levamisole

Levamisole (7.5 mg/kg b.wt), *A. indica* and *B. monosperma* seed powder @0.25 gm/kg/b.wt orally were administered once and the percentage efficacy on 7th Post treatment day was 100% 47.3 and 22.87% respectively against Ascariasis of buffalo calves.

In the biochemical study parameters like calcium, triglycerides, cholesterol, globulins and A:G ratio showed no significant difference in mild, moderate and severe Ascariasis as compared to healthy buffalo calves.

The blood Phosphorus level was significantly increased in mild and moderate Ascariasis affected buffalo calves as compared to healthy buffalo calves.

The PCV and SGOT levels were significantly increased in moderate and severe Ascariasis whereas, the SGPT and Total bilirubin levels were significantly increased in severe Ascariasis as compared to healthy buffalo calves.

The glucose and total plasma proteins levels were significantly decreased in severe Ascariasis and compared to healthy buffalo calves.

The PCV and various biochemical parameters estimated before and on 3rd and 7th day of treatment in mild and moderate Ascariasis indicated either decrease or increase or maintenance of status quo and many parameters did not return to normal values.

The colostrums and milk samples from recovery parturient buffaloes in various locations were collected and examined for the presence of 3rd stage larva of *T. Vitulorum*. None of the colostrum and milk samples examined revealed 3rd stage larva and this finding is suggestive of transplacental transmission of Ascariasis in Buffalo.

INCIDENCE OF CANINE MAMMARY TUMOUR IN NORTH KARNATAKA AND COMPARATIVE EVALUATION OF SURGERY AND TOMOXIFEN THERAPY

Shrikant.M.Ganvi

2003

Major Advisor:Dr.Shivashankar.M.Usturge

The incidence of canine mammary tumours was studied among the total number of dogs presented with surgical problems in various Veterinary institutions of North Karnataka during the period of January 2002 to December 2002. Comparison of efficacy of surgical excision of mammary tumours alone and combination of surgical excision with Tamoxifen therapy was undertaken in the cases affected with canine mammary tumours. Tamoxifen therapy was undertaken post-operatively @ 1 mg/kg b.wt/day orally for 60 days. The treatments were evaluated post-operatively based on clinical, physiological, haematological, biochemical and histopathological observations.

The incidence of canine mammary tumour revealed 0.07% among total canine cases, 0.37% among total surgical cases and 15.52% among the total number of canine tumours. Surgical excision of canine mammary tumours continues to be an effective line of treatment. Surgical excision of mammary tumours with tamoxifen therapy is also an effective treatment with fewer side effects. Physiological and haematobiochemical parameters were not affected with the treatment. All the canine mammary tumours were malignant in nature mainly of ductal carcinoma type.

EPIDEMIOLOGICAL ASPECTS OF BLUETONGUE INFECTION IN BIDAR DISTRICT

Ravindra.Bhoyar

2003

Major Advisor:Dr.K.Ganesh Udupa

The study on epidemiological aspects of bluetongue indicated the existence of the disease and infection base on the informations collected from sheep owners and on the basis of seroprevalence of BT antibodies in apparently healthy sheep, goat, cattle and buffaloes in the district respectively. The epidemiological factors of bluetongue such as open type of housing, suitable breeding habitats for vectors and higher flies activity were also observed in the farms visited.

Culicoides midges were collected near animal sheds at agriculture Research Station, Veterinary College, Bidar and Mandakanahalli during October second-fortnight of 2002 to August first-fortnight of 2003 using light trap and total number of Culicoides collected were 1,74,273:1,05,676 and 19,695 respectively. Midges were found to be abundant almost throughout the year in Bidar taluk and their abundance was found to be highest during South-west monsoon and was lowest during Pre monsoon seasons.

A total of 14 species were identified among which *C. imicola* and *C. oxystoma* were found to be dominant species. On analysis for finding association between average abundance of Culicoides midges with the climatic factors a positive significant correlation was found between midges abundance and relative humidity. The presence of BTV antigen was detected in one of 11 pools of Culicoides midges using AGID test. A survival period of Culicoides midges under starvation and upon feeding sugar and blood under confinement in jars were studied.

The monthly monitoring of seronegative goats and cattle to detect the possible seroconversion to BTV revealed that seroconversion occurred during the periods of higher abundance of midges indicating that the virus is actively circulating between host and vectors.

DETECTION OF BRUCELLA ABORTUS ANTIGENS BY IMMUNOPEROXIDASE TEST ON THE PLACENTAL AND FOETAL LESIONS OF BOVINES

Somshekar

2003

Major Advisor: Dr. Hari Babu

A total of 14 clinical cases suspected for brucellosis with abortions and other complications were examined and screened with RBPT, STAT, STT and 2MET for antibodies of Brucella. Anti-Brucella antibodies were raised in rabbits. After purification with saturated ammonium sulphate precipitation method and dialysis, anti Brucella immunoglobulins were tagged to horseradish peroxidase and used in the immunoperoxidase test at 1:10 dilution. Impression smears collected from placental cotyledons from all the cases and foetal organs like liver, spleen, stomach contents collected from one animal were subjected to immunoperoxidase test. The serum samples which were found positive on serological tests were further subjected to SDS-PAGE analysis and western blotting.

Four animals were found positive for brucellosis on serological screening. All the animals which were positive for brucellosis on serological tests showed positive reaction on immunoperoxidase test. SDS-PAGE clearly distinguished positive and control serum samples wherein bands with molecular weight of 88 and 55 kD were seen only in positive serum samples. In western blotting three bands with molecular weights of 88, 55 and <29 kD were found to be immunodominant bands.

Based on the above observations it was concluded that immunoperoxidase test can be used successfully as a rapid and sensitive method for the diagnosis of brucellosis. SDS-PAGE and western blotting have the potential in molecular characterization of positive serum samples.

EFFECT OF COMPLETE FEED ON GROWTH RESPONSE AND MEAT CHARACTERS IN LOCAL BIDRI GOATS

C.Suresh

2003

Major Advisor:Dr.B. Ramachandra

Twenty four Bidri goats (3-4 months old) were distributed to four groups consisting three male and three females in each group and were fed with complete diets containing crude protein and total digestible nutrients of 15.46 and 55.00 (A): 15.58 and 60.00 (B) ; 17.75 and 55.00 (C) and 17.76 and 60.00 (D) per cent respectively. Twenty four weeks feeding trial revealed non significant body weight and body weight gain among different groups with significantly ($P \leq 0.01$) higher dry matter intake/100 kg body weight in C and D groups. Rumen biochemical parameters showed a significant ($P \leq 0.01$) increase upto the end of 2nd month and non significant thereafter. Significantly ($P \leq 0.01$) higher haemoglobin and blood ure nitrogen values were observed in high protein fed groups. The digestibility of proximate principles were found to be non significant. TDN, DCP and ME intake were non significant among the groups but significantly ($P \leq 0.01$) higher in males than females . Forage fibre factors were well utilized by growing males rather than females and also in C and D groups. All the four groups showed positive nutrient balances. Significantly ($P \leq 0.01$) higher heart girth gain, slaughter weight, carcass weight, dressing percentage, total meat and longissimus dorsi weight were observed in high protein fed groups. Chemical components of meat were non significant except intramuscular fat and iodine number where they are significantly ($P \leq 0.01$) higher in high protein fed groups. Organoleptic evaluation of sausage and loaf was done and observed that even after 60 days storage the keeping quality of the product was not deteriorated. C and D diets were found to be economical because of higher benefit cost ratio. Considering the results of the experiment it can be concluded that C (17.75% CP and 55.00% TDN) and D (17.67%CP and 60.00%TDN) complete diets with 50:50 concentrate to roughage ratio can be used for the production of better quality chevon in local Bidri goats.