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Contents

RESEARCH ARTICLES

Journal of Plant Development Sciences Vol. 14(1)

ECOLOGICAL NICHE MODELLING FOR *MANORANJITHAM*, AN ENDEMIC AND THREATENED BANANA CULTIVAR OF EASTERN GHATS, SOUTH INDIA

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Abstract: Predictive habitat distribution modelling framework for *Manoranjitham* (*Karuvazhai*), an important endemic fragrant banana cultivar of Eastern Ghats, South India has been analyzed using Maximum Entropy method. Presence points (geographical coordinates) were collected using a global positioning system during exploration survey visits for the collection of germplasm in Eastern Ghats, Tamil Nadu. MaxEnt software version 3.3.3k downloaded from www.cs.princeton.edu/~schapire/maxent was used for habitat modelling. The climate models generated for the present and future climates indicating that climate suitable regions for cultivation and on-farm conservation are available in parts of Andhra Pradesh (Prakasam, Chittoor), Tamil Nadu (Chengalpattu, North Arcot Ambedkar, Tiruvannamalai, South Arcot, Dharmapuri, Nilgiri, Periyar, Salem, Tiruchchirappalli, Thanjavur, Coimbatore, Dindigul, Madurai, Pasumpon, Pudukkottai) and Kerala (Kannur, Kozhikode, Malappuram, Palakkad, Thrissur, Ernakulam). Highest probability value of 0.75 to 1.00 has been obtained for the above-mentioned states in India for climate suitability. These districts of South India could be targeted for phased introduction of this elite banana cultivar, selection of cultivation sites based on climate suitability, identifying *on-farm* conservation areas, and for managing other related genetic resources activities in the climate change regime. Accordingly, contingent plan for sustainable cultivation and on-farm conservation of *Manoranjitham* landrace is to be developed.

Keywords: Banana, Conservation, Cultivation, *Manoranjitham*, DIVA-GIS, MaxEnt

Journal of Plant Development Sciences Vol. 14(1)

IN VITRO SHOOT PROLIFERATION OF IRONWOOD (*EUSIDEROXYLON ZWAGERI* TEIJSM. & BINNED)

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Abstract: The over exploitation of natural resource such as tropical forest for deforestation and urbanization have threatened the population of endangered tropical timber tree species such as *Eusideroxylon zwageri*. The present study reported the results of a number of experiments aimed at optimizing shoot proliferation protocol for the mass propagation of *E. zwageri*. The effect of different combinations and concentrations of plant growth regulators (PGR) such as BAP, IBA and NAA on the shoot proliferation and elongation were evaluated. The findings showed that the best treatment for nodal segment multiplication in terms of the number of shoots and leaves per explant were obtained in the half strength MS medium supplemented with either 5.0 mg/L BAP alone or 5.0 mg/L BAP in combination with 0.5 mg/L IBA. Healthy shoots treated with 300 mg/L IBA for 20 min followed by transfer to another half MS medium without PGR resulted in 80.3% of shoots producing roots.

Keywords: Conservation, Timber, Borneo Ironwood, In vitro culture, BAP, Shoot elongation

Journal of Plant Development Sciences Vol. 14(1)

STCR TARGETED YIELD APPROACH OF FERTILIZER RECOMMENDATION INCREASED RICE YIELD BY PROMOTING THE NUTRIENT USE EFFICIENCY IN BLACK SOILS OF CENTRAL INDIA

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Abstract: Integration of chemical fertilizers with manures improves crop yield and minimizes the detrimental effects of fertilizers. Here, an effort was made to evaluate the combined effect of organic and inorganic fertilizers on the yield, nutrient uptake and nutrient use efficiency of rice. Application of organic and inorganic fertilizers based on Soil Test Crop Response (STCR) equation significantly increased the nutrients uptake, nutrient use efficiency and yield of rice. The treatment T_6 (157:125:70 N, P_2O_5 and K_2O kg ha^{-1} with 5 t FYM ha^{-1}) produced the highest grain yield (5725 kg ha^{-1}) and straw yield (5725 kg ha^{-1}) of rice. The lowest grain yield (2781 kg ha^{-1}) and straw yield (4295 kg ha^{-1}) were found in the control treatment. Further, it was observed that the application of the same doses of fertilizers based on targeted yield with farmyard manure performed better than that of single-use of fertilizers. The nitrogen, phosphorus and potassium uptake and use efficiency of rice (Var. *Kranti*) were markedly influenced by the combined application of organic and inorganic fertilizers. Overall, the treatment T_6 (157:125:70 N, P_2O_5 and K_2O kg ha^{-1} with 5 t FYM ha^{-1}) was found to be the best combination of organic and inorganic fertilizers for obtaining the maximum yield as well as the nutrient use efficiencies.

Keywords: FYM, STCR, Targeted yield, Rice yield, Nutrient uptake, Nutrients use efficiency

Journal of Plant Development Sciences Vol. 14(1)

GENETIC VARIABILITY AND HERITABILITY STUDIES FOR YIELD AND QUALITY TRAITS IN FOXTAIL MILLET (*SETARIA ITALIC* (L.) BEAUV.)

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Abstract: The present study was carried out to assess the nature and magnitude of genetic variability for yield and quality related traits in 64 genotypes of foxtail millet, carried at Agricultural college farm, Bapatla during *Kharif*, 2020-2021. The ANOVA revealed the significant differences for all the traits under study. Estimates of GCV were lesser than the corresponding PCV values for all the traits indicating the influence of environment on expression of the characters under study. Moderate to high variability and high heritability coupled with high genetic advance as per cent of mean was observed for characters *viz*., panicle length, panicle width, No. of productive tillers per plant, test weight, harvest index, SCMR at 45 days, SCMR at maturity, flag leaf blade width, panicle exertion, peduncle length, zinc content, copper content, iron content, manganese content, protein content, calcium content, phosphorus content and antioxidant activity indicates the predominance of additive gene action.

Keywords: Foxtail millet, Genetic advance, Genetic advance as per cent of mean, Heritability, Variability

Journal of Plant Development Sciences Vol. 14(1)

DESIGN AND DEVELOPMENT OF MANUALLY OPERATED NURSERY VEGETABLE PLANTER FOR CHILLI, BRINJAL AND TOMATO

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Abstract: Nursery seedling production is depends on the variety of vegetables and its cultivation practices as well as bad seed emergence, lack of uniformity and weed infestation. Traditional sowing such as broadcasting, manually line sowing is non uniform distribution of seedwhich causes poor germination and uneven growth of seedling as well as labor and time consuming method.Nursery vegetable planter was designed and developed in dept. of FMPE, CAET, Parbhani.Four row vegetable planter was tested in the field and it was found average plant spacing of 2.27 cm, 2.26 cm and 2.40 cm, respectively for chilli, brinjal and tomato against the required spacing of 2.30cm at speed 1.25 km/h. The missing and multiple index were 14.35 % and 8.33 %for chilli, 15.27 % and 8.68 % for brinjal, 18.51 % and 8.79 % for tomato respectively. Effective field capacity of the developed planter was 0.045 ha/hwith field efficiency of 88.66 % for chilli.Cost of planting was 67.2 % less compared to traditional method.

Keywords: Nursery vegetable planter, Field efficiency, Germination percentage, Miss index, Multiple index

Journal of Plant Development Sciences Vol. 14(1)

STUDIES ON EFFECT OF INCORPORATION OF CROP RESIDUE ON SOIL PROPERTIES

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Abstract: An incubation experiment was conducted to study the influence of decomposition of korra crop residue along with microbial consortium and starter dose of N and P fertilizers in black soils under greenhouse condition at Agricultural Research Station, Amaravati with eight treatments and laid out in a completely randomized design. The soil total carbon, total nitrogen, mineral nitrogen, MBC and microbial populations were estimated at 15 days interval. The carbon content decreased and nitrogen increased with days of incubation. The results of the study indicated that the treatments were significantly influenced by the application of crop residue along with microbial consortia. The microbial biomass carbon and microbial populations assayed at different intervals were significantly influenced by the application of crop residue along with microbial consortia. There was a decrease in C:N ratio, increase in mineral nitrogen content, higher microbial biomass carbon and microbial populations were recorded in treatments that received crop residue @1.5 t ha^{-1} along with microbial consortium @ 2 kg t^{-1}+ starter dose of N and P fertilizers when compared to the treatments that received only crop residue and inorganic fertilizers.

Keywords: Crop residue, Microbial consortium, Total carbon, Total nitrogen, Microbial biomass carbon, Soil micro flora

Journal of Plant Development Sciences Vol. 14(1)

IMPACT OF PLANT GROWTH REGULATOR ON ROOT DEVELOPMENT OF DRAGON FRUIT CUTTING [*HYLOCEREUS COSTARICENSIS* (WEB.) BRITTON AND ROSE]

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Abstract: An experiment was to conducted to know the influence of growth regulators IBA, NAA and their combination on rooting of stem cuttings in Dragon fruit [*Hylocereus undatus* (Haworth) Britton & Rose] under low cost polyhouse at Horticulture Research Farm, Department of Horticulture, BBAU a central university luck now, during the year October 2020 to April 2021. The experiment was laid out by following Complete Randomized Design with twelve treatments replicated thrice. The stem cuttings of Dragon fruit treated with different plant growth regulators result reveals that, the length of the longest root (10cm), fresh weight and dry weight of root (18g and 0.18 g, respectively), total number of roots per cuttings (8.00), root diameter (2.00 mm) were found in T_9 IBA @3000ppm+ NAA@100ppm) at 60 day after treatment followed by T_{11} (8.66cm,16g,0.16g, 7 number, 1.86 mm) treated with IBA @ 2000ppm +NAA@200 ppm). while and the lowest of all these were found in control (without PGR) T_1 (6cm, 13g,0.12gm ,6 number, 1.00 mm) was recorded.

Keywords: Dragon fruit, Rooting, Stem cutting, IBA, NAA, PGR

Journal of Plant Development Sciences Vol. 14(1)

PRODUCTIVITY AND PROFITABILITY OF GREEN GRAM, *VIGNA RADIATA* (L.) WILCZEK AS INFLUENCED BY FRONTLINE DEMONSTRATION UNDER ARID REGION OF RAJASTHAN

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Abstract: Pulses are important food crops for human consumption and animal feed. The green gram production among pulses was 1299655 MT from the area of 2322998 hectares in Rajasthan in the year 2019-20. The major cultivation of green gram is based upon rainfed conditions. In Bikaner district, the green gram is grown in an area of 47420 hectares with an annual production of over 16857 MT (Agricultural Statistics at a Glance Year 2019-20, Govt. of Rajasthan). The study in total 125 frontline demonstrations were conducted on farmers' fields in four block of Bikaner district in Rajasthan during *Kharif* season 2018 and 2019 to demonstrate production potential and economic benefit of improved technologies for the green gram crop. The findings of the study revealed that demonstrations recorded a mean seed yield of 657 Kg ha^{-1} which was 25.03 % higher than farmers' practice seed yield (525 Kg ha^{-1}). The average extension yield gap, technology yield gap and technology index were 132 Kg ha^{-1}, 444 Kg ha^{-1} and 40.1 %, respectively. Higher mean net income of ` 24647/- $ha^{-1}$ with a Benefit: Cost ratio of 2.40 was obtained with improved technologies in comparison to farmers' practices (` 18013/- ha^{-1} with a Benefit: Cost ratio of 2.2). The frontline demonstrations conducted on green gram at the farmers' field revealed that the adoption of improved technologies enhanced the seed yield as well as the net returns and income to the farmers under rainfed conditions.

Keywords: Adoption, Frontline demonstration, Profitability, Green gram, Livelihood and gap analysis

Journal of Plant Development Sciences Vol. 14(1)

EFFECT OF DRIP GEOMETRY ON SOIL MOISTURE DISTRIBUTION IN DRIP IRRIGATED ONION

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Abstract: An experiment was conducted, during (Jan-May) 2018, to study the soil water dynamics in drip irrigated onion crop, subjected to treatments comprises of lateral spacing (two levels viz. 45 cm and 60 cm) and lateral placement depth (two levels viz. surface and subsurface) arranged in split-plot-design. With each treatment replicated thrice, the experiment laid in 12 micro plots, already filled with sandy loam soil. Periodic field observations were made to study the soil moisture distribution. During the study, it was observed that soil moisture content tended to decrease with increase in radial distance from the drip lateral at all soil depths and tended to decrease with increase in soil depth at all the radial distances, during whole crop period, in all treatments, irrespective of the lateral spacing and lateral placement depth. It may be concluded from the study that for cultivation of drip irrigated onion in sandy loam soils, closer lateral spacing (45 cm) offers better soil moisture distribution, as compared to wider lateral spacing (60 cm) where as shallow lateral placement depth (5 cm) didn't much affect the soil moisture distribution.

Keyword: Lateral spacing, Lateral placement depth

Journal of Plant Development Sciences Vol. 14(1)

PERFORMANCE OF NUTRIENTS ON COTTON GROWN IN POLYPROPYLENE BAGS

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Abstract: A field investigation to evaluate the impact of foliar spray of nutrients (NPK, micronutrients and NPK + micronutrients) on Bt-cotton was conducted in the research field of Jawaharlal Neharu Krishi Vishwa Vidyalaya (JNKVV), Jabalpur, Madhya Pradesh, India during July-2020 to January-2021. Foliar spray of NPK, micronutrients and NPK + micronutrients was the three treatments evaluated against the control. The plants growth indicators recorded were plant height, thickness of stem and number of sympoidal branches; while yield indicators were number of bolls, width of bolls, fibre+seed cotton yield and plant biomass as fuelwood. The mean plant height (MPH) was highest (67.6cm) for micronutrients on 55^{th} day after sowing (DAS) *i.e.*, before the foliar spray of treatments. The MPH was highest on plants treated with NPK. It was 113.7cm, 132.4cm and 137.6cm on 85^{th}, 130^{th} and 180^{th} DAS. Similarly, the highest mean thickness of stem (14.67mm), mean number of sympoidal branches (29.71 plant^{-1}), mean number of bolls (62.14 plant^{-1}), mean width of boll (36.50mm), mean weight of fibre+ seed (270.00g) and mean weight of plant biomass (727.14g plant^{-1}) was also recorded under foliar spray of NPK. There was no significant difference among the treatments for mean thickness of stem and mean weight of fibre+seed.

Keywords: Cotton, Polypropylene bags, Doubling of farmers income, Nutrients, Foliar application, Stem thickness

Journal of Plant Development Sciences Vol. 14(1)

EFFECT OF NITROGEN DOSES ON THE INCIDENCE OF FALSE SMUT OF RICE CAUSED BY *USTILAGINOIDEA VIRENS* (COOKE) TAKAHASI

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Abstract: Field trial was carried out (2019-20) to assess the role of nine different levels of nitrogen (40, 50, 60, 70, 80, 90, 100, 110 kg acre-1) and untreated application on their effect on incidence of false smut of rice using two rice genotype *viz*., Kranti and MTU 1010 at experimental field, department of Plant Pathology JNKVV, Jabalpur (M.P). The results indicated that In Kranti, maximum disease incidence of 50.1 percent was observed at 110 kg/acre nitrogen level followed by 43.2 percent at 100 kg/acre and minimum disease incidence 8.5 percent in control. Total number of tiller and infected number were increased with increase nitrogen levels and observed maximum at nitrogen level 110 kg *i.e.* 261 and 110.7, respectively. In cultivar MTU1010, the disease incidence of 19.7 percent was observed in plots with nitrogen 110 kg/acre followed by 18.1 percent with nitrogen 100 kg/acre and minimum disease incidence 3.4 percent was observed in control. Total number of tiller and infected were increased with increase nitrogen levels and observed nitrogen level *i.e.* 240.8 and 47.5 respectively.

Keywords: Rice, False smut, Nitrogen dose, *Ustilaginoidea virens*, Disease incidence

Journal of Plant Development Sciences Vol. 14(1)

ERGONOMIC EVALUATION OF MANUALLY OPERATED NURSERY VEGETABLE PLANTER

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Abstract: Nursery seedling production is depends on the variety of vegetables and its cultivation practices as well as bad seed emergence, lack of uniformity and weed infestation. Traditional sowing such as broadcasting, manually line sowing is non uniform distribution of seedwhich causes poor germination and uneven growth of seedling as well as labor and time consuming method. Vegetable planter was tested in the field for evaluating performance of chilli, brinjal and tomato to assess their suitability at speed 1, 1.25 and 1.5 km/h.It was ergonomically evaluated for studying human engineering for operator. Randomly 6 subject selected whose anthropometric dimensions matches with the average dimensions (5^{th} and 95^{th} percentile) of the region for ergonomic evaluation and their mean heart rate and oxygen consumption found in ranged between 90.67 to 104.67 beats/min and 0.35 to 0.51 *l/min* respectively. Mean overall discomfort rating on a 10 point visual analoguediscomfort scale (0- no discomfort, 10- extreme discomfort) was 3.0 and scaled as "light discomfort".BPDR values ranged from 36.33 to 47.3 for all speed and subjects. Overall discomfort for all subject found to be light.

Keywords: Nursery vegetable planter, Field efficiency, Germination percentage, Overall discomfort, Ergonomic evaluation

Journal of Plant Development Sciences Vol. 14(1)

STUDIES ON SUITABILITY OF GRAFTING UNDER DIFFERENT GROWING SEASONS IN GUAVA (*PSIDIUM GUAJAVA* L.)

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Abstract: The current investigation was carried out to study the suitability of different methods of grafting under different growing seasons in guava for year round production of quality planting material. The experiment was carried out at the College Orchard, TNAU, Coimbatore during the year 2018-19. The experiment was carried out using FRCD with three replications. Different methods of grafting viz., approach grafting (G_1), wedge grafting (G_2) and side grafting (G_3) at three different seasons of grafting viz., Oct-Nov, 2018 (S_1), Feb- March, 2019 (S_2) and June- July, 2019 (S_3) were experimented. The study showed that there was great scope for clonal multiplication of guava through grafting techniques. The results of the experiment indicated that, among the three methods of grafting, Wedge grafting performed during the month of Oct-Nov, 2018 (G_2S_1) registered lesser days taken for bud sprouting (19 days), first leaf emergence (24.70 days), highest graft success percentage (82.65) and increased leaf area (44.04cm^2) as compared to other methods of grafting. Likewise, wedge grafting done during the month of June-July, 2019 (G_2S_3) exhibited improved graft survival percentage (72.28), highest sprout length (11.11cm) and no. of leaves per graft (30.5). With regard to the biochemical parameters, wedge grafting performed during June-July, 2019 (G_2S_3) recorded highest chlorophyll content (24.40 SPAD unit), photosynthetic rate (16.26 µmol CO_2 m^{-2} s^{-1}) and lowest phenol contents (3.16 mg g^{-1}). Microtome studies also indicated a strong graft union in wedge grafted plants.

Keywords: Guava, Grafting methods and season, Graft success and survival percentage, Chlorophyll, Phenols, Microtome studies

Journal of Plant Development Sciences Vol. 14(1)

EFFECT OF NUTRIENT MANAGEMENT PRACTICES ON GROWTH, YIELD AND NUTRIENTS UPTAKE BY CHICKPEA (*CICER ARIETINUM* L.) UNDER ORGANIC FARMING

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Abstract: A field experiment was carried out during the winter season of 2019-20 at Agronomy Instructional Farm, Chimanbhai Patel College of Agriculture, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar to study the effect of nutrient management practices on growth, yield and nutrients content and uptake by chickpea (*Cicer arietinum* L.) under organic farming. Total nine treatment combinations *viz.*, T_1 : FYM 5 t/ha + *panchagavya* spray 3% at branching and flowering, T_2 : FYM 5 t/ha + cow urine spray 5% at branching and flowering, T_3 : FYM 5 t/ha + vermiwash spray 10% at branching and flowering, T_4 : FYM 2.5 t/ha + seed inoculation with *rhizobium* and PSB + *panchagavya* spray 3% at branching and flowering, T_5 : FYM @ 2.5 t/ha + seed inoculation with *rhizobium* and PSB + cow urine spray @ 5% at branching and flowering, T_6 : FYM @ 2.5 t/ha + seed inoculation with *rhizobium* and PSB + vermiwash spray @ 10% at branching and flowering, T_7 : Castor cake @ 0.5 t/ha + *panchagavya* spray @ 3% at branching and flowering, T_8 : Castor cake @ 0.5 t/ha + cow urine spray @ 5% at branching and flowering and T_9 : Castor cake @ 0.5 t/ha + vermiwash spray @ 10% at branching and flowering were laid out in randomized block design replicated 3 times. Application of 5.0 t FYM/ha along with two foliar sprays of 3% *panchagavya* at branching and flowering recorded the maximum value of all growth parameters *viz*., plant height, number of branches per plant, dry matter accumulation per plant, number of root nodules per plant and dry weight of root nodules per plant and yield attributes *viz*., number of pods per plant, seed index as well as seed and stover yield of chickpea besides improving quality parameter (protein content). However, it was found at par with 0.5 t castor cake/ha along with two foliar spray of *panchagavya* at branching and flowering, 5.0 t FYM/ha along with either two foliar spray of 5% cow urine or 10% vermiwash at branching and flowering stages. It also uptake maximum total N and P_2O_5 by chickpea, net returns and benefit cost ratio.

Keywords: Chickpea, Farm yard manure, Castor cake, *Panchagavya*, Cow urine, Vermiwash, Branching, Flowering, Uptake

Journal of Plant Development Sciences Vol. 14(1)

FORAGING BEHAVIOR OF EUROPEAN HONEY BEE, *APIS MELLIFERA* (HYMENOPTERA-APIDAE) IN LITCHI FLOWERS IN SURGUJA DISTRICT OF CHHATTISGARH, INDIA

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Abstract: A study was undertaken at Raj Mohini Devi College of Agriculture and Research station, Ambikapur (Chhattisgarh) substation of Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh) India. The foraging behavior of European honey bee, *Apis mellifera* was observed in Litchi (orchard) flowers during 27 February 2021- 02April 2021. The maximum foraging activity of honey bee was observed third week of March 2021 (32.76 bees/5min/plant) followed by second week of March 2021 (25.38 bees/5min/plant) and fourth week of March 2021 (122.45 bees/5min/plant) however the lowest population was recorded during first week of April 2021 (6.61 bees/5min/plant). Similarly during the different hours of the day the maximum population of honey bees were recorded at 10.00-11.00 AM (20.63 bees/5min/plant) followed by at 11.00AM-12.00PM (19.72 bees/5min/plant) and at 9.00-10.00AM (19.27 bees/5min/plant). However the lowest population was recorded at 3.00-4.00PM (12.08 bees/5min/plant).

Keywords: European honey bee, Foraging behavior, Litchi flowers, Weather parameters

Journal of Plant Development Sciences Vol. 14(1)

EFFECT OF ORGANIC, INORGANIC MANURES AND PLANT DENSITY ON YIELD AND ECONOMIC OF RADISH (*RAPHANUS SATIVAS* L.)

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Abstract: A field experiment was conducted during *rabi* season of 2014-15 on sandy loam soil to "Effect of organic, inorganic fertilizers and plant densities on performance of radish (*Raphanus sativas* L.)". The experiment consisted three treatment of organic manures (control, VC @ 5 t/ha and FYM @ 15 t/ha), three treatment of inorganic manures (control, 50% RDF of NPK and 100% RDF of NPK) and two treatment of plant densities (20 x 10 cm and 30 x 10 cm), thereby making eighteen treatment combinations tested in randomized block design with three replications. Results indicated that application of vermicompost @ 5 t/ha and 100% RDF of NPK significantly higher yield and yield attributes of radish over control, FYM @ 15 t/ha and control, 50% RDF of NPK, respectively. However, the application of FYM @ 15 t/ha significantly increased the root to shoot ratio and remained at par with vermicompost @ 5 t/ha over control. But, the application of 50% RDF of NPK significantly increased the root to shoot ratio and remained at par with 100% RDF of NPK over control. The result also indicated the plant spacing 30x10 cm significantly higher yield attributes and economic of radish over plant spacing 20x10 cm. However, the plant spacing 20x10 cm significantly increased the root to shoot ratio and remained at par with plant spacing 30x10 cm. The economics of maximum net returns (262595 /ha) was recorded with combined application of vermicompost 5 t/ha + 100 % RDF of NPK + 30 x 10 cm spacing and maximum B: C ratio (3.28) was recorded with combined application of vermicompost 5 t/ha + 50 % RDF of NPK + 30 x 10 cm spacing. Radish was significantly superior to other treatments in including sole or combination in different proportions.

Keywords: FYM, Yield, NPK, Plant density, Radish, RDF, Vermicompost and Economic

Journal of Plant Development Sciences Vol. 14(1)

EFFECT OF COATED UREA ON SOIL FERTILITY STATUS, NUTRIENT CONTENT AND UPTAKE OF INDIAN MUSTARD [*BRASSICA JUNCEA* (L.) CZERN & COSS]

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Abstract: A field experiment was conducted during *rabi* 2014 at Castor-Mustard Research Station, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar to study the "Effect of coated urea on yield, oil quality and nutrient uptake of Indian mustard [*Brassica juncea* (L.) Czern & Coss] in loamy sand". This experiment was conducted with ten treatments comprising of two coated urea *viz*., T_1-No nitrogen (control), T_2- 100 % RDN Urea-(Basal + one split), T_3-100 % RDN-NCU (Basal + one split), T_4-100 % RDN-CCU (Basal + one split), T_5-100 % RDN-NCU (Basal), T_6-100 % RDN-CCU (Basal), T_7-75 % RDN -CCU (Basal + one split), T_8-75 % RDN -NCU (Basal + one split), T_9-50 % RDN-CCU (Basal + one split) and T_{10}-50 % RDN -NCU (Basal + one split) were evaluated in randomized block design replicating three times. Mustard variety GDM 4 was used as test crop. The results revealed that an application of T_7-75 % RDN-CCU (Basal + one split) recorded significantly higher nitrogen and phosphorus content in seed as well as stover of mustard, while potassium content in seed and stover were non significantly influenced by different treatments of coated urea. An application of T_7-75 % RDN-CCU (Basal + one split) recorded significantly higher nitrogen, phosphorus and potassium uptake by seed and potassium uptake by stover of mustard. An application of 100 % RDN-CCU (Basal + one split) recorded significantly higher nitrogen and phosphorus uptake by stover of mustard. Higher total P uptake was recorded with treatment of 100 % RDN-CCU (Basal + one split), while higher total N and K uptake of mustard was recorded with treatment of 75 % RDN-CCU (Basal + one split). An application of 100 % RDN- NCU (Basal + one split) recorded significantly higher available nitrogen, organic carbon and higher nitrogen use efficiency (NUE) was recorded with treatment of T_7- 75 % RDN- CCU (Basal + one split) over other treatments. The soil pH, EC, available phosphorus and potassium status in soil as affected non significantly by different treatment of coated urea.

Keywords: Coated urea application, Nutrient content and uptake, Soil fertility status, Indian mustard, Loamy sand soil

Journal of Plant Development Sciences Vol. 14(1)

MOLECULAR CHARACTERIZATION AND *IN VITRO* EXPRESSION OF *CAJANUS CAJAN* LECTIN GENE

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Abstract: Plants accumulate a set of defense proteins including lectins, proteinase inhibitors, amylase inhibitors etc. Lectins reversibly and non-enzymatically bind specific carbohydrates and this agglutination property makes them useful against various lepidopteran and homopteran insect pests. The isolated pigeonpea lectin (PPL) gene (~825 bp) was first cloned in pENTR-D-TOPO vector, subcloned into an expression vector (Gateway Destination vector pET300/NT-DEST) and transformed into BL21 DE3 pLysS competent cells of *E. coli* for protein expression studies. The PPL gene expression

studies were carried out at different temperatures, IPTG concentrations and time intervals. The expression was maximum at 2.0 and 2.50 mM IPTG concentration at 37ºC for 5 hrs. The size of the protein was found to be around ~30 KDa. The expression was confirmed by SDS-PAGE and western blotting. Thus, transferring these defense genes under the control of tissue specific promoters will be an effective tool for sustainable insect pest management programme.

Keywords: Cloning, Expression, Insecticides, IPTG and Lectin

Journal of Plant Development Sciences Vol. 14(1)

GENETIC VARIATION, CHARACTERS ASSOCIATION AND PATH ANALYSIS FOR SEED YIELD AND RELATED TRAITS IN CORIANDER (*CORIANDRUM SATIVUM* L.)

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Abstract: Two hundred seventy five genotypes and nine checks (RCr-20, RCr-41, RCr-435, RCr-436, RCr-446, RCr-475, RCr-480, RCr-684 and RCr-728) of coriander *(Coriandrumsativum L.)* were evaluated in Augmented Block Design with five blocks during Rabi season of 2014-15 at Research Farm, S. K. N. College of Agriculture,Sri Karan Narendra Agriculture University, Jobnerto study the genetic variation, characters association and path analysisfor ten growth and yield characters namely, days to 50% flowering, plant height, branches per plant, umbels per plant, umbellets per umbel, seeds per umbel, days to maturity, 1000-seed weight, volatile oil content and seed yield per five plants. The association analysis at phenotypic level revealed that the seed yield per five plants was significant and positively correlated with days to maturity, test weight, umbels per plant, seed per umbel, plant height, umbellets per umbel. While, it association with volatile oil content was significant but negative. Path analysis at both genotypic and phenotypic levels indicated that the magnitude of both direct and indirect effects were generally low. Among the characters, the direct effect of plant height was found to be positive and highest indicating that the correlation of plant height with seed yield was primarily because of the direct effect.

Keywords: Coriander, Correlation, Path analysis, Seed yield

Journal of Plant Development Sciences Vol. 14(1)

EFFECT OF SUPPLEMENTAL IRRIGATION AND CROP RESIDUE MULCH ON LITTLE MILLET (SAMAI - CO4) – *PANICUMSUMATRENSE*

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Abstract: Field experiments were conducted to study the effect of supplemental irrigation and crop residue mulch on little millet(CO4) cultivated in dryland areas of southern part of Tamil Nadu. The experimental was laid out in randomizedblock design with three treatments viz., T1 - Farmers practice (rainfed cultivation without supplemental), T2 - Supplemental irrigation twice through mini portable sprinkler and T3 - Supplemental irrigation twice through mini portable sprinkler and crop residue mulch 2.5 t/ha with three replications. The yield and economic analysis reveals that, in samai the highest BC ratio (0.67) and RWUE (1.59) was obtained in supplemental irrigation twice through mini portable sprinkler and crop

residue mulch 2.5 t/ha treatment (T3). The results of the study showed that farm pond is an effective technology for harvesting andproviding water for supplemental irrigation.

Keywords: Dryland, Farm Pond, Little Millet, Productivity, Supplemental Irrigation