Journal of Plant Development Sciences

(An International Monthly Refereed Research Journal)

Volume 9 Number 3 March 2017

Contents

SHORT COMMUNICATION

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EXPORT POTENTIAL AND PACKAGING OF SOME IMPORTANT FRUITS OF INDIA

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Received-11.02.2017, Revised-05.03.2017

Abstract: Fruits and vegetables are an important sub-sector in the agricultural sector because they are valued as protective food. They are very rich source of minerals, vitamins providing more energy per unit weight than cereals. India's is a country with wide agro-climatic conditions as a result of which we have got different climatic condition in different parts of country throughout the year. Because of this reason the production of fruits and vegetables is available in the country throughout the year in one or another part.

Keywords: Agriculture, Fruit, Production, Vegetables

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IN-SILICO CHARACTERIZATION AND HOMOLOGY MODELING OF PEPCK ENZYME OF *MEDICAGO TRUNCATULA*

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Received-01.12.2016, Revised-10.03.2017

Abstract: Phospho*enol*pyruvate carboxykinase (PEPCK) is an enzyme in the lyase family. PEPCK is an ATP-dependent that is involved in the metabolic pathway of gluconeogenesis. It converts oxaloacetate into phospho*enol*pyruvate and carbon dioxide. In this study, the results of structural and physiochemical study of *Medicago truncatula* PEPCK has explored. The conceptual three-dimensional structure investigated while there was no structural information available in any other database. Computational analysis performed on *Medicago truncatula* PEPCK and developed a three-dimensional structure of PEPCK enzyme using comparative modeling approach. The modeled enzyme includes N-terminal and C-Terminal domains with a mixed α/β topology. The energy of constructing models was minimized and the quality of the models was evaluated by VERRIFY_3D and PROCHECK. Ramachandran plot analysis showed the confirmation of 100 % amino acid residues was within the most favored regions. Multiple sequence alignment of the PEPCK protein sequence of different plant sources revealed the conserved region and constructed a phylogenetic tree. The stability of model checked through Gromacs 4.5. The final three-dimensional structure submitted in the protein model database (PMDB). This study may play keystone role in in-vivo and in-vitro studies.

Keyword Phospho*enol*pyruvate carboxykinase, phylogenetic tree, Gromacs, MD simulation, Homology Modeling

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STUDY OF SOUTH-WEST MONSOON RAINFALL SCENARIO IN MEERUT DISTRICT

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Received-26.02.2017, Revised-12.03.2017

Abstract: Rainfall is one of the most important climatic variables and renewable natural source of water on the earth. Meerut District is the part of Upper Ganga-Yamuna doaba which lies between 28^0.98' & 29^0.15' north latitude and between 77^0.45' & 77^0.07' east longitude. The objective is to compute properties of a long period of time series is broken into separate components and analyzed individually to understand the pattern of rainfall. The annual and monthly rainfall data used for observed trend during long period. Analysis of rainfall data of a century (1916-2015) over Meerut plays a significant role in the agricultural and urbanization contribution and in the overall growth of the District. The data of annual rainfall and S-W rainfall is 689.6mm and 587.2mm respectively. The monthly south-west monsoon rainfall variability in years is observed maximum after 21th century. It is most important period of rainfall seasonal cycle. The analysis data of S-W monsoon observed highest rainfall 85.2% and lowest rainfall in post monsoon season 4.4%. The anomalous departures from the mean were observed the highest positive and negative departure from the mean of approximately -459.1 & 457.5 in year 2009 and 1933 respectively. The analysis included variability of rainfall, trends in rainfall pattern and changes in spatial and temporal patterns of Precipitation Ratio (PR) and Monsoon Precipitation Index (MPI). The maximum abnormality 2.46 and -2.04 in annual rainfall was recorded during 1933 & 2009. It is seen that the average MPI varied from 0.63 to 0.77. The trend in the annual rainfall showed that the rainfall decreasing in the area whereas south-west rainfall declined pattern of 3% changes was also observed in the century. The standardized anomalies results obtained show a fluctuating rainfall pattern across the years over Meerut District which makes it hard to freely forecast rainfall trend for a future season. The rainfall data analysis of Meerut District for a period of 100 years (1916 to 2015) reveals variation in the rainfall amount and points out a negative trend of rainfall in future. The information is useful for agriculturists and policy makers on critical issues is it affects seasonal agricultural practices such application of agricultural inputs, water resources maintenance and management practices. The global climate and the local environmental changes are the chief factors for the variation in rainfall over the recent times. The knowledge of current situation of weather and climate change related pattern and adaptation of technology is maintend trend. Uncertainty on the dates of monsoon onset and its withdrawal also puts a great problem before the farmers.

Keywords: Anomalies, Climate change, MPI, PR & South-west monsoon

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ASSESSMENT OF GENETIC FIDELITY OF MOTHER PLANT AND *IN VITRO* RAISED MEDICINAL PLANT *EPHEDRA GERARDIANA* THROUGH MOLECULAR MARKERS

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Received-25.02.2017, Revised-14.03.2017

Abstract: *Ephedra gerardiana* is an important medicinal gymnosperm shrub. It has been traditionally use for an assortment of medicinal purpose. Molecular markers analysis was conducted to screen genetic fidelity among *in vitro* raised plantlets compare with mother plant of *Ephedra gerardiana*. Genetic fidelity of regenerated plants was assessed using Random Amplified Polymorphic DNA (RAPD) and Simple Sequence Repeat (SSR) Primers. A total of 50 RAPD primers and 30 SSR primers were utilized in the present study to analyze genetic fidelity of mother plant and among tissue culture raised plants of *Ephedra gerardiana*. Out of 50 RAPD primers, 19 primers exhibited DNA amplification in all the DNA samples and out of 30 SSR primers, 18 were show amplification. The amplified products of the regenerated plants showed similar banding patterns to that of the mother plant thus demonstrated the homogeneity of the micropropagated plants. The banding pattern ruled out presence of any kind of somaclonal variation. Thus, the results revealed that genetic fidelity between the micropropagated and mother plant in *Ephedra gerardiana* and supports the suitability of tissue culture technique for generation of genetically similar plants. Hence, the results obtained confirmed genetic stability of regenerated plants.

Keywords: *Ephedra gerardiana*, Micropropagation, Genetic fidelity, RAPD, SSR

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SCREENING OF NATIVE BACILLUS THURINGIENSIS (BT) ISOLATES FOR THE PRESENCE OF CRY 1 AB & *VIP 3A*

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Received-03.03.2017, Revised-15.03.2017

Abstract: Insecticidal *cry* and *vip* genes from *Bacillus thuringiensis* (Bt) have been used for control of lepidopteran insects in transgenic crops. However, novel genes are required for gene pyramiding to delay evolution of resistance to the currently deployed genes.PCR-based techniques were employed for screening of *cry1Ab* type genes in 96 Bt isolates from diverse habitats in India and 8 known Bt strains. 96 native Bt isolates, recovered from different locations in India and 8 known Bt strains were screened for the presence of cry 1 Ab, cry 1Ac, Cry 3A & vip 3A for Isolation of plasmid DNA from native Bt isolates of Bacillus thuringiensis, Screening for the presence of cry 1 Ab, cry 1Ac, cry 3A & vip 3A gene using PCR amplification and Cloning of partial cry 1 Ab & vip 3A gene using different sets of primers. *Cry1Ab* type genes were more prevalent than *cry1Aa*- and *cry1Ac* type genes. Correlation between source of isolates and abundance of *cry1*-type genes was not observed..

Keywords: *Bacillus thuringiensis*, *Cry1Ab* genes, *Cry1Ac*, *Cry3A*, Vip3*A*, *Helicoverpa armigera*, Insecticidal genes

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RESPONSE OF SORGHUM [*SORGHUM BICOLOR* (L.) MEONCH] GENOTYPES TO DIFFERENT FERTILITY LEVELS ON NUTRIENT UPTAKE, AVAILABLE SOIL NUTRIENTS AFTER HARVEST AND YIELDS

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Received-04.03.2017, Revised-14.03.2017

Abstract: An experiment was conducted at the Instructional Farm, Rajasthan College of Agriculture, during *kharif* 2012. To study the effect of different fertility levels on nutrient uptake and nutrient status in soil nutrients after the harvest and yields of crop. Four fertility levels *i.e.* control, 50, 75 and 100% RDF (recommended dose of fertilizers; 80 kg N+40kg P_2O_5 +40kg K_2O ha^{-1}) and 6 elite sorghum genotypes (SPH 1674, SPH 1680, SPV 2083, CSH 16, CSH 25 and CSV 23) were compared in a factorial randomized block design. **Maximum nitrogen uptake by grain, maximum** protein uptake by grain, as well as fodder, with genotype SPH 1674. CSV 23 recorded **maximum** phosphorus uptake (22.66 ha^{-1}) by fodder. Results showed that application of 100 % RDF gave significantly higher grain, fodder and biological yields over 50 % and control.Significantly increased available N, P & K contents in soil after harvest the sorghum crop over control.CSV 23 and SPV 2083 recorded significantly **maximum** available N, P and K in soil after harvest over rest of the genotypes.SPH 1674 recorded significantly higher grain yield (61.94 q ha^{-1}) and harvest index (34.48 %) than other genotypes.

Keywords: Fertility levels, Genotypes, Nutrient uptake, Available soil after harvest, Yield

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ISOLATION AND MOLECULAR CHARACTERIZATION OF PLANT GROWTH PROMOTING RHIZOBACTERIA FROM THE HIGH ALTITUDE HIMALAYAN REGION OF UTTARAKHAND

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Received-10.02.2017, Revised-02.03.2017

Abstract: The objective of this study was to isolate and characterize a rhizospheric bacterium from Munsyari, (2200 feet, 30.06^{o}N/80.23^{o} E) Uttarakhand, western Himalayas, (India). Plant growth promoting rhizobacteria (PGPR) are known to influence plant growth by various direct or indirect mechanisms. Isolated strain was tested for various PGP traits like 1-aminocyclopropane-1-carboxylate (ACC) deaminase activity, phosphate solubilisation, indole acetic acid production, production of siderophore, carbohydrate utilization test. Bio-control ability of isolate was also screened. Further identification of isolate was performed by PCR based 16S rRNA gene sequencing. The isolate PS03 was found to be most effective.

Keywords: Rhizobacteria, Isolation, Molecular, Himalaya region

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SURVEY FOR INCIDENCE, SEVERITY AND SCREENING OF BRINJAL GERMPLASM LINES AGAINST FRUIT ROT DISEASE OF BRINJAL

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Received-20.02.2017, Revised-08.03.2017

Abstract: A survey was conducted during September to November, 2014 to observe disease prevalence of brinjal fruit rot in Bagalkot district at Northern dry zone of Karnataka. Through the survey disease severity and incidence were recorded. The roving survey revealed the presence of disease in all talukas *viz.*, Bagalkot, Badami, Hunagunda, Jamakandi and Mudhol. The per cent disease index ranged from 13.00 to 54.66. Per cent disease index was high in Bagalkot taluk followed by Badami and Jamakandi taluk. Among different villages under cultivation in these districts, Belur was more prone to disease with per cent disease index of 54.66 followed by Sulikieri which recorded a per cent disease index of 44.00. Screening of 60 genotypes under field conditions revealed that none of the genotypes were found to be immune. Only two genotypes were found resistant and 31 genotypes showed moderately resistant reaction and 27 genotypes showed moderately susceptible reaction.

Keywords: Egg Plant, Pathogenic Fungi, *Solanum melongena*. L., Brinjal

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AVAILABLE MICRONUTRIENTS IN SOILS OF CHIKKARSINKERE HOBLI OF MADDUR TALUK, MANDYA DISTRICT OF KARNATAKA

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Received-05.03.2017, Revised-15.03.2017

Abstract: Available micronutrients and their relationship with different soil properties was studied in four hundred soil samples collected from different locations of 42 villages representing the soils of Chikkarsinkere hobli of Maddur Taluk Mandya district of Karnataka. The soils were analysed for textural separates, physico-chemical properties and status of available micronutrients. On the basis of pH and EC values, these soils are moderately acidic to very strongly alkaline (5.6 to 9.4). Majority of the soils under study area were found deficient in available zinc. Available iron, copper and manganese were sufficient to adequate. The availability of micronutrients in soils significantly influenced by soil properties viz, textural separates, organic carbon, $CaCO_3$, CEC and pH of soils. Available Zn ranged between 0.02 to 6.36 mg kg^{-1} with a mean value of 0.63 mg kg^{-1}, available Fe ranged ranged from 0.14 to 95.4 mg kg^{-1} with a mean value of 25.29 mg kg^{-1}. Available Cu ranged between 0.14 to 6.10 mg kg^{-1} with a mean value of 1.29 mg kg^{-1}. Available Mn ranged between 1.20 to 40.20 mg kg^{-1} with a mean value of 13.41 mg kg^{-1}. Organic carbon, clay, and CEC were positively correlated with available Zn, Fe, Cu and Mn while pH, $CaCO_3$ and sand were negatively correlated.

Keywords: Available micronutrients, Fertility, Correlation, Critical limit

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GENE ACTION STUDIES FOR SEED YIELD AND OTHER QUANTATIVE CHARACTERS IN FIELD PEA *(PISUM SATIVUM* L.)

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Received-02.03.2017, Revised-16.03.2017

Abstract: In the present study, generation mean analysis were undertaken to estimate the nature and magnitude of gene action for yield and its component traits in two crosses of field pea viz IM 9214-10 X Rachna (C-1) and IM 9214-10 X Ambika (C-2). Scaling tests revealed the presence of one or more kinds of epistatic effects for almost all the agro-morphological traits. The selection of elite lines from delayed generations and subsequent inter mating might be useful approach to recover/ develop the high yielding field pea lines. The elite lines recovered from crosses IM 9214-10 X Rachna might be superior in terms of early maturity with more number of clusters per plant and seed yield per plant. Likewise, crosses *i.e.* IM 9214-10 X Ambika for plant height, number of clusters per plant and seed yield per plant; may give opportunity to isolate transgressive segregants in advanced generations.

Keywords: Epistasis, GMA, Gene effect, Inheritance, Field pea, Transgressive segregants

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NUTRIENT UPTAKE BY WEEDS AND PEA (*PISUM SATIVUM* L.) AS INFLENCED BY DIFFERENT HERBICIDE COMBINATIONS

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Received-01.02.2017, Revised-02.03.2017

Abstract: A field experiment was carried out during the winter season of 2012-13 and 2013-14 at Palampur to evolve an effective herbicide combination on nutrient depletion by weeds in pea (*Pisum sativum* L.). In the present study, pendimethalin 1000 g/ha *fb* HW (45 DAS)andpendimethalin 1000 g/ha (Pre)*fb* imazethapyr + imazamox 60 g/ha (45 DAS)

resulted in significantly lower total weed dry weight over other herbicidal treatments. All the herbicide combinations were comparable to weed free in reducing the GR_w between 90-120 DAS. Pendimethalin 1000 g/ha *fb* HW (45 DAS), pendimethalin 1000 g/ha *fb* imazethapyr + imazamox 60 g/ha (45 DAS) were as effective as weed free in reducing NPK uptake by weeds. Weeds in weedy check removed 49.3 kg/ha N, 19.7 kg/ha P and 44.7 kg/ha K depriving thereby the crop for that much amount of nutrients. Most of the treatments were results in significantly higher crop dry matter accumulation. Significantly higher green pod yield and NPK uptake by crop were obtained in weed free, pendimethalin 1000 g/ha *fb* HW **(**45 DAS) and pendimethalin 1000 g/ha *fb* imazethapyr + imazamox 60 g/ha (45 DAS) treatments. Herbicide combinations in general were better than sole application of herbicides in effectively reducing the NPK uptake by weeds and increasing NPK uptake by crop.

Keywords: Hand weeding, Imazethapyr, Nutrient uptake, Peas, Pendimethalin

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EFFECT OF THE NUTRIENT ON YIELD AND YIELD ATTRIBUTING CHARACTERS IN MAIZE CROP

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Received-02.02.2017, Revised-27.02.2017

Abstract: The field experiment on maize crop was conducted at research farm of C.S.A. University Of Agriculture & Technology Kanpur, during Kharif season 2015-16 and 2016-17. The doses of experiment were Control, 100% NPK , 100% NPK+ S40, 100% NPK + Zn5, 100% NPK+S40 +Zn5, 125% NPK, 125% NPK + S40, 125% NPK + Zn5, 125% NPK + S40 + Zn5 and 150% NPK. The results showed that the grain yield of maize first year (2015) varied from 14.33 to 30.78 q ha^{-1} and in second year (2016) varied from 14.85 to 32.80 q ha^{-1} and the straw yield of maize first year (2015) varied from 38.91 to 81.10 q ha^{-1} and in second year (2016) varied from 39.48 to 82.13 q ha^{-1} . It was noted the number of plant in maize varied from 109.75 to 112.25 $plot^{-1}$ and 109.60 to 112.00 $plot^{-1}$, Plant height (cm) from 175.25 to 213.75 $plant^{-1}$ and 178.75 to 219.48 $plant^{-1}$, Number of cob from 1 to 1.48 and 1.10 to 1.45 $plant^{-1}$, length of cob from 13.40 to 22.45 and 14.60 to 23.49 cm $plant^{-1}$, Test weight from 20.28 g to 32.37 g 100 $grain^{-1}$ and 20.87 g to 33.01 g100 $grain^{-1}$ in first and second years, respectively.

Keywords: Maize, Nutrient, Crop, Production

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EFFECT OF INORGANIC NUTRIENTS AND BIO-INOCULANTS ON BLACKGRAM (*VIGNA MUNGO* L.)

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Received-20.02.2017, Revised-06.03.2017

Abstract: A pot experiment on blackgram crop was conducted at pot house of the Department Soil Science and Agriculture Chemistry, C.S.Azad University of Agriculture and Technology Kanpur during kharif -2013 with variety shekhar-2 . The dose of experiment were 50% SR , 50% SR+Rh , 50% SR+PSB, 50%SR+Rh+PSB , 100% SR , 100 %SR+Rh , 100% SR+PSB, 100%SR+Rh+PSB , . The result showed that number of branches /plant varied from 1.5 to 4.5 and 2.5 to 5.5 at 30 and 60 DAS, respectively. The number of nodules ranged from 8.75 to 23.0 and 16.0 t0 30.50 at 30 and 60 DAS, respectively .The grain yield varied from 8.50 to 15.20 q/ha and stover yield varied from 12.60 to 23.80 q/ha . The N content in grain ranged from 3.16 to 4.24 % and P from 0.60 to 0.69 % .The N content in stover varied from 1.03 to 1.09 % and P From 0.24 to 0.29 % . The total nitrogen uptake ranged from 39.83 to 90.60 kg/ha and P uptake from 8.35 to 16.6 kg/ha . The protein content in black gram grain showing the range of variation from 19.75 to 26.62 % The treatment T_9 (100%SR+Rh+PSB) gave the best results in terms of branches , number of nodules, garain and stover yield, nutrient content, uptake values and protein content.

Keywords: Black gram, Crop, Inorganic nutrient, Production

STUDIES ON ANTIOXIDANT ACTIVITY IN PULP AND PEEL OF SAPOTA (*MANILKARA ZAPOTA* L.) FRUITS IN DIFFERENT STAGES OF RIPENING

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Received-27.01.2017, Revised-25.02.2017

Abstract: Fruits are major source of antioxidant enzymes. So, in this study the antioxidant activity and its related enzymes have been discussed in the peel and pulp of sapota during the three stages of ripening i.e. mature, half ripe and full ripe. Activity of all antioxidant and its related enzymes viz. superoxide dismutase, ascorbate peroxidase, peroxidase and glutathione reductase decreased during ripening from mature to full ripe stage. Mature fruits have highest content of ascorbic acid and all antioxidant enzymes. Peel of the fruit had higher activity of all antioxidant and its related enzymes as compared to pulp.

Keywords: Sapota, Pulp, Ripening stages, Antioxidant enzymes

EFFECT OF FOLIAR APPLICATION OF NUTRIENTS ON SOYBEAN

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Received-16.02.2017, Revised-08.03.2017

Abstract: An experiment was conducted at BAU experimental farm (Kanke), Ranchi, Jharkhand during (Soybean) *Kharif* season 2015 on sandy loam soil with low organic carbon (4.10 gkg^{-1}) and available nitrogen (192.5 $kgha^{-1}$), moderately acidic (pH 5.1) in nature, medium potassium (128 $kgha^{-1}$), phosphorus (13.65 $kgha^{-1}$), boron (0.58 $mgkg^{-1}$), molybdenum (0.25 $mgkg^{-1}$) and zinc (0.60 $mgkg^{-1}$), with 9 treatments replicated thrice. Results revealed that the productivity of soybean was influenced by foliar application of nutrients. Among application of nutrients, RDF along with molybdenum 0.5% spray produced higher grain (1524 $kgha^{-1}$) and straw (2062 $kgha^{-1}$) yield, which was significantly higher than all other treatment but it was at par with RDF + zinc chealted 0.5% spray and RDF + 19:19:19 ($N:P_2O_5:K_2O$) 2% spray. However, foliar application of zinc chelated 0.5% spray along with RDF gave highest net return (22630 $Rs.ha^{-1}$) and benefit: cost ratio (1.19).

Keywords: Economics, Soybean, Foliar, Nutrient

CHARACTERIZATION AND CLASSIFICATION OF SOILS OF JHALARAPATAN BLOCK, JHALAWAR DISTRICT OF RAJASTHAN

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Received-02.03.2017, Revised-16.03.2017

Abstract: A detailed soil survey of cluster of 10 villages in Jhalarapatan block, Jhalawar district of Rajasthan was carried out at 1: 8000 scales. Five typifying pedons representing undulating and alluvial plain landforms were studied for their morphological and physico-chemical properties. The soils were shallow to very deep, well

to moderately well drained, moderately eroded, clay in texture developed over sandstone and basaltic parent materials. Soils of the undulating belong to *Typic Haplustept* while soils of the plain were classified as *Typic Haplustert*. The soils were slightly alkaline to strongly alkaline in reaction pH (7.78-8.76). Electrical conductivity ranged between 0.10-2.65 dSm^{-1}, organic carbon varied from 0.08-0.99 g kg^{-1}, cation exchange capacity ranged from 13.0- 56.5 cmol (p^{+}) kg^{-1}. Soils were low in available nitrogen (68.0-184.7 kg ha^{-1}), low to medium in phosphorus (3.4-20.2 kg ha^{-1}) and high in available potassium (1092 kg ha^{-1}). Soils were medium to high in available zinc (0.18-3.6 mg kg^{-1}), high in available iron (5.84-26.46 mg kg^{-1}) and copper (0.67-4.32 mg kg^{-1}). Available manganese was low to high (1.24-21.86 mg kg^{-1}).

Keywords: Soil, Survey, Morphology, Land resources

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GENETIC VARIABILITY STUDIES FOR YIELD, OIL AND MORPHO-PHYSIOLOGICAL TRAITS IN SOYBEAN (*GLYCINE MAX* (L.) MERRILL)

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Received-05.03.2017, Revised-15.03.2017

Abstract: Thirty five different elite germplasm lines of soybean along with five checks were sown during kharif, 2011 in an experiment laid out at experimental farm of All India Coordinated Research Project on soybean, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani during kharif, 2011 with a view to study the genetic variability for yield, oil and morpho-physiological traits in soybean. The study revealed that the genotypes viz., EC 3412, EC 257303, MACS 609, JS 20-29, JS 93-05, MAUS 162, NRC 87, SL 778, MACS 1281, NRC 86, Swarna Vasundhara, VLS 77, MACS 1259, AMS-MB 5-19, Monetta and MACS 1201 exhibited better performance for number of branches per plant, number of pods per plant, 100 seed weight, harvest index, leaf area index, oil content. High genetic coefficient of variation was observed for seed yield per plant, number of pods per plant, number of branches per plant, leaf area index, plant height and harvest index. High heritability coupled with high expected genetic advance was observed for number of pods per plant, seed yield per plant, number of branches per plant and 100 seed weight. Hence, direct selection for these characters in soybean will increase the breeding efficiency. The promising genotypes viz., EC 3412, EC 287303, MAUS 609, JS 20-29, JS 93-05, MAUS 162, NRC 87, SL 778, MACS 1281, NRC 86, Swarna Vasundhara, VLS 77, MACS 1259, AMS-MB 5-19, Monetta, MACS 1201 should be further evaluated for yield and other characters in future.

Keywords: Genetic variability, Heritability, Soybean, Yield

Journal of Plant Development Sciences Vol. 9(3)

ESTIMATES OF VARIABILITY PARAMETERS FOR YIELD AND ITS COMPONENTS IN SOYBEAN (*GLYCINE MAX* L.)

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Received-28.02.2017, Revised-12.03.2017

Abstract: The present study of genetic variability was carried out using 30 genotypes of soybean for 8 quantitative characters. Analysis of variance for the design of experiments indicated highly significances among treatments for all the characters. Wide range of variation was found for seed yield per plant, plant height, 100-seed weight, number of pods per plant , number of secondary branches per plant , number of primary branches per plant ,number of seeds per pod, indicated good scope for improvement. Maximum phenotypic and genotypic coefficients of variation were observed for plant height followed by number of primary branches per plant, seed yield per plant, number of clusters per plant, number of pods per plant and pod length.

Keywords: Soybean, Variability, Heritability, Yield

Journal of Plant Development Sciences Vol. 9(3)

PLANT GROWTH REGULATORS AFFECTING SEX EXPRESSION OF BOTTLE GOURD [*LAGENARIA SICERARIA* (MOL.)] CV. PUSA SUMMER PROLIFIC LONG

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Received-03.03.2017, Revised-16.03.2017

Abstract: The investigation was carried out in the experimental farm of Department of Horticulture, S.K.N Agriculture University, Jobner,Jaipur (Rajasthan) to see the effect of various plant growth regulators and thiourea on vegetative growth, sex expression, quality and yield attributes of bottle gourd cv. cv. Pusa Summer Prolific Long, during the season 2012. The experimental was laid out with 13 treatments in randomized block design and replicated thrice. The treatment comprised of plant growth regulators and thiourea, viz. T_0 (control), T_1 (100 ppm NAA), T_2 (200 ppm NAA), T_3 (300 ppm NAA), T_4 (150 ppm Ethrel), T_5 (300 ppm ethrel), T_6 (450 ppm ethrel), T_7 (100 ppm CCC), T_8 (200 ppm CCC), T_9 (300 ppm CCC), T_{10} (250 ppm thiourea), T_{11} (500 ppm thiourea), T_{12} (750 ppm thiourea). The results revealed that the application of NAA 300 ppm (T_3) recorded maximum vine length (6.80 m), nodes per vine(22.01) and leaf area (274.00 cm^2). The CCC 300 ppm (T_9) treatment produced maximum primary branches (22.97) and secondary branches (9.30) per vine and leaf area (203.26 m^2) were observed in this treatment. The results showed that NAA 300 ppm registered maximum vegetative growth, ethrel 750 ppm significantly decreased male flower (65.60). Most of the quality parameters are maximum at ethrel 450 ppm as crude protein contents (0.226), ascorbic acid (12.90), TSS (5.31%). It may be concluded that ethrel 400 ppm (T_6) was found most effective as it remained statistically at par in all the growth, flowering attributes and yield.

Keywords: Bottle guard, PGRs, Thiourea, Vegetative growth, Flowering, Yield, Quality

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STUDY OF ECONOMICS ON MAIZE (*ZEA MAYS* L.) INFLUENCED BY WEED MANAGEMENT

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Received-16.02.2017, Revised-13.03.2017

Abstract: A field investigation was conducted at BAU experimental Farm, Ranchi during *kharif* season 2015 on sandy clay loam soil. The experiment was laid out in a RBD with 13 treatments: pretilachlor 1.0 $kgha^{-1}$ PE (T_1),atrazine 1.0 $kgha^{-1}$ PE (T_2),pendimethalin 1.0 $kgha^{-1}$ PE (T_3), metribuzin 0.35 $kgha^{-1}$ PE (T_4),pretilachlor 0.5 + metribuzin 0.175 $kgha^{-1}$ PE (T_5), atrazine 0.5 + pendimethalin 0.5 $kgha^{-1}$ PE (T_6), pretilachlor 1.0 $kgha^{-1}$ at 15 DAS (T_7), metribuzin 0.35 $kgha^{-1}$ at 15 DAS (T_8), atrazine 1.0 $kgha^{-1}$ at 15 DAS (T_9), green manuring by *Sesbania* @ 80 $kgha^{-1}$ *fb* 2,4-D 0.625 $kgha^{-1}$ at 30 DAS (T_{10}), two mechanical weeding at 20 and 40 DAS (T_{11}), two hand weeding at 20 and 40 DAS (T_{12}),and weedy Check (T_{13}), replicated thrice. Results revealed that gross return (70591Rs.ha^{-1}), net return (44623Rs.ha^{-1}) and B: C ratio (1.72) were observed maximum due to application of same treatment (atrazine 0.5 + pendimethalin 0.5 Rs.ha^{-1}PE). The cost of treatment (atrazine 0.5 + pendimethalin 0.5 kg ha^{-1}PE) is much lower (1768 Rs.ha^{-1}) against mechanical weedings (3749 Rs.ha^{-1}) and hand weedings (9372 Kg.ha^{-1}).

Keywords: Maize, Weed management, Economics, Investigation