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Contents

SHORT COMMUNICATION

CAGE WHEEL FOR TRACTION IMPROVEMENT IN POWER TILLER

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Abstarct: Cage wheel is important traction improvement device in wet puddle soil condtion.In India rice is important crop for crop production and produced first crop as well as second crop where required puddle field condition.during the field operation with machine no of losses such as trafficability of the surface layer is very poor,increased energy consumption,fuel consumption,soil hardpan,plant debris etc.The cage wheel, in particular, provides a floating effect to the power tiller in wet paddy fields, in addition to puddling the soil.use of suitable cage wheel allow well puddle condtionand energy saving operation in wet land.

Keywords: Cage wheel, Traction, Sinkage, Slippage, Drawbar power

LOCAL ASSESSMENT OF URBAN TREE DIVERSITY

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Abstract: This work provides an overview of tree diversity in the municipality of porbandar through an assessment of the road side tree flora in urban sectors of the city. An enumeration of roadside trees along major routes of porbandar city was examined. It is aimed to make available the knowledge required for supporting proactive action for plant documentation, diversity assessment and conservation. Biodiversity indices for individual roads and area were calculated and used to depict the biodiversity in the urbanized area. A total of 35 tree species belonging to 23 families were enumerated. Most of the trees were products of planted rather than wildling preservation at number of roads. Distribution pattern of tree species analysis depict the contiguous pattern except the Avicennia marina showed random distribution. The analysis was based on a tree census in which all tree species were counted and studied for various parameters. Sum total of indices of a city then compared with the major urban spaces in the saurashtra region resulted into species richness and evenness at regional level.

Keywords: Biodiversity, Roadside trees, Saurashtra region, Urban area

OVULE ABORTION AND ITS POSSIBLE IMPLICATIONS IN *FUMARIA INDICA* (HAUSKN.) PUGSLEY – AN ANNUAL WEED

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Abstract: Our studies on the breeding systems and pollination biology of number of annual weed species of Jammu region of J&K, India has revealed most of them to be annuals, sexually reproducing and selfers. Majority of them are prolific fruit and seed producers. Predominant / obligate selfing enables these plants to set seeds even in uncertain pollinator conditions,

helping both in their survival and rapid spread. Two plant species of this group namely *Trifolium dubium* Sibth and *Fumaria indica* (Hauskn.) Pugsley however defy these generalisation. Plants of these species like their other counterparts are selfers with high fruit set. Seed set in these two species however averages below 50 %. This dip in seed set is because they invariably abort a proportion of their ovules. The abortion is mostly prefertilization and fruits are invariably one seeded. The details of the studies in different populations of *Fumaria indica* point towards this mechanism to be universal, although the pattern differs. Investigated abortion seems predetermined and is uniform indicating it to be genetically determined.

GENETIC FIDELITY STUDIES OF *HOLOSTEMMA ADA-KODIEN* SCHULT.– A VULNERABLE MEDICINAL PLANT

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Abstract: *Holostemma ada-kodien* a species indigenous to India and popularly known as Jivanti, is a twiny, laticiferous perennial medicinal shrub belongs to the family Asclepiadaceae. The occurrence of *in-vitro* culture stress might results instability of the genome in tissue cultured plantlets and hence these plantlets have to be subjected to assessment of genetic fidelity using DNA based molecular marker in *in- vitro* regenerated *H. ada-kodien* plantlets. The nodal explants responded satisfactory in terms of growth related traits when inoculated in the MS medium supplemented with KIN (1.50 mg/l) + NAA (0.50 mg/l). When screened with 12 Random Amplified Polymorphic DNA (RAPD) primers, it produced clear reproducible and scorable bands. All banding profiles from *in-vitro* raised plants were monomorphic and similar to that of the mother plant. This study is of high significance as these could be commercially utilized for large scale production of true-to-type plantlets in *H. ada-kodien.*

GENETIC SYSTEMS IN *ARTEMISIA* L. I: *ARTEMISIA TOURNEFORTIANA*, A SPECIES WITH HIGH SEXUAL REPRODUCTIVE EFFICIENCY

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Abstract: Present communication encompasses detailed studies on genetic system of *Artemisia tournefortiana* Reichb., (F. Asteraceae) sprawling at Rumtse, Khardong and Kharu areas of Ladakh region of Jammu & Kashmir, India . Species has high sexual reproductive efficiency and exhibits a stable genetic system with diploid chromosome constitution and high pollen stainability resulting in good seed set averaging 60.61 ± 1.55 on open pollination. Plants of the species studied by us are based on x=9 and invariabily exhibit 2n=18 as their chromosome number. Somatic analysis reveals presence of 16M and 2 SM chromosomes.

BENEFICIAL MICROFLORA IN RHIZOSPHERE SOIL UNDER SELECTED EXOTIC FOREST TREE SPECIES

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Abstract: A field investigation was carried out with four exotic tree species (*Acacia auriculiformis, A. mangium, Casuarina equisetifolia* and *Swietenia macrophylla*) planted at 2m × 2m spacing and of about 30 years age at Kerala Forest Research Institute sub-centre Nilambur. The specific objective of the study was to examine the population variations of beneficial microflora in rhizosphere soil, due to long term occupancy of these trees. The rhizosphere soils were collected for isolation and enumeration of soil microflora like actinomycetes, bacteria, fungi, N-fixing bacteria, P-solubilizer and K-solubilising bacteria population. It was found that, over the years, the tree species influenced the soil microflora. The highest population of fungi, nitrogen fixing bacteria, phosphate solubilizing microorganism and potash solubilizing bacteria was recorded under *A. mangium.* The highest mean population of actinomycetes and bacteria was associated with *C. equisetifolia.* These four exotic tree species taken part actively in the improvement of soil quality and soil health which are the major determinants of sustainable soil productivity.

Keywords: Exotic forest tree species, Actinomycetes, Bacteria, Fungi, Beneficial microflora

EFFECT OF DIFFERENT RATE OF N APPLICATION ON MAIZE – WHEAT CROPPING SYSTEM IN RELATION TO GREENHOUSE GASES (GHGS) EMISSION

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Abstract: A field experiment was conducted to study the effect of different rate of nitrogen application on GHGs emission under maize-wheat cropping system in an acid soil. Nitrogen rates were arranged with four levels including (N_1: 0, N_2 : 80, N_3 : 160 and N_4 : 240 kg N ha^{-1}) in case of maize. However in case of wheat N rates was ($N_1 = 0$, $N_2 = 50$, $N_3 =100$ and $N_4=150$ kg N ha^{-1}). GHGs were estimated by using Cool Farm Tool (CFT), and the result showed that the application of higher dose of N, emitted more total GHGs (11163 kg CO_2eq ha^{-1} in maize and 7108 kg CO_2eq ha^{-1} in wheat, respectively). Similar trend was followed by emission of N_2O and CO_2. A breakdown of various emission sources shows that the major emission sources at farm level is the production and use of synthetic fertilizer. GHGs emission increased with increasing N application both maize and wheat crop and was observed highest at highest N application rate i.e. 240 kg N ha^{-1} and 150 kg N ha^{-1} (11163 and 7108 kg CO_2eq ha^{-1}, respectively) and lowest at no nitrogen applied plot (1941 and 2124 kg CO_2eq ha^{-1}) respectively.

Keywords: Carbon dioxide, Cool Farm Tool, Nitrogen fertilizer, Nitrous oxide, Maize-wheat

PRODUCTIVITY AND CARBON SEQUESTRATION POTENTIAL OF VAN PANCHAYAT FOREST IN KUMAUN HIMALAYA

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Abstract: Present study deals with biomass and carbon sequestration potential in Letibunga van panchayat forest in Nainital district of Kumaun Himalaya. The van panchayat was dominated by banj oak (*Q. leucotrichophora*) species and associated with some other tree species. The whole van panchayat forest was divided into three sub-sites viz., hill top, hill slope and hill base site. In van panchayat, total 7, 14 and 34 species of tree, shrub and herb were reported. *Quercus leucotrichophora* was the dominant tree species in each site with maximum density. The biomass and productivity of forest was 523 t ha^{-1} and 21 t ha^{-1} yr^{-1}, of which tree layer accounted for 99 and 86 per cent, respectively. The carbon stock and carbon sequestration was 249 t ha^{-1} and 10 t ha^{-1} yr^{-1}, of this tree layer contributed 99 and 86 per cent, respectively. This study concluded that van panchayat forest having oak tree species not only provide the wood demands of the local people in the area but also play a vital role in the conservation of carbon, therefore mitigates the climate change problem and also supports the sustainability of the region. In this context, such community forests must be protected and managed in such a way so that the sustainable development could not be hampered in near future.

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INFLUENCED BY EFFECTIVE MICROBIAL CONSORTIA ON GROWTH AND FLOWERING OF MARIGOLD (*TAGETES ERECTA* L.) WITH GRADED LEVELS OF NPK

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Abstract: A field experiment was conducted to know the field response of Marigold (*Tagetes erecta* L.) cv. Double Orange to liquid formulations of effective microbial consortia with graded levels of NPK on growth and flowering at Department of Horticulture, College of Agriculture, Shivamogga, Karnataka during 2014-15. The experiment was laid out in randomized complete block design with 3 replications and 15 treatment combinations, among 15 treatment combinations, 100 % RDF + *Azotobacter* (T_3) recorded significantly maximum plant height, stem girth, internodal length, number of leaves, leaf area, LAI and chlorophyll content. However, the maximum number of primary and secondary branches per plant was observed in the treatment which received 75 % RD'N' + *Azotobacter* + 100 % RD'P' and 'K' (T_2) and 75 % RDF + *Azotobacter* + *Bacillus megaterium* + *Frateuria aurantia* (T_{14}), respectively. Significantly maximum plant spread was recorded in T_{11} which received 100 % RDF + *Azotobacter* + *Frateuria aurantia*. The plants treated with 75 % RD'N' + *Azotobacter* + 100 % RD'P' and 'K' (T_2) reported significantly maximum flowering duration of 71.17 days over (T_1) 100 % RDF.

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KRISHI VIGYAN KENDRA LEADS IN CHANGING THE SCENARIO OF PANNA DISTRICT WITH THE PROMOTION OF EFFECTIVE TECHNOLOGY

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Abstract: Panna district forms a part of the Kymore plateau and Satpura hills zone of Madhya Pradesh which is characterized by undulating topography, slopy lands and adverse climatic factors. The prevailing slopy lands and precipitation mainly received during July to September provide congenial conditions for growing Kharif season crops in the district. Hence, an effort was made by KrishiVigyan Kendra Panna M.P. to promote farmers for Kharif cultivation during 2005-06 to 2009-10 percentage increase in Kharif crop area is 16.03, similarly percent increase in yield is varies from 18 to 89 percent on various crops, seed replacement rate increases from 78.45 to 400 percent on various crops, more than 17.76 percent of newer farmers adopt farming all in all it leads to increase in cropping intensity up to 8 percent and increase in total production up to 72 percent.For achieving this series of training programs & frontline demonstrations conducted on improved cultivation technology by KVK resulted in successful efforts

VARIABILITY, CHARACTER ASSOCIATION AND PATH ANALYSIS STUDIES IN FORAGE SORGHUM

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Abstract: Economic yield attributing characters were studied in forage sorghum for crop improvement through selecting high yielding characters. Significant variations were recorded among the genotypes for various yield traits studied. High values for phenotypic coefficient of variation (PCV) and genotypic coefficient of variation (GCV) was noted for plant height, leaf breadth, internode length and green fodder yield per plant. High heritability coupled with high genetic advance as percent of mean was revealed for plant height, leaf breadth, internode length, number of leaves per plant, leaf stem ratio, leaf area, total soluble solids and green fodder yield per plant. Green fodder yield per plant observed positive and significant correlation with plant height, number of leaves per plant, internode length, leaf area and protein content at both the levels. The result of path coefficient analysis showed that leaf area, leaf breadth, leaf length, plant height and protein content had positive direct effect on green fodder yield. Sorghum is one of the important food crops of the world. To exploit the potentiality of sorghum several crop improvement programmes have been undertaken. Yield is a complex character, which depends upon many independent contributing characters. Knowledge of the magnitude and type of association between yield and its components themselves greatly help in evaluating the contribution of different components towards yield. Yield being a polygenic character is highly influenced by the fluctuations in environment. Hence, selection of plants based directly on yield would not be very reliable. Improvement in sorghum yield depends on the nature and extent of genetic variability, heritability and genetic advance in the base population and besides the information on the nature of association between yield and its components helps in simultaneous selection for many characters associated with yield improvements. It was concluded that these characters could be considered as significant selection criteria for yield improvement in forage sorghum.

INFLUENCE OF CROP CONFIGURATION AND SEED RATE ON YIELD ATTRIBUTES, YIELD AND QUALITY OF SOYBEAN [*GLYCINE MAX* (L.) MERRILL]

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Abstract: A field experiment was carried out during *kharif* 2014 to investigate the effects of crop configuration and seed rates on yield and yield components of soybean. Experiment was conducted in the split plot design with four crop configuration (Broadcast method of sowing, Cross sowing 30 cm apart, Closed space sowing 20 cm apart and Recommended Spacing of sowing at 30 cm) as main plot and four seed rates (50, 65, 80 and 95 kg/ha) as sub plot. Results revealed that significantly higher number of pods and seeds per plant, seed and stover yield, Productivity rating index (PRI) and Production efficiency (PE) were obtained in recommended spacing of sowing at 30 cm. Crop sown with seed rate 95 kg ha^{-1} recorded significantly highest seed and stover yield, PRI and PE and was at par with 80 and 65 kg ha^{-1}. Number of seeds pod^{-1}, 100 seed weight, oil and protein content were not affected significantly by crop configuration and seed rates. Interaction between recommended spacing of sowing at 30 cm and 65 kg seed ha^{-1} gave highest seed yield which was at par with seed rate 80 and 95 kg ha^{-1}.

Keywords: Crop configuration, Seed rate, Soybean, Yield

ASSESSMENT OF GENETIC DIVERSITY IN CHICKPEA (*CICER ARIETINUM* L.) GERMPLASM

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Abstract: Genetic diversity among 100 accessions of chickpea collected from different agro-ecological zones of India was assessed for several quantitative and qualitative traits. These accessions were grown in the augmented design with 5 intermittent checks *viz.*, HK 94-134, KWR 108, GCP-105, Udai and Pant G-186 after every tenth row. Wide range of variability was observed for both qualitative and quantitative traits studied. All the chickpea genotypes were grouped into 11 discrete clusters with higher genetic diversity for different traits. Maximum 12 genotypes consisted by cluster II, IV, VII followed by cluster I, III and VI were having 11 genotypes. The highest intra-cluster distance was recorded for cluster II (23.214) followed by cluster VIII (16.218). The maximum inter-cluster distance was observed between cluster IV and XI (70.776) followed by cluster III and XI (58.599). The above result indicates that these genotypes having sufficient genetic diversity to generate segregants through crossing programme.

Keywords: Chickpea, Accessions, Cluster Distance, Augmented, Genetic Diversity

IMPACT OF KISAN MOBILE ADVISORY SERVICES ON POTATO AND MAIZE PRODUCTION TECHNOLOGY

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Abstract: Information Communication Technology (ICT) in the field of agriculture has brought many changes in traditional methods of extension .It enables the dissemination of requisite information at the right time to the right people. The present study was carried out during the year 2015-16 in Surguja district of Chhattisgarh state. Findings of the study showed that in case of Maize production technology before use of Kisan Mobile Advisory Service (KAMS) the majority of respondents had increased knowledge gain of 51.5 per cent in knowledge on seed rate. However after use of KMAS, the highest knowledge gain about application of manure & fertilizer was 98.5 %, while maximum % increase was found on knowledge about

storage (156.00%). In case of level of adoption before use of KMAS maximum number of respondents had 59.00 per cent adoption level about application of manure & fertilizer while after use of KMAS majority of respondents had 123 per cent increase in adoption on seed rate. In case of Potato production technology before use of KMAS majority of respondents had knowledge level of 49.00 per cent about application of manure & fertilizer, 48% about seed treatment, 45.5 % about seed rate and application of fungicide/chemicals for control of diseases both. However after use of KMAS, regarding potato production technology, knowledge level 95.5 per cent was about time of sowing. While maximum respondents had 157 % change in knowledge was about time of sowing followed by use of weedicide (125%) and earthing up (117%) respectively. In case of level of adoption before use of KMAS, maximum number of respondents had 52.5 per cent adoption about use of weedicide, followed by time of sowing (52%), seed rate and application of manure & fertilizer (50.5%) both. However, after use of KMAS maximum respondents had 97.5 per cent adoption level about seed rate followed by application of fungicide/chemicals for control of diseases and storage (95%) both. While maximum respondents having % change in adoption level to the extent of 135 % about storage 105 % about, Use of insecticide /pesticide and 93 % about seed rate. Impact of Kisan mobile advisory services on yield of maize indicate that there was low yield (26.65q ha^{-1}) before KMAS it while increased (45.56q $^{-1}$ha^{-1}) after use of KMAS. However % increase in yield was 71%. Before use of KMAS average yield of potato were 120.8q ha^{-1}. While after KMAS it increased to 215.50q /ha^{-1}. However % increase in yield was 78%.

ANALYSIS OF DIGITAL ELEVATION MODEL OF RAJGARH FOREST DIVISION HIMACHAL PRADESH USING SHUTTLE RADAR TOPOGRAPHY MISSION DATA AND GIS TECHNIQUES

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Abstract: The present study highlights the use of DEM and its analysis on aspects. SRTM data and GIS techniques are helpful to analyze the Elevation characteristics of hilly terrain. The SRTM data were downloaded and used for the present study. The study area covers an area of 820.02 Km^{2}in parts of Rajgarh Forest Division, Himachal Pradesh. The result of elevation variation using DEM was analyzed and its classification is given below. Using this DEM output as input in ArcGIS to prepare the aspect details of the study area is attempted. This output has immense application in proper planning and management of various natural resources and also highly useful for the natural disaster management studies.

ANALYSIS OF TIME ADOPTION OF NEW AGRICULTURAL INNOVATION IN SPECIAL REFERENCE SOYBEAN VARIETIES

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Abstract: Field extension may mean many things to many people, but what we mean by this is the production of desirable change in farmers behavior which is reflected in their field. The researchers and policy makers considered it as a vital impediment in enhancing agricultural production quite earlier and concentrated their efforts on the transfer of improved cultivation techniques amongst farmers. The efforts were focused mainly on increasing area coverage under agricultural innovations and scientific methods of cultivation at quicker pace.

SCREENING OF LITCHI GENOTYPES AGAINST BARK EATING CATERPILLAR, *INDARBELLA* SP.

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Abstract: Bark-eating caterpillar, *Indarbella sp.* was found to be the most heavily infested pest on litchi at Ambikapur**,** Surguja district of Chhattisgarh. Twenty one year old twenty genotypes of litchi were tested against *Indarbella sp* no any single genotype with no bark-eating caterpillar attack had been found, all the genotypes were categorized as heavy infestation category. The incidence and intensity of bark eating caterpillar was showed significantly differences on different litchi genotype, the genotype Dehradun was found minimum per cent incidence (53.33 -56.67) and low numbers of active holes/ tree (5.3- 5.7) during the course of study year 2015 and 2016. The mean incidence of bark eating caterpillar on Dehradun genotype was 55.00 percent and 5.5 numbers of active holes/ tree.

EFFECT OF PLANT GROWTH REGULATORS ON PHYSICO-CHEMICAL CHANGES IN GUAVA CULTIVARS UNDER ULTRA HIGH DENSITY PLANTING SYSTEM

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Abstract: A field experiment was carried out during the year 2014-15 in winter season at research field of Precision Farming Development Centre (PFDC), Department of Horticulture, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) to study the effect of plant growth regulators on physico-chemical changes in guava (*Psidium guajava* L.) under ultra high density planting. Accommodation of the maximum number of precocious plants per unit area to get the maximum profit per unit of the tree volume without impairing the soil fertility status is called the high density planting. Better light distribution within tree canopy increases the number of well illuminated leaves. The experiment was carried out with three varieties (Lalit, Allahabad Safeda and L-49). Plant growth regulators showed maximum plant height, plant spread, plant girth, number of fruit/plant fruit yield/plant and fruit yield/hectare. The average fruit weight, acidity, pH and TSS were also maximum with varieties Lalit.

COLLECTION OF VARIOUS INSECT FAUNA UNDER AGRO-FORESTRY ECOSYSTEM OF CHHATTISGARH PLAIN

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Abstract: The investigation was conducted during October 2015 to April 2016 under agroforestry ecosystem of Chhattisgarh plain. The overall collectingof variousinsect fauna by different methodclearly indicated that,the total number of insects was belonged to order Hymenoptera (639) followed by Diptera (420). Whereas, the crawling insects dominated the fauna of agro-forestry and order Diptera was significantly dominated towards on yellow pan among the various coloured pans/basins used in the pit fall trap.

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PERFORMANCE OF BRASS METAL DURING FREEZE BRANDING IN SAHIWAL CATTLE

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Abstract: Identification of animal in livestock enterprise is of immense importance to draw conclusion of their status in production as well as performance. The present investigation was conducted at the Bull Mother Experimental Farm, College of Veterinary Science & A.H., Anjora, Durg on 80 Sahiwal cattle of different age groups. The age of animals ranged from 0 month to above 18 months. In 0-6 months, the time of appearance of white hairs were 49 ± 1.83, 50.66 ± 2.33, 48.75 ± 3.94 and 55.25 ± 1.75 days, respectively for 5, 7, 9 and 11 seconds of exposure time. In 6 to 12 months, the exposure time of 8, 11, 14 and 17 seconds using brass metal, the appearance of white hairs were 47.2 ± 2.4, 49.75 ± 1.75, 56.66 ± 2.40 and 49.66 ± 3.28 days, respectively. In 12 to 18 months, the times of appearance of white hairs were 59 ± 1.00, 61 ± 2.65, 55.5 ± 6.54 and 62.5 ± 2.50 days, respectively for 12, 15, 18 and 21 seconds of exposure time. In age group of above 18 months, the exposure time of 17, 20, 23 and 26 seconds using the brass metal, the time of appearance of white hairs were found to be 63 ± 00, 47 ± 00, 57.66 ± 2.96 and 64 ± 2.00 days, respectively.