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A REVIEW ON BIOCHAR FOR AGRICULTURE

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Abstract: A nutrient-rich product made from biomass known as biochar is gaining popularity for its use in soil amendment, crop yield improvement, and carbon sequestration. Utilizing biochar has numerous environmental advantages, economic advantages, and a possible role in carbon credit systems. Thermal combustion of biomass results in the production of biochar, which is a remarkably rich source of carbon. Another specific area for the expanding use of biochar for removing certain contaminants is activating biochar. The current rise in population is causing an increase in the world's energy needs. Energy is needed in every sector of the economy. The main source of energy is fossil fuel. However, the replacement of fossil fuels has become more important due to the impact of CO_2 on the environment and global energy challenges. The types and speeds of interactions depend on a variety of variables, including the content of the biomass and the biochar, the preparation techniques used, the physical characteristics of the biochar, and the climatic conditions of the soil, particularly the soil temperature and moisture. In addition to increasing plant growth, biochar can work as a soil conditioner by strengthening the physical and biological characteristics of soils, such as their ability to retain water and nutrients.

Keywords: Biochar, Char, soot, Black carbon, Charcoal, Activated Carbon

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FLORISTIC DIVERSITY AND ETHNOBOTANY OF DISTRICT UDHAMPUR (J&K) INDIA-A PART OF NW HIMALAYA

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Abstract: A floristic study was conducted in the District Udhampur (Jammu & Kashmir) to learn about the importance of plants that local inhabitants use fornumerouspurposes. Semi-structured interviews were used to acquire ethnobotanical data from local key informants. A total of 210 plant species were recorded in this study belonging to 75 families and 175 genera. Lamiaceae was the dominant family represented by 19 species followed by Fabaceae with 18 species, Asteraceae represented by 14 species, Rosaceae 9 species, Moraceae 8 species while Polygonaceae and Ranunculaceae represented by 6 species each. Similarly, Acanthaceae, Euphorbiaceae and Solanaceae were presented by 5 species each; Apiaceae, Apocynaceae,Araceae, Pinaceae, Plantaginaceaeand Sapindaceae contributed 4 species each; Amaranthaceae,Caprifoliaceae, Convolvulaceae, Liliaceae, Malvaceae, Meliaceae, Oleaceae, Rutaceaeand Violaceae were represented by 3 species each, and the rest 50 families have contributed one and two species each. The largest proportion of plant species (153 species, 72.87%) were used in medicine, followed by food(63 species, 30.04%), timber (15 species, 7.14%), fodder (14 species, 6.66%), fuelwood (11 species, 5.33%), religious purposes (13 species, 6.19%) and dye (3 species, 1.42%).The growth form analysis revealed that herbs made the highest proportion with 117 species (55.71%) followed by tree 54 species (25.71%), shrubs 27 species (12.85%), and climbers 12 species (5.71%). The most frequently used plant parts were leaves 88species(43.34%), followed by fruits 39 species (19.21%), whole plants 36 species (11.88%), flowers 22 species

(10.83%),rhizomes13 species (6.40%), bark 12 species (5.91%), wood 8 species (3.94%), shoot 6 species (2.95%), root and stem 5 species each (2.46%).Frequency Index ranges between 4.28 to 57.14. *Berberis lyceum* was the most used plant species having a frequency index of 57.14, while *Ampelocisuss tomentosa* Planch, *Biden alba*, *Nepeta racemosa*, *Sarcococcasaligna*, *Stachys alpina* were the least utilized with a frequency index of 4.28. Plants such as *Senegalia catechu, Aeglemarmelos*, *Butea monosperma*, *Quercus leucotrichophora,Cynodondactylon,Phyllanthus emblica*, *Pistacia integerrima*, *Olea ferruginea*, and *Juglans regia*were used for more than three uses in the research region, while 48 species were used for more than one purpose, and the remaining 150 species had a single use.

Keywords: Ehnobotanical studies, Fodder, Food, Medicinal, Semi-structured, Indigenous, Inhabitants life forms

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EVALUATION OF FIFTY WHEAT (*TRITICUM AESTIVUM* L.) GENOTYPES USING CHLOROPHYLL INDEX CANOPY TEMPERATURE DEPRESSION AND SPOT BLOTCHUNDER TERAI AGROCLIMATIC CONDITIONS OF WEST BENGAL

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Abstract: During the *rabi* season of 2020-2021, the experiment was conducted at the university instructional farm, Uttar Banga Krishi Vishwavidyalaya, Pundibari, Cooch Behar, West Bengal, to evaluate 50 wheat genotypes for chlorophyll index, canopy temperature depression, and spot blotch in the terai regions of West Bengal, as part of the 19th High-Temperature Wheat Yield Trail nursery from CIMMYT. Two-way ANOVA analysis revealed significant divergence in growth stages in all three cases. Six genotypes showed high chlorophyll efficiency at maturity whereas thirteen genotypes showed higher physiological efficiency in the present environment. Among them, only ENTRY 8 and 28 showed both and are recommended for future drought tolerance breeding. No genotype was found to be resistant to spot blotch, thus none is recommended for disease resistance breeding. According to a correlation study, when the area under chlorophyll index progress curve value rises, biomass rises, canopy temperature declines, and physiological efficiency rises. Furthermore, high chlorophyll index levels are linked to increased disease severity.

Keywords: Chlorophyll index, Canopy temperature depression, Spot blotch, Disease severity, Wheat

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IMPACT OF REMOVING THE BARK OF TREES FOR NUMBERING ON THE HEALTH AND LONGEVITY OF TREES

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Abstract: Surveys were undertaken to understand the impact of the present method of numbering the roadside trees on their health and longevity. The study revealed that wounding of trees for numbering has an adverse effect on the health and longevity of the trees. Hence, it is recommended to avoid the present method of numbering trees by removing the bark and to find an alternative method of numbering without causing any injuries to trees.

Keywords: Bark, Roadside trees, Woody trees

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GENETIC STUDIES OF LINE X TESTER ANALYSIS IN MULBERRY (*MORUS* SPP.)

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Abstract: Sericulture is the agricultural activity that traditionally consists in the cultivation of mulberry trees (*Morus* spp.) to yield leaves that are used for feeding silkworms (*Bombyx mori* L.), reared for silk production. In order to improve the leaf quality of mulberry leaf, general combining ability of the parents and specific combining ability of hybrids were estimated for F_1 hybrids of mulberry for survivability and growth traits. Combining ability studies were done using line x tester mating design involving eight genotypes of mulberry. Combining ability analysis of variance revealed that the hybrids were highly significant for all characters because of the preponderance of non-additive genes. Among the parents, MI-0543, MI-0615, MI-0685 and V-1 were the best general combiners for most of the traits in the study. Two best combinations viz. MI-0543 x V-1 and MI-0685 x V-1 had high significant variance coupled with high SCA and can be utilized for further mulberry crop improvement programme.

Keywords: Mulberry leaf, Line x Tester, GCA, SCA, Silkworm

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BACTERIAL SOFT ROT DISEASE IN PINEAPPLE (*ANANAS COMOSUS* (L.) MERR.) -IDENTIFICATION AND *IN VITRO* STUDIES

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Abstract: 'Vazhakulam pineapple', the Mauritius pineapple cultivar is the predominant variety cultivated in Kerala. Soft rot disease of pineapple fruit, which sporadically spread after heavy rainfall and floods in Kerala, caused severe economic loss to farmers. This disease was characterized by fruit deformation, water blisters in the immature stages, internal decay, and soft rot in mature fruit. Severely affected fruits of Mauritius pineapple were collected from Manjalloor and Avolypanchayats of Muvattupuzha block in Ernakulam districtand based on morphological,biochemical and cultural characteristics and polymerase chain reaction (PCR) assay the pathogen was identified as *Enterobacter cloaca*.Antibiotic formulation containing Streptomycin sulphate 90% and Tetracycline hydrochloride 10%,at 100 ppm concentration was found to inhibit the growth of *E. cloacae* (10^9CFU/m).

Keywords: Bacterial soft rot, Vazhakulam Pineapple, Mauritius, *Enterobacter cloacae*

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VARIABILITY STUDIES IN SEED MORPHOLOGY AND GERMINATION PARAMETERS OF *DALBERGIA LATIFOLIA* (ROXB.) IN KERALA

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Abstract: Thirty plus trees have been selected from dominant rosewood growing areas in Kerala based on growth attributes like tree height, girth at breast height, clean bole height and seed yield. Seeds were collected from these identified genetic resources and incorporated in the evaluation program. The thirty plus trees differed significantly due to various seed attributes coupled with the germination traits. Considering all the seed and germination attributes, the superiority of seven progenies *viz*., KLMYKUT 1, KLNLKAR 2, KLNLKAR 4, KLNMNEL 3, KLNMNEL 6, KLTMPLO 5 and KLTRMAC 6 were evidenced. The variability studies on growth attributes indicated that the genotypic co-efficient of variation was higher than the phenotypic co-efficient of variation for most of the characters and expressed that these characters are strongly under genetic control.

Keywords: *Dalbergia latifolia, Seed morphological, Germination traits, Variation*

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EFFECT OF PRE-SOWING TREATMENTS ON SEED GERMINATION AND SEEDLINGS GROWTH OF *BOMBAX CEIBA* -AN IMPORTANT MULTIPURPOSE TREE SPECIES FROM INDIA

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Abstract: The present study was conducted at Department of Silviculture and Agroforestry nursery, Forest College and Research Institute, Mulugu, during 2021-2022. The experiment was laid out incompletely randomized design with nine treatments and three replications. The experiment consisted of nine different pre-sowing treatments for *Bombaxceiba* seeds viz; Water treatment for 12 hours (T1), Water treatment for 36 hours (T2), Hot water treatment for 6 hours (T3), Hot water treatment for 12 hours (T4), GA3 of 100 ppm for 24 hours (T5), IBA of 100 ppm for 24 hours (T6), 98% Conc. H2SO4 for 1 minutes (T7), 98% Conc. $H_2SO_4$for 2 minutes (T8) and Control (T9). Ninety seeds of *Bombaxceiba* were used for each treatment in three replications and these seeds were sown after treating them with above mentioned treatments on seed bed of 10m x 1m with potting media of soil, sand, and FYM in 2:1:1. The observations such as germination percentage, survival percentage, germination energy and germination period were recorded from the day of germination commencement. Growth attributes such as root length, shoot length, number of leaves, collar diameter was recorded at 45 days' interval up to 90 days. After 90 days, dry weight of root, dry weight of shoot was recorded for the species after up rooting the seedlings. Amongst all the treatments, Seeds of *Bombaxceiba* treated with Seed Soaking in Sulphuric acid (H2SO4) at 98 percent concentration for 2 min was found to be superior over the other treatments in respect to seeds germination percentage (83.3%), Germination period (19 days), Germination energy (45.5 %), Survival percentage (93.3%) and Shoot length (20.4 cm), Root Length (17.1 cm), Collar diameter (2.1cm), Number of leaves (27.6), Dry weight of shoot (3g), Dry weight of root (1.6 g) of seedlings. Therefore, for seed treatment of *Bombax ceiba*for better germination attributes and good seedling growth performance and biomass production, Seed treated with 98% Sulphuric acid @ 2 minutes for *Bombaxceiba* is recommended.

Keywords: Agroforestry, *Bombax ceiba*, *Germination*, Silviculture

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GENETIC VARIABILITY STUDIES FOR YIELD AND ITS COMPONENTS IN INDIGENOUS FINGER MILLET (*ELEUSINECORACANA* (L.)GAERTN) GERMPLASM

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Abstract: In the present study 60 indigenous finger millet germplasmlineswere evaluated for thirteen quantitative traits. Analysis of variance for 60 indigenous germplasm revealed significant differences among the germplasm lines for all thirteen traits studied indicating the presence of considerable genetic variability among the genotypes studied. The characters such as finger length, number of productive tillers plant, 1000 grain weight, grain yield plant^{-1} and fodder yield plant^{-1} showed higher estimates of PCV and GCV indicating ample amount of variation among indigenous germplasm lines for these traits. High heritability coupled with high genetic advance as per cent of mean was observed for days to 50% flowering, peduncle length, ear head length, finger length, finger width, number of productive tillers plant^{-1}, 1000 grain weight, grain yield plant^{-1} and fodder yield plant indicating the predominance of additive gene action and direct selection would be effective for improvement of these traits.

Keywords: Finger millet, PCV, GCV, Heritability, Genetic advance

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COMPARATIVE STUDY OF DIFFERENT METHODS OF (DIRECT SEEDED RICE) PADDYE STABLISHMENT IN KANPUR, CENTRAL U.P.

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Abstract: A field study was conducted during *Kharif* season of 2014, to evaluate direct seeded rice options as compared to transplanted paddy with an objective to improve farm productivity and efficiency. For fulfilling all requirements related this field experiment,paddy crop was monitored during the seasons*kharif*, 2014 & 2015. The treatment effects were evaluated in terms of growth, yield attributes and yield. The highest plant population (158.12 ha^{-1}) was recorded under sprouted seedling broadcasting in puddled condition the lowest (158.09 ha^{-1}) was recorded under dry sowing in line, the highest final plant

population (350.07 m^2) was recorded under sprouted seedling broadcasting in puddled condition and the lowest (327.80 m^2) was recorded under dry sowing in line. The no. of shoot/m^2 was obtained maximum at harvesting stage under sprouted seedling broadcasting in puddled condition (337.51 cm) and lower in dry sowing in line,the number of grassi weed was numerically higher under sprouted seedling broadcasting in puddled condition.The maximum number of grain/panicle (72.63) test weight (20.13g) was recorded under the sprouted seedling broadcasting in puddled condition.Sprouted seedling broadcasting in puddled conditiontreated plots had the maximum Biological Yield, Grain Yield and Harvest Index except Straw Yield recorded q h^{-1}.

Keywords: Direct seeded rice, Kharif season, Kanpur

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EVALUATION OF *DALBERGIA LATIFOLIA* (ROXB.) PROGENIES IN NURSERY

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Received-02.12.2022, Revised-14.12.2022, Accepted-27.12.2022

Abstract: Thirty plus trees have been selected from dominant rosewood growing areas in Kerala based on growth attributes like tree height, girth at breast height, clean bole height and seed yield. Seeds were collected from these identified genetic resources and incorporated in the evaluation program. The evaluation of progenies in the nursery experiment proved once again the superiority of three progenies *viz*., KLTMPLO 4, KLMYKUT 1 and KLSWMEP 7 in terms of all the growth attributes investigated. The superiority of these three progenies due to juvenile superiority indicated that these three progenies are under strong limelight for immediate utilization and incorporation in the further breeding programme. The variability studies on growth attributes indicated that the genotypic co-efficient of variation was higher than the phenotypic co-efficient of variation for most of the characters and expressed that these characters are strongly under genetic control.

Keywords: *Dalbergia latifolia*, Nursery, Tree