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ROLE OF TURFGRASS IN URBAN LANDSCAPES

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Abstract: Lawns occupy a significant proportion of green spaces in many cities worldwide. Despite of aesthetic and ornamental benefits, turfgrass also possess many inevitable functional benefits. It helps in maintaining ecological balance and reclamation of polluted environments due to profuse exploitation of nature in urban landscape. The major benefits include controlling soil erosion and improving soil quality, water purification and noise reduction, mitigating air pollution and dust. Turfgrass plays a major role in carbon sequestration which reduce the atmospheric temperature. Apart from these functional benefits, turfgrass is also used in various medical therapies as a tool for reducing mental stress and by various entrepreneurs as a billion-dollar industry with high returns per unit area.

Keywords: Turfgrass, Urban landscape, Air pollution, Water quality

EFFECTS OF GROWING MEDIA AND GROWTH HORMONES ON THE SPROUTING, ROOTING AND FIELD ESTABLISHMENT OF *WOODFORDIA FRUTICOSA* (L.) KURZ (DHAWAI) IN SUB HUMID FOOTHILLS OF EASTERN HIMALAYA

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Abstract: The common method of propagation of *Dhawai* (*Woodfordia fruticosa* (L.) Kurz, through seeds have low germination and seedling survival under normal conditions due to heavy rainfall immediately after the seed maturity and microbiotic seed nature. Hence, an attempt on vegetative propagation through stem cuttings was made to observe the effect of different growth hormones, their concentrations and different growing media on its rooting and sprouting. Cuttings were treated with six different concentrations (IBA 250, 500, 750 and 1000 ppm), naphthalene acetic acid (NAA) + indole-3 butyric acid (IBA) (250 ppm each) by using quick dip method while, the untreated cuttings were used as control. The cuttings were planted in three different growing media: soil, sand, and soil + FYM in equal proportion. Results showed maximum survival (80.0 %) at 30 days in IBA- 750 ppm treated cuttings when planted in sand medium and minimum was with control in (soil + FYM). All the combinations of growth hormone and sand gave better results. In the second trial, sand media alone taken to evaluate the effect of different growth hormones, their concentrations in successive studies. Initiation of sprouting ranged from 12.00 to 15.33 days and completion of sprouting ranged from 18.00 to 25.67 days. Maximum survival (35.56 %) at 90 days was recorded in IBA 1000 ppm treated cuttings when planted in sand medium. Healthy and uniform *Dhawai* planting materials in Terai region of West Bengal can be produced by planting *Dhawai* stem cuttings treated with IBA 1000 ppm in sand medium, transplanting of the rooted cuttings to polybags containing soil and FYM in 3:1 ratio after two months with root ball and then transplanted to outfield with root ball.

Keywords: *Woodfordia fruticosa*, Vegetative propagation, Sprouting, Rooting, Survival

IMPACT OF SULPHUR AND BORON ADDITION ON SOIL CHEMICAL PROPERTIES, ACTIVITY OF SOIL ENZYMES AND LENTIL PRODUCTION IN RED SOILS OF VINDHYAN REGION, UTTAR PRADESH

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Abstract: In red soil, secondary nutrient deficiency, especially sulphur (S) and micronutrients (such as B), has resulted in low fertility. Due to the severe shortage of high-quality pulses, researchers have become increasingly interested in the availability of S and B in soils. Therefore, four levels of sulphur as gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) and four levels of Boron as borax ($\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$) were applied to soil in different treatment combinations, along with recommended doses of NPK (40, 60, and 20 kg ha^{-1} N, P, and K, respectively) as urea, diammonium phosphate, and Muriate of potash. With a factorial completely randomised design, this experimental trial was performed in pots and repeated three times. The soil samples were collected and analysed after the harvest of the lentil crop to determine changes in soil pH, EC, organic carbon, availability of cationic DTPA - extractable micronutrient (Zn, Cu, Fe & Mn), urease and dehydrogenase activity. According to the findings, sulphur and boron application reduce soil pH and EC, increased organic carbon. Similarly, it also affects the available Cu and Mn but not significantly. Application of these treatments affects the Zn availability significantly both the years and available Fe in one season only. The lowest pH value (pH 5.74) was observed with the application of 45 kg S ha^{-1} with 3 kg B ha^{-1} and the lowest EC value (0.28 dSm^{-1}) was obtained different levels of boron fertilizers through borax along with RDF application. The soil organic carbon increased from 4.01 to 4.28 mg kg^{-1} . Soil application of sulphur and Boron along with RDF has significantly increased DTPA - extractable Zn (0.57 to 0.72 mg kg^{-1}) and non-significantly decreased the soil available DTPA - extractable Cu (0.77 to 0.72 mg kg^{-1}) and increased in Fe (23.49 to 26.26 mg kg^{-1}) and Mn (5.38 to 5.67 mg kg^{-1}) status. The effect of or gypsum and boron on lentil yield found positive and it increased the grain yield 86.17 % as compared to the application of RDF of NPK only. Urease activity was increased from 35.08 to 52.57 $\mu\text{g NH}_4^+ \text{ g}^{-1} \text{ hr}^{-1}$ and dehydrogenase activity from 113.39 to 141.87 $\mu\text{g TPF g}^{-1} \text{ soil day}^{-1}$. The synergistic effect of S and B application along with RDF recorded in lentil yield also. Remarkably, 86.17 % increment was recorded in grain yield of lentil with combined application of S @ 45 kg ha^{-1} and B @ 2 kg ha^{-1} along with RDF ($2.29 \text{ g plant}^{-1}$) as compared to treatment where only RDF applied ($1.23 \text{ g plant}^{-1}$). The increasing doses of sulphur through gypsum improved result in crop growth and yield of lentil but a higher dose of boron through borax after 2 kg B ha^{-1} reduces the yield of the lentil crop. The study explains that the treatment combinations had a synergistic effect and it may be concluded that the combinations of sulphur + Boron with primary nutrients increased soil available micronutrient status, enzyme activity and yield of lentil.

Keywords: Gypsum, Borax, Physico-chemical properties, Micronutrients, Soil enzyme activity, Lentil yield

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EFFECT OF SALINITY ON SEEDLING GROWTH OF CITRUS ROOTSTOCKS

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Abstract: The experiment was carried out at screen house of the Department of Horticulture, CCS Haryana Agricultural University, Hisar for the two consecutive years during the year 2018-19 and 2019-20 to extrapolate the effect of rootstock and salinity on seedling parameters of nine different citrus rootstocks. Seedling height, stem diameter, number of leaves per plant and number of seedlings emerged per seed were adversely affected when subjected to soil salt stress from control (0.07 dS/m) to 7 dS m^{-1}). Among all rootstocks, Rangpur lime, followed by Volkamer lemon and Cleopatra mandarin were found better with relatively less reduction at 7 dS m^{-1} over control, whereas Pectinifera, followed by NRCC-4 and Alemow were found inferior which showed relatively high reduction at 7 dS m^{-1} over control in respect of seedling height, stem diameter and number of leaves per plant at seedling stage.

Keywords: Citrus, Rootstocks, Salinity, Seedling growth

INFLUENCE OF BEE VISITATION ON QUANTITATIVE AND QUALITATIVE PARAMETERS OF CORIANDER IN CHHATTISGARH

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Abstract: The quantitative parameters such as number of seed per umbel (34.93), number of umbel per plant (30.45), seed yield per plant (4.35 g), seed weight per umbel (0.45 g), seed size (3.30 mm), 1000 seed weight (10.13 g) were recorded maximum in control treatment (total open) and minimum recorded number of seed per umbel (14.95), number of umbel per plant (13.30), seed yield per plant (1.98 g), seed weight per umbel (0.20 g), seed size (1.63 mm), 1000 seed weight (6.80 g) in total closed treatment. The qualitative parameter such as germination percentage (79.50%), seedling vigour index (1233.84), shoot length (9.00 cm) and root length (6.50 cm) were significantly higher in total open (control) treatment compared to other treatment and the minimum germination percentage (58.75%), seedling vigour index (587), shoot length (6.75 cm), root length (3.25 cm), were recorded in total closed treatment.

Keywords: Coriander crop, Indian honey bee, *Apis cerana indica*, Pollination, Yield parameter

HETEROSIS AND CORRELATION ANALYSIS IN BREAD WHEAT (*TRITICUM AESTIVUM* L.)

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Abstract: The present investigation was carried out to study heterosis, correlations, variance, genetic advance, heritability using diallel mating design at Research farm, during *rabi*, 2016-17. The experimental materials for the present investigation consisted of five lines *viz.*, Kalyan sona, WH-1080, PDW-215, DBW-90 and CPAN-1796 and one check *viz.*, PBW-725. The experiment was carried out in randomized block design and observations were recorded on ten characters namely days to booting, days to heading, days to anthesis, days to maturity, plant height, spike length, peduncle length, spikelets per spike, grain yield per plant, CPAN-1796 was identified as best general combiner for grain yield per plant followed by WH-1080 and PDW-215. WH-1080 × CPAN-1796 showed good specific combining ability for grain yield per plant, days to booting, days to heading, days to anthesis, days to maturity, peduncle length, number of productive tillers per plant, biological yield per plant, number of grains per plant and harvest index. The best heterotic cross for grain yield per plant was Kalyan Sona × WH-1080. Results revealed the variance analysis of grains per plant showed highly significant and positive genotypic correlations with days to booting, days to heading, spike length, plant height, harvest index and peduncle length.

Keywords: Diallel, Variance, Anthesis, Peduncle, Heterosis

Abbreviations: ANOVA, Analysis of variance; GCA, general combining ability; SCA, specific combining ability

D² ANALYSIS IN ADVANCED BREEDING LINES OF GREENGRAM (*VIGNA RADIATA* L.)

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Abstract: Genetic divergence studies are very important to devise a hybridization strategy to exploit the variability present in the base population. In the present study, thirty genotypes of advanced breeding lines of greengram were evaluated to know divergence and use it the hybridization programme based on the inter cluster and high mean values of the clusters. The thirty genotypes were grouped into ten clusters. The cluster I was the largest cluster with 13 genotypes followed by the cluster, II (6) and III (4). The clusters, IV to X were solitary clusters with single genotype each. The contribution of test weight towards divergence was maximum (78.39%) compared to other characters. The intra cluster distance was maximum in the cluster III (22.83) followed by the cluster II (21.52) and I (15.56). The inter cluster distance was maximum between the clusters VI and X (753.22) followed by IV and X (717.11), VII and X (552.56) and I and X (531.27) indicating their importance in the hybridization programmes for the generation of transgressive segregants. The cluster X mean value for test weight was maximum and can be utilized in the breeding programmes as it forms an important yield contributing trait for yield improvement.

Keywords: Advanced breeding lines, Divergence, Greengram

BIOPRIMING AND INTEGRATED MANAGEMENT OF MAJOR DISEASES OF SESAME

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Abstract: Sesame (*Sesamum indicum* L.) is one of the important oilseed crop grown widely under tropical and subtropical regions in India. Diseases pose a major constraint in sesame cultivation that leads to yield loss. Various modules were evaluated for the management of major diseases in sesame. From the results, it was found that the module comprising of seed treatment with *Trichoderma asperellum* @ 10 g/kg, furrow application of enriched *Trichoderma* (2.5 kg *Trichoderma* sp. + 100 kg Vermicompost) @ 250 kg/ha followed by foliar application of combi product (Tebuconazole 50% + Trifloxystrobin 25%) @ 0.5 g/l at 30-35 DAS and second spray at 50-60 DAS significantly reduced the root rot, phyllody, *Alternaria* leaf spot and powdery mildew diseases. In addition to disease reduction, seed yield was also found to be enhanced in the effective module.

Keywords: Sesame, Diseases, Biopriming, Modules

INFLUENCE OF PRE-SOAKING ON SEED NUT GERMINATION IN COMMERCIAL CASHEW SOFT WOOD GRAFT NURSERY IN KERALA

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Abstract: Evaluation of different pre-soaking treatments and soaking duration on germination of seed nut in a commercial cashew rootstock nursery revealed that the seed nuts pre-soaked in water for 72 hours resulted in highest germination of 95.3 per cent. While soaking in water or 0.1 per cent salt solution induced early germination. The emergence of sprout was noticed in 3.3 days after sowing when seeds are presoaked for 96 hours, either in water or 0.1per cent salt solution and recorded 9.3 days for fifty per cent germination. Presoaking cashew seed nuts in water for 72 hours recorded the lowest mean germination time of 8.6 days and 11.0 days for fifty percent germination and 5.0 days for emergence of first sprout. Thus, low cost pre-soaking treatment of cashew seed nut in water , by changing water daily can hasten the emergence of sprout, time to germinate, total germination per cent and which in turn may reduce the cost of production of cashew grafts in a commercial nursery.

Keywords: Germination, Cashew seed nut, Kerala

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NUTRITIONAL AWARENESS IN RURAL WOMEN THROUGH NUTRITION KITCHEN GARDENING IN DAUSA DISTRICT

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Abstract: At present time food insecurity, malnutrition and healthcare are the major problems faced in India. Kitchen garden plays an important role for rural areas, to provide varieties of vegetables in their daily diet and fulfilling their dietary and nutritional needs. In the city areas Of the country most of the families having kitchen garden of different sizes are interested to improve the practice, Home gardening can contribute to household food security by providing households with direct access to food that can be harvested prepared and consumed by household members, often on a daily basis. The present study was conducted for availability of fresh and nutritive vegetables through nutritional kitchen gardening in rural areas of Dausa district. Also the objective of study was for aware and motivate to rural women about the nutritional kitchen garden during the tough time of COVID 19. Study was conducted in Dausa and Lalsot block of Dausa District, Rajasthan. Two villages, Adopted by KVK Dausa under, NARI (Nutri-Sensitive Agricultural-Resources and Innovation) programme, were selected from each block. The number of families for nutritional kitchen garden was selected from each village by random sampling method. In this way families from each village were selected, consisting the total sample of 92 respondents. The data were collected from each respondent through personal interview method with the help of questionnaire. The study revealed that a nutritional kitchen garden of 500 sq mt fulfills 83.03 per cent of their daily needs of vegetables but the actual consumption is 60.40 per cent.

Keywords: Kitchen gardening, Nutrition, Food security