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PHYTOREMEDIATION OF HEAVY METALS CONTAMINATED SOILS

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Abstract: Soils may be contaminated by the accumulation of heavy metals and metalloids through the emissions from rapidly expanding industrial areas, mine tailings, disposal of high metal wastes, leaded gasoline and paints, application of fertilizers, animal manures, sewage sludge, pesticides, wastewater irrigation etc. Excessive accumulation of heavy metals can have deleterious effects on soil fertility and productivity, disrupts ecosystem functioning and can lead to serious health risks to animals and human beings. Many methods of preventing or removing these pollutants from soils are identified, however, most of these conventional remedial processes are expensive and adversely affect the soil fertility and productivity. Therefore, phytoremediation which uses higher plants to reduce contaminant levels in soil is an eco-friendly and cost effective technology. The objective of this review is to discuss the different mechanisms of phytoremediation, their potentials, limitations, and techniques to enhance the phytoremediation efficiency.

Keywords: Phytoextraction, Hyperaccumulator, Ecofriendly, Cost effective, Chelates, Microbes

THE SPECTRAL MODELLING OF ABOVE GROUND FOREST BIOMASS IN JHAJRA FOREST RANGE OF DEHRADUN FOREST DIVISION USING MICROWAVE DATA

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Abstract: Forests play an important role in the global carbon cycle as a carbon sink. Deforestation and degradation of forests lead to carbon emissions, which should be prevented or minimized by protecting forests. Radar remote sensing has proven to be particularly useful tomonitor forests especially in the tropics due toweather and daytime independence. Radar data fromthe ALOS PALSAR-2 provide a potential opportunity to monitor large areas of tropical forests due to the high resolution.The study describes the development of logarithmic model for the estimation of forest above ground biomass and carbon using ALOS-PALSAR-2 synthetic aperture radar (SAR) data. The backscatter coefficient of the SAR data in different polarization were quantified using field data collected Jhajra forest range. A significant correlation has been observed between HV backscatter and plot level biomass with a coefficient of determination (R^2= 0.8918). The up-scaled biomass ranges from 5.2 tonnes/ha to 397.45 tonnes/ha. The total amount of carbon stored in the Jhajra forest range is 237471.99 tonnes. The carbon sequestration potential of the forest is 871522.20 tonnes.

Keywords: Biomass, Backscatter, Spectral Modelling, ALOS-PALSAR-2, Carbon Sequestration

ISOLATION AND CHARACTERIZATION OF VARIOUS FUNGAL STRAINS AS PRIMARY COLONISER FROM WHEAT STRAW AT VARYING NITROGEN CONCENTRATIONS

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Abstract: The present study was undertaken with an aim to search for the fungal strains, which have the potential to efficiently decompose wheat straw with high C:N ratios. Identification and characterization of these microbial species is important to study their decomposition potential for use in soil fertility management. A total 19 strains of fungal primary colonizers were isolated from a sample of wheat straw. Out of these, one belonged to Zygomycota while the remaining 18 belonged to Deuteromycota. *Alternaria, Aspergillus, Cladosporium, Helminthosporium, Stachybotrys, Fusarium* and *Penicillium* were the most frequently isolated genera at low nitrogen concentration. Isolated strains at low nitrogen concentration seem to be the most probable candidates, as initial primary bio inoculants, for hastening the decomposition of wheat straw. The results of this study suggest the possibility of utilizing fungal inoculants as an integrated component of microbe-based strategies for biotechnological management of wheat straw.

Keywords: Wheat Straw, Microorganisms, Isolation, Decomposition, Serial dilution, Fertilizers

COMMUNITY STRUCTURE OF DANDACHALI FOREST OF TEHRI FOREST DIVISON, NORTH-WEST HIMALAYA

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Abstract: The present investigation was conducted in Dandachali forest of Tehri Forest Division, North-Western part of Himalaya. Surveys and sampling of the vegetation were done using standard ecological assessment methods with an aim to study plant species composition and natural regeneration status at community level. Forty seven woody species (17 trees) belonging to 12 families and 15 genera, and 6 forest communities *viz.*, *Pinus roxburghii- Quercus leucotrichophora* mixed, *Pinus roxburghii, Pinus roxburghii- Rhododendron arboreum* mixed, *Cedrus deodara- Pinus wallichiana* mixed, *Cedrus deodara- Rhododendron arboreum* mixed and *Rhododendron arboreum- Quercus leucotrichophora* mixed, have been recorded in 16 sites between 1482- 2200 m asl. Among the communities, total tree density ranged from 263.34-1493.33 Ind ha^{-1}, TBA 260.2- 310.7 m^2 ha^{-1} and total shrub density 488.3- 4250 Ind ha^{-1}. Species diversity (H') for trees ranged from 0.58-1.89. Concentration of dominance (cd) of trees ranged from 0.20-0.76.

Keywords: Survey, Tehri Forest Division, North-West Himalya

AGRI-BUSINESS MANAGEMENT BEHAVIOR OF THE ONION GROWERS OF REWA DISTRICT (M.P.)

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Abstract: The present study was an attempt to assess the agri-business management behavior of the onion growers. The study was carried out in Rewa block of Rewa District of M.P. with a sample of 120 onion growers. An interview schedule was designed for collecting the relevant information on selected variables. The data were collected personally with the help of this pre-tested interview schedule. It was found that the respondents were managing the agri-business components such as information seeking management, information evaluation management, information preservation management, input management and technology management in a good manner while they could not manage the components i.e. financial

management, storage management, labour management, planning and marketing management to the desired extent .It was also observed that the attributes education, occupation, land holding, annual income, farm assets, farming experience, marketing facilities, training received, mass media use, scientific orientation, economic motivation, risk orientation and decision making were determinants of agribusiness management behaviour of onion growers.

EFFECT OF BOTANICALS AND BIO-AGENTS ON *FUSARIUM OXYSPORUM* F. SP. *CICERI* CAUSES FUSARIUM WILTS OF CHICKPEA (*CICER ARIETINUM* L.)

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Abstract: Chickpea (*Cicer arietinum* L.) an important pulse crop in the world, is a good source of protein and fixes the atmospheric nitrogen in the fields. It is one of the best crops for arid conditions. Fuasrium wilt, a most severe disease and causes huge losses. The potential of anti-fungal activity of different botanicals and bio-agents were tested in laboratory conditions. Among seven botanicals tested, Palmarosa (*Cymbopogon martinii* var. *motia)* with minimum growth of pathogen and 56.36 per cent of inhibition was found most effective against *Fusarium oxysporum* f. sp. *ciceri* followed by others to inhibit the fungal growth in comparison to control. Among the bio-agents, *Trichoderma viride* inhibits the 62.57 per cent and proved to be best in suppressing the growth of the pathogen followed by others.

PEOPLE PERCEPTION ON THE USE OF HOUSEHOLD COPING STRATEGIES AGAINST SHOCKS: A CASE STUDY OF FOREST RESOURCES USE IN GARHWAL HIMALAYA

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Abstract: The present study investigates the use of forest resources as well as other coping strategies opted by rural households against addressal of shocks in securing and sustaining livelihoods. Multistage random sampling was applied for selection of blocks, villages and households (the primary sampling unit) in Garhwal Himalaya. The primary data on the forest resource use and coping strategies against the different types of household shocks were collected from 454 households using semi-structured questionnaire followed by discussions with local people during 2014-2016. The primary results of the study revealed that the rural households practice different strategies to minimize the adverse effect of shocks and use of forest resources for addressing household shocks. The result estimates of the study will be helpful in framing policies regarding evaluation of shocks and also development of mechanism to minimize the impact of shocks at household as well as at community level in Himalayan region.

IMPACT OF PARTICIPATORY SEED VILLAGE PROGRAMME ON ADOPTION

LEVEL OF WHEAT SEED PRODUCERS IN REWA DISTRICT (M.P.)

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Abstract: The word seed or seeds may be defined as all propagating materials used in any kind of cultivation. The seed is considered as most precious input in agriculture. The quality seed availability at desired time determines the sustainable crop productivity growth. It has been observed that presently about 80- 85% of the seeds used by the farmers is their own farm produced seeds and which is managed and conserved by the farmers from his own produce for future use.. Due to poor quality of seed with low germination capacity of seed the crop growth is affected adversely which eventually reduces the productivity of the crop. Despite implementation of the organized seed program since the mid 60s, the seed replacement rate has touched the level of 15 per cent. only .In view of the above facts it has been realized that the availability of genetically good quality of seed materials are of great importance to improve the quality of farm saved seed. In order to accelerate the seed replacement rate of desired genetic seed materials Krishi Vigyan Kendras through its participatory Seed Village Programme was implemented by Krishi Vigyan Kendras of M.P. in the year 2006-07 and continued till 2011-12. Under this programme about twenty villages were covered. The seeds of high yielding varieties along with recommended seed production technologies were demonstrated at farmers' field. Besides this capacity building programmes were also conducted at critical stages of the crops. Since regular follow up and evaluation is a necessary concomitant of such programme to assess the impact and suggest strategy for further growth and expansion of the programme the present investigation entitled "The impact of participatory seed village Programme on adoption behaviour of wheat seed producers in Rewa district (M.P.)" was under taken to assess the impact of the programme on adoption behaviour of seed producers. The study was based on 120 respondents (60 beneficiaries and 60 non-beneficiaries as control) covering 10 villages of Rewa block of Rewa district for analyzing the impact of Seed Village Programme on adoption behaviour of seed producers.. The ex-post facto research design was adopted in this research work. The responses were obtained by administering a pretested interview schedule .The findings inferred there was significant difference between beneficiaries and non-beneficiaries as regards to extent of adoption of seed production technology. The beneficiaries had greater extent of adoption than non-beneficiaries. Correlation coefficient between independent variables and extent of adoption as dependent variable elucidated that knowledge, risk orientation, marketing orientation, attitude towards agricultural technology, extension participation, mass media exposure, innovativeness, education, land holding and annual income had positive and significant relationship with adoption behaviour of both the categories i.e. beneficiaries and non beneficiaries. Social participation and family type had negative and significant relationship with extent of adoption.

Keywords: Seed Production Technology, Krishi Vigyan Kendras , Adoption behaviour

ENHANCEMENT OF PRODUCTION AND PRODUCTIVITY OF SOYBEAN THROUGH THE CLUSTER FRONT LINE DEMONSTRATION OF OILSEED

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Abstract: Cluster front line demonstrations on soybean were organized in the kharif seasons of year 2015-16 different villages of Ashoknagar district by Krishi Vigyan Kendra, Ashoknagar for creating awareness among the farmers to popularize the high yielding variety of soybean. In this context, centre was conducted demonstration to assess the improved varieties of soybean JS 9560 along with existing varieties used by the farmers as local check in the district. The farmers followed the full package of practices like proper seed rate, seed treatment with biofertilizer, fertilizer application on soil test value, weed management, IPM practices etc. Result of front line demonstrations indicated that on an average of 25% more yield of soybean was found as compared to farmer's practices.The number of productive pods per plant of JS 9560 soybean was found 52.7 and non-productive pods per plant 7.9 under package of improved practices. The economic analysis of data over the years revealed that the adoption of improved technology of soybean not only gives the opportunity of higher yield, but also provides higher benefit cost ratio i.e. 1.62 as compared to 1.37 in the farmer's practices.

Keywords: CFLDs, Soybean, Front Line Demonstration, Ashoknagar

PERFORMANCE OF STRAWBERRY (*FRAGARIA X ANANASSA* DUCH.) GENOTYPES FOR GROWTH AND YIELD CHARACTERS IN HILL ZONE OF KARNATAKA

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Abstract: The study was conducted on performance of seven genotype of strawberry (*Fragaria x ananassa* Duch.) at College of Horticulture Mudigere, Karnataka in naturally ventilated polly house during 2015-2016 the significant variation was occurred for all vegetative and Yield parameters. The genotype Sabrina accounted maximum plant height (32.30 cm), number of trifoliate leaves (30.40), plant spread (48.47 cm in north and south direction whereas 53.93 cm in east and west direction), leaf area (206.04 cm^2), leaf area index (6.95), plant dry weight at harvest (29.04 g), chlorophyll content (2.33 mg/100 g), number of fruits per plant (22.36) and yield per plant (380.29 g). number of runners per plant was maximum (10.70) in Cristle , weight of fruit was maximum (20.01 g) in Fortuna, maximum (4.43 cm) fruit length was recorded in genotype Cristle followed by Fortuna (4.12 cm), the breadth and volume of fruit was observed maximum in genotype Fortuna that was 3.28 cm and 24.37 cc respectively Among different genotypes evaluated the Sabrina accounted maximum for growth and yield parameters of strawberry..

Keywords: Genotypes, Strawberry, Growth, Yield, Hill zone