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STUDY OF SPATIO-TEMPORAL ANALYSIS OF ANNUAL RAINFALL VARIABILITY IN UTTAR PRADESH

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Abstract: Uttar Pradesh is Humid subtropical and semi arid climatic region situated between 23° 52' N and 31° 28' N latitudes and 77° 3' and 84° 39'E longitudes. The state is divided into 18 divisions and 71 districts. The statistical analysis of annual rainfall data of past to present 100 years (1915-2014) ranged from 532.7mm in year in 1991 to 1313.1 mm in year 2013 with an average annual rainfall of the area is 929.6 mm. The average rainfall with 2013 showing the highest positive rainfall anomaly (2.26) while the other years show rainfall below normal with 1991 Showing the lowest negative rainfall deviation (-2.34). The calculated value of standard deviation reveals that deviation of rainfall is of 169.7 mm. in a century. The trend analysis in XLSTAT 2014.6.02 ver. observed trend of rainfall, the R^2 value 0.018 means that only 1.8 percent variation is observed in hundred years. The coefficient of skewness has been computed as -0.06 for annual rainfall indicates a negative trend or going to decline pattern. The maximum standard deviation value and CV(%) is observed 210 & 23% in year 1935-44 and minimum standard deviation and CV(%) is observed 80.7 & 10% in year 1995-04. The overall decadal dataset observed decadal maximum rainfall 1328.9 in year 1955-64 whereas minimum rainfall 493.9mm in year 2005-14 observed. In future, expected annual rainfall may be less in year 2025 observed 881.9mm in the state. In the year 2021; expected rainfall may be 893mm. The geostatistical analysis is the ARCGIS 10.3.1 extension used for interpolation and kriging. The prediction map of dataset year 1995-2004 was highest rainfall in east side of some place of Uttar Pradesh. The western part of Uttar Pradesh covered less rainfall the other side cover area. The central part of state decadal map covered maximum area in year 1966-74. The objective of this study is to analyze the recent and future trend of annual rainfall pattern.

Keywords: Anomaly**,** GIS, Geostatistical method, Kriging & Monsoon

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INSIGHT INTO SEQUENCE-STRUCTURE-FUNCTION RELATIONSHIP OF *CATHARANTHUS ROSEUS* RNA BINDING PROTEIN USING *INSILICO* APPROACH

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Abstract: RNA binding protein regulates numerous aspects of RNA metabolism such as pre-mRNA processing, transport and translation. This study describes sequence-structure-function relationship between the *Catharanthus roseus* and their homologs plant species through computational approach. After using sequence analysis techniques, it was observed that only 11 plant species showed higher similarity with RNA binding protein of *C. roseus*. Also, multiple sequence alignment illustrate only two conserve regions between *C. roseus* and their respective homologs plant species. Hence, the structural molecular model of the RNA binding protein was developed through homology modeling using the software MODELLER (9v5). Using PROCHECK and VERIFY-3D, the energy of constructed models was minimized and qualities of each models were evaluated. The corresponding Ramachandran plot specify 93.70% amino acid residues were in the most favoured regions. Final predicted model structure was submitted to Protein Model Database having deposition number PM0080432.

Keywords: RNA binding protein; *Catharanthus roseus*, Homology modeling, RNA recognition motif

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STUDY OF PHENOLOGICAL EVENTS OF SOME MEMBERS OF ERICACEAE

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Abstract: Phenological events during the life cycle of plants in eight species of family Ericaceae e.g. *Enkianthus deflexus Schneider, Gaultheria hookeri Clarke, Lyonia villosa Hand- Mazz, Pieris Formosa Don, Agapetes serpens Sleumer, Vaccinium retusum Hook* and *Vaccinium vacciniaceum* Sleumer are recorded on the basis of field studies in their natural habitats. The various phenological events include bud initiation, period of flowering, anthesis time, pollination, fertilization, seed maturation and seed germination. Flower bud initiation takes place in the month of September and October. Buds are covered with scaly bracts and undergo dormancy for four to five months to overcome the severe winter. These buds after overcoming winters bloom in February to June accordingly. The pollen dehiscence takes place before anthesis. Fertilization follows in next 6-10 days and it is completed after pollination within 20 days. Seed and fruit mature from July to September. Seed dispersal takes place in September and October. It was concluded that various phenological events are affected by various climatic conditions.

Keywords: Phenological events, Ericaceae, Flower buds

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ECONOMICS OF PRODUCTION AND MARKETING OF BRINJAL IN BILASPUR DISTRICT OF CHHATTISGARH STATE

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Abstract: The study was conducted to work out the cost and return of brinjal production in Bilaspur District of Chhattisgarh. One hundred fifty four vegetable growers were selected randomly from four blocks namely Bilha, Masturi, Kota and Takhatpur. The primary data were collected for the year 2013-14. The study observed average size of farm 1.76 hectare. The dugwell was observed as major source of irrigation as irrigated area from it found to be 41.45 per cent. On an average, the cost of cultivation of brinjal, was amounted as Rs 51781.71/ha. The major share of cost of cultivation gone to labour cost. The cost of production of brinjal was calculated as Rs 284.88/q. The net return against the cost of cultivation was observed Rs 109382.94/ha and cost of production found to be Rs 601.79/q. The input – output ratio of brinjal came to 1:3.11. There were two marketing channels identified in the study area. Channel- I: Producer - consumer. Channel-II: Producer – commission agent/retailer. The channel-I found more efficient as 51.54 than channel –II for the selected vegetable. The study suggested that the labour cost must be reduced to enhance the economic viability of the production and shortest marketing channel must be encouraged by the government as short marketing channel possess more marketing efficiency.

Keywords: Cost of cultivation, Cost of production, Output Input Ratio, Marketing channel
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EFFICACY OF AQUEOUS AND ETHANOLIC EXTRACTION ON PHENOLICS AND ANTIOXIDANT ACTIVITY OF *PAEDERIA FOETIDA* L. AND *SPERMACOCE STRICTA* L.F.

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Abstract: Plant phenolics, particularly flavonoids are rich source of antioxidants. Efficient extraction of phenolics with solvents safe for human health is sought for dietary formulations. The study deals with the efficacy of aqueous (temperature 30, 50, 80, and 100°C; duration 10, 20 and 30 min) and ethanolic (concentration 50, 70, and 90%; duration 30, 60 and 90 min) extractions of total phenolic content (TPC) and flavonoid content (TFC), and total antioxidant activity (TAA) in *Paederia foetida* L. and *Spermacoce stricta* L.f. (Family; Rubiaceae). The observations are statistically analyzed and results reveal that the phenolic and flavonoid contents and antioxidant activity is higher in *P. foetida* than *S. stricta*. Furthermore, ethanolic extraction is better than aqueous extraction in terms of antioxidant activity. The result highlights the potential use of the two plant species in dietary formulations to defend oxidative stress.

Keywords: Phenolics, Flavonoid, Antioxidant activity, *Paederia foetida*, *Spermacoce stricta*.

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EFFECT OF ORGANIC MATTER AND SOIL-MICROBIAL COMMUNITY ON PHYSICAL, CHEMICAL AND BIOLOGICAL PROPERTIES OF SOIL

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Abstract: A field experiment was conducted at Varanasi, Uttar Pradesh during rainy (*kharif*), winter (*rabi*) and summer (*zaid*) season of 2004 and 2005 to find out the effect of various sources (farmyard manure, vermicompost and poultry manure) and rates of organic manures (100%, 125%, 150% RND) on yield, quality and economics of scented rice on a sandy clay-loam soil low in available N and medium in available phosphorus and potassium. Pooled data analysis revealed that the application of organic manure significantly influenced the yield attributes and grain yield of rice over 100% RND as urea (control). Progressive increase in dose of all the organic manures significantly increased the organic matter, soil microbial population, physical, chemical and biological properties of soil.

Keywords: Origin matter, Physical, Chemical, Biological, Soil

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STUDIES ON AERIAL BLIGHT OF SOYBEAN CAUSED BY *RHIZOCTONIA SOLANI*

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Abstrct: Soybean aerial blight caused by *Rhizoctonia solani* is a most important oilseed disease. This disease is destructive and causes heavy losses in the yield particularly in warn and humid parts of the countries. The use of resistant varieties is the cheapest, easiest, safest and most effective method to manage the aerial blight disease. Forty-two entries screened for resistant to aerial blight of soybean, 2 entries (SL 752 and RKS 48) were found absolutely resistant and 6 entries were highly resistant. Soybean crop sown at 29th July showed least disease severity (11.04%) in comparison to 21st June, 9th July and 19th July sowing. Losses assessment study revealed that maximum percent reduction in seed weight, plant height, pods and branches were recorded in 9 score plants (more than 50% leaf area infected) i.e., 55.55%, 40.90%, 71.42%, and 72% respectively. Maximum aerial blight intensity was recorded in the crop sown in flooded field.

Keywords: Aerial blight of soybean, *Rhizoctonia solani*, Screening of soybean varieties, Web blight

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STUDY ON COSTS AND RETURNS OF PADDY PRODUCTION IN MEERUT DISTRICT OF WESTERN UTTAR PRADESH

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Abstract: The present study was conducted during 2011-12 on costs and returns of paddy production. It was found that cost of cultivation has increased due to increase the cost of productive resources. The share of variable and fixed cost to total cost was 55.54 and 8.11 percent, rental value of land was to be 27.00 per cent and 9.09 per cent was the managerial cost to the total cost. The overall profit margin was only Rs. 255.50 per quintal. The benefit cost ration was found to be highest for the large farmer followed by small.

Keywords: Paddy production, Coats, Meerut district

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TILLAGE INFLUENCE ON CROP PRODUCTIVITY AND SOIL HEALTH

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Abstract: There is an urgent need to match food production with increasing world population through identification of sustainable land management strategies. However, the struggle to achieve food security should be carried out keeping in mind the soil where the crops are grown and the environment in which the living things survive. Soil are create physical environment suitable for seed germination, seedling emergence and root development. This process requires optimum soil water and soil temperature regimes and freedom from oxygen and mechanical stress. Tillage affect the soil physical environment though its affect on physical properties of soil. The change in bulk density which always accompanies alters the pore size distribution and porosity, volume water content and particle to particle contact. Conservation agriculture (CA), practicing agriculture in such a way so as to cause minimum damage to the environment is being advocated at a large scale world-wide. Conservation tillage, the most important aspect of conservation agriculture, is thought to take care of the soil health, plant growth and the environment.

Keywords: Tillage, Crop productivity, Soil

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PERFORMANCE OF INDIAN MUSTARD (*BRASSICA JUNCEA* L.) GENOTYPES ON PLANT GEOMETRY

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Abstract: A field experiment was conducted during winter (*rabi*) season of 2015-16 at Banaras Hindu University, Varanasi to assess the effect of planting geometry on growth and yield of Indian mustard (*Brassica juncea* L.) genotypes. The treatments were comprised of three genotypes (NRCHB-101, Kranti and RGN-73) and four levels of planting geometry (30 cm x 10 cm, 30 x 20 cm, 45 cm x 15 cm and 45 cm x 30 cm). Mustard genotype 'RGN-73' showed its distinct superiority over 'Kranti' and 'NRCHB-101' and proved to be the most suitable genotype, and planting geometry of 45 cm x 15 cm was observed to be the optimum plant geometry as this treatment was superior over other corresponding treatments of plant geometries, *viz.*, 30 cm x 10 cm, 30 cm x 20 cm and 45 cm x 30 cm. This was corroborated from the similar significantly higher values of plant height, dry matter accumulation/plant, primary and secondary branches/plant, yields and other quality components recorded under the best treatments (genotype 'RGN-73' and geometry of 45 cm x 15 cm). The highest net profit could be realized with the plant geometry of 45 cm x 15 cm of Indian mustard genotype 'RGN-73'.

Keywords: Genotype, Plant Geometry, Indian mustard, Yield

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ROOTING RESPONSE OF GUAVA (*PSIDIUM GUAJAVA* L.) THROUGH CUTTING UNDER GARHWAL HIMALAYAN REGION

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Abstract: Rooting response of Guava (*Psidium guajava* L.) through cutting, experiment was done valley region in Garhwal Himalayan. The experiment was laid out in Randomized Block Design (RBD) with three replications. For preparing the rooting media, soil and farm yard manure (FYM) in ratio of 2:1 by v/v were mixed thoroughly, then the mixture was filled in root trainers. Properly prepared hardwood cuttings of about 15-20 cm in length during the month of August were treated with various concentrations of IBA viz., 2000, 3000 and, 4000ppm for 10 second by concentrated solution quick dip method with control, and planted in three different conditions namely Mist chamber, Shade house and open condition. The result shows mist house growing condition was found effective in increasing the rooting performance of the cuttings. The cuttings treated with 4000ppm IBA performed best in all aspects, Survival percentage of cutting, number of sprouts, number of leaves**,** shoot length, shoot diameter, number of primary root, number of secondary root, root length, root diameter, fresh weight of root, dry weight of root and rooting percentage. Overall treatment G_2C_3 (Mist chamber with 4000 ppm IBA) treatment combination was found best in all parameters taken.

Key words: Guava, IBA, Growing condition, Rooting percentage

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EFFECT OF TILLAGE AND ORGANIC MULCHES ON CONTENT AND UPTAKE OF NUTRIENTS ON INDIAN MUSTARD IN VINDHYAN REGION OF EASTERN UTTAR PRADESH

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Abstract: A field experiment was conducted on conventional and reduced tillage with different organic mulches during 2012-13 to study the effect of tillage and organic mulches on content and uptake of nutrients on mustard crop in vindhyan region of eastern Uttar Pradesh at the Agronomy farm of Rajiv Gandhi South Campus, Barakachha (BHU), Mirzapur which is situated in *Vindhyan* region. Data revealed that the content and uptake in grain and stover of mustard crop increased significantly with implementation of reduced tillage and application of water hyacinth. The maximum content and uptake of

N, P, K and S were found with application of water hyacinth @ 2 t per hectare under reduced tillage condition. Paddy straw mulch is the second highest treatment in content and uptake of macro nutrients in mustard crop. The increasing order of organic mulches was- No mulch < legume straw mulch < paddy straw mulch < water hyacinth regarding content and uptake of macro nutrients by mustard crop. The maximum content of nitrogen (3.40%) and (3.46%) among all nutrients was observed in mustard grain with application of water hyacinth under reduced tillage system. The similar trend was found in case of potassium uptake by stover of mustard crop (62.51 and 65.29 kg ha^{-1}) under reduced tillage and water hyacinth, respectively.

Keywords: Soil, Mulching, Mustard, Content, Uptake

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EVALUTION OF DIFFERENT ANTIFUNGAL COMPOUNDS AGAINST *RHIZOCTONIA SOLANI* CAUSING AERIAL BLIGHT OF SOYBEAN

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Abstrct: Soybean (*Glycine max* (L.) Merrill) is one of the most important oil seed crop of India . Soybean aerial blight caused by *Rhizoctonia solani* is a most important oilseed disease. The disease appears July-August and is characterized by sudden and complete death of the plants. Antifungal activity of different medicinal plant leaf extracts, oils and *Trichoderma spp* were studies under *in vitro* condition. The Out of fifteen medicinal plants leaf extracts, studies, the extract of Butch significantly inhibited the mycelial growth of *Rhizoctonia solani* under *in vitro* conditions. Among the medicinal oils, Eucalyptus and Neem oils were found to significantly inhibit the mycelial growth of *Rhizoctonia solani* at 5% concentrations. Among the antagonists, maximum mycelial growth inhibition was observed by *Trichoderma harzianum* (74.81%) followed by *Trichoderma viride* (67.40%) while *Trichoderma spp.* (mushroom isolates) was least effective against *Rhizoctonia solani*.

Keywords: Aerial blight of soybean, *Rhizoctonia solani*, Antifungal compound, *Trichoderma spp.*

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EFFECT OF WEED MANAGEMENT ON INDIAN MUSTARD (*BRASSICA JUNCEA* L.) CULTIVARS

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Received-17.03.2016, Revised-26.03.2016

Abstract: A field experiment was conducted at Banaras Hindu University, Varanasi (U.P.) during winter (*rabi*) seasons of 2011-12 and 2012-13 to develop weed management practices for popular Indian mustard (*Brassica juncea* L.) cultivars, *viz.*, 'Kranti', 'Pusa bold' and 'Varuna' with pre-emergence application of alachlor 0.75 kg/ha, pendimethalin 0.75 kg/ha and metolachlor 0.75 kg/ha alone or their integration with hand weeding after one month of sowing. Pre-emergence application of alachlor 0.75 kg/ha, pendimethalin 0.75 kg/ha and metolachlor 0.75 kg/ha with one hand weeding at 30 days after sowing (DAS) were the most effective in minimizing weed population and their dry weight in mustard. These treatments recorded maximum seed yields (19.71, 19.06 and 18.94 q/ha) and increase 47.76%, 42.77% and 41.87% over weedy check, respectively. No significant difference was seen in mustard cultivars with respect to weed management. The maximum seed yield was obtained with 'Kranti'. The net return was maximum in alachlor 0.75 kg/ha applied along with hand weeding over other treatments. Unchecked weeds caused 32.27% seed yield loss with minimum net return.

Keywords: Cultivars, Herbicides, Hand weeding, Indian mustard, Weed, Yield