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Wheat yield prediction using satellite data and meteorological parameters for Udham Singh Nagar district of Uttarakhand

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ABSTRACT

In the present study, combination of NDVI and decadal weather variables was used to develop spectral-meteorological models for district-level wheat yield prediction for US Nagar district of Uttarakhand during 2005-06 to 2014-15. Cloud free crop season's images of LANDSAT-TM/ETM+/OLI satellite for a period of ten years (2006-2015) of path 145 and row 40 (containing US Nagar and adjoining region) were used for wheat crop discrimination. SPOT derived NDVI images were used to calculate the area weighted average NDVI (AWANDVI). Four different spectral-meteorological models were developed for wheat yield prediction by integration of NDVI with different weather variables of various crop growth stages. These models were used to predict wheat yield at district level and prediction accuracy of different models varied significantly. The observed yield ranged from 2.98 t/ha to 4.12 t/ha and predicted yield by model 4 was found in the range of 3.04 t/ha to 4.06 t/ha. The RMSE between observed and predicted yield using model 4 was found to be 2.43% (0.088 t/ha). The highest value of co-efficient of determination (R^2 = 0.944) by model 4 reveals that spectral-meteorological models could help to forecast the wheat yield with highest accuracy.

Phenotypic diversity for symbio-agronomic characters in chickpea (*Cicer arietinum* L.) germplasm

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ABSTRACT

Breeding chickpea (*Cicer arietinum* L.) cultivars combining desirable symbiotic and agronomic characters has both economic and ecological significance at G.B. Pant University of Agriculture and Technology, Pantnagar, India. The experiment was conducted in an augmented block design in six blocks with five checks having one, non-nodulating crop (wheat) genotype as a reference crop were employed to estimate the amount of symbiotic nitrogen fixation. Data analysis of 24 agronomic and symbiotic characters showed significant differences among the accessions for all traits under study except for number of primary branches per plant. Trait-based cluster analysis grouped the accessions into nine different classes. Standardized Mahalanobis D^2 statistics showed significant genetic distances between all clusters constituted accessions. The genetic distance was found maximum between cluster VI and VIII (48.13) followed by between the cluster VI and IX(44.57), between cluster VI and VII (43.43) and between cluster V and VI (43.26) indicating these to be genetically diverse. Different symbiotic and agronomic characters had different contribution to the total differences among the populations. Those characters that contributed more to the total differentiation of the populations and accessions into the different clusters should be exploited in future breeding.

Characterization of minerals present in the agricultural Soil

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ABSTRACT

Clay samples separated from agricultural soil of Ahmadgarh, Faridkot and Zira of Punjab, India were selected for systematic study. In this paper three samples of clay which were separated from soil of Punjab, India. Clay samples were characterized by XRD to know different minerals present in them. Kaolinite, smectite, montmorillonite, illite were analyzed by XRD which were further substantiated by FTIR and TG/DTA/TGA analysis.

Studies on Crossability and Genetic Diversity in Brinjal (*Solanum melongena* L.) using molecular markers

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ABSTRACT

The present work was taken up to study the genetic diversity of 31 accessions of eggplant and five accessions were chosen for crossability studies on the basis of fruit set. Flowers were detached from the plant after 24 and 48 hours of pollination to study pollen tube germination, growth and abnormalities. Genetic diversity was studied by RAPD and SSR markers. Amongst the selfing, the maximum fruit set was obtained in Pusa Upkar (80 %). When the parents were crossed, the maximum fruit set was obtained from Jawaharlal Brinjal-8 x Brinjal Rajendra Green and DBR-31 x DRNKV-104 (80 %) where pollen germination was not the highest. The fruit set was the least (40 %) in Jawaharlal Brinjal-8 x DBR-31 where pollen germination was the highest. It was observed that pollen fertility, germination and tube growth had no significant correlation with fruit set. Seven RAPD (out of 18) and all 12 SSR primers were selected to assess the genetic diversity of 31 accessions. A total of 35 amplification products were scored in 31 accessions with 7 RAPD primers, out of which 29 were found polymorphic. With 12 SSR primers, a total of 42 alleles were generated. The PIC value of primers ranged from 0.220 to 0.736, with an average of 0.467.

Genetic divergence analysis of bottle gourd [*Lagenaria siceraria* (Mol). Stdl.]

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ABSTRACT

The present investigation was carried out at vegetable research farm, Hisar during summer season of 2016. It comprised of 37 genotypes of bottle gourd and the genotypes were planted in randomized block design with three replications. Diversity analysis was done by using D^2 statistics analysis. Analysis of variance revealed significant difference among genotypes. The results revealed that the greatest diversity was observed in fruit characters especially in fruit shape and fruit colour among the various characters studied.

Effect of homeopathic drugs on growth and haemato-biochemical parameters of piglet anaemia

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ABSTRACT

The present study was conducted to evaluate the effect of homeopathic drugs (Ferrum met and ferrum phos) on growth, haemato-biochemical parameters of piglets. Fifteen, day old large white Yorkshire piglets reared under standard management condition were used as experimental animals in present study. These piglets were randomly distributed into three equal groups with five piglets in each. Piglets of T_0 (control) group were provided with standard ration- and no drug, while T_1 and T_2 (treatment) groups were supplemented with homeopathic drugs-T_1 (ferrum met @3x 5drops/piglet) and T_2 (ferrum phos 6x 4tab./piglet) from day one to 90 days of age. These drugs were administered orally after mixing with water. Body weight at two weeks intervals and various haemato-biochemical parameters –viz. Hb , PCV, TLC, TEC, total protein ,

albumin and serum glucose were measured on 30th , 60th and 90th days. It was observed that supplementation of ferrum phos significantly (P<0.05) improved the Hb, PCV, TLC, TEC, Total protein, albumin and glucose levels of subjected piglets.

Pathological studies on the *Pasteurella multocida* A: 1 outer membrane proteins vaccinated layer chickens challenged with homologous strain

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ABSTRACT

A total of 73 layer birds of 12 weeks of age were randomly divided into two groups of 33 (V) and 40 (UV) birds each. Group V birds were given OMPs @ 200 µg/bird emulsified in Freund's complete adjuvant subcutaneously in the neck region at 12 weeks of age whereas group UV birds were administered 0.5 mL sterile broth emulsified in Freund's complete adjuvant by same route. At 14 weeks of age, birds were given booster with respective inocula at the same dose rate and by same route as given earlier but emulsified in Freund's incomplete adjuvant instead of Freund's complete adjuvant. At 15 weeks of age, each bird in group V and UV 6was infected with *P. multocida* A: 1@ 0.2 mL broth culture containing 3.16 x 10 cfu intravenously. Two birds randomly from each group were sacrificed at 1, 2, 3, 7, 10, 14, 21, 28 DPI and the remaining birds in each group were sacrificed at 35 DPI. The representative sections were stained with MacCallum Good Pasteur stain and indirect immunoperoxidase technique (IIPT) for demonstration of organisms. Reisolation of organism was attempted from liver, spleen, kidney, heart, brain and lungs from each group on the above said DPIs on the blood agar and the organisms reisolated were stained with Gram's staining. Grossly and histopathologically the lesions were mainly septicemic in nature and exhibited congestion and hemorrhages in different organs and necrotic foci in liver and spleen in later stages. Gross and histopathological lesions

were less severe in vaccinated group than in unvaccinated group. Organism could be reisolated upto 4 DPI and 7 DPI from V and UV groups, respectively. Organism could also be confirmed by MacCallum Good Pasteur stain and indirect immunoperoxidase technique (IIPT).

Comparative evaluation of medicinal plants against stored product mite, *Tyrophagus putrescentiae* in *Pleurotus sajor caju* compost

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ABSTRACT

The present research is to evaluates acaricidal potential of aqueous leaf extracts of *Withania somnifera* (L) Dunal and *Azadirachta indica* (A) Juss, neem oil and neem cake were used to assess in vitro antimicrobial potential on *Pleurotus sajor caju* (Fr.) Singer compost under laboratory conditions at 5 different concentrations (0.5%, 0.7%, 0.8%, 1% and 2%) against *T. putrescentiae* under 27±10^{o}C and 80-85% RH conditions with the aim of exploring safe, natural protectants as alternatives to toxic synthetic miticides. The acaricidal action was evaluated under treated bioassay in terms of adult's mortality rate. The treatments responded in a concentration dependent manner. Highest mortality in *T. putrescentiae* population was achieved with aqueous leaf extracts of *W. somnifera* and *A. indica* at a concentration of 0.05% as compared to neem oil and neem cake at a concentration of 1.00 percent. Higher reduction was recorded in all the treatments as compared to control. In terms of percent increase in reduction, aqueous leaf extract of *W. somnifera* caused highest increase (82.20%) compared to *A. indica* (48.64%) followed by neem oil (25.60%) and neem cake (23.00%) respectively. Among the tested plants, extracts of *W. somnifera* and *A. indica* were found to be highly potent activity and other plants viz., *A. indica* viz. neem oil and neem cake showed moderate activity. The order of reactivity of natural plant extract was aqueous leaf extracts of *W. somnifera*≥aqueous leaf extracts of *A.indica*≥neem oil≥neem cake respectively.

A study on torque requirement of rotavator with ADI blades in soilbin condition

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ABSTRACT

Rotavator is a tillage tool used to obtain the desired soil tilth with significantly reduced number of passes. The study was conducted to evaluate torque requirement of a rotavator fitted with Austempered Ductile Iron 'L' shaped blades. Experiments were conducted in a laboratory Soilbin for torque measurement by varying number of blades from six to one, operating at 40, 80 and 120 mm depth. The forward speed was kept 2.5, 3.0, 3.5 and 4.0 km/h. The results indicated that the number of the blade, forward speed, and operating depth has a significant effect on torque requirement at the constant rotational speed of rotavator shaft. The torque requirement was highest for the single blade rotor as compared to three, four and six blades arrangement respectively. It was observed that increasing the forward speed resulted in increased torque requirement. The highest torque was obtained at operating depth of 120 mm.

Optimization of process parameters for cottonseed oil methyl ester production from refined cottonseed oil using RSM

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ABSTRACT

Biofuel is an alternative fuel derived from vegetable oil that can be utilized in CI engines. In the present study, cottonseed oil methyl ester which commonly known as biofuel was produced from refined cottonseed oil. In order to get the purest form of cottonseed oil methyl ester, the transesterification process between refined cottonseed oil and methanol was done in presence of potassium hydroxide (KOH) which acted as catalyst. This process was standardized by applying the response surface methodology (RSM) with Box-Behnken Design (BBD)for three variables such as molar ratio, catalyst concentration and reaction temperature. Quadratic polynomial second order equation was employed to investigate the operating conditions of transesterification process with predefined goals for optimization. The process parameters molar ratio, catalyst concentration and reaction temperature were standardised to reduce kinematic viscosity with a maximum possible yield of the cottonseed oil methyl ester. After the analysis of obtained results, it is recommended that, the refined cottonseed oil should react with 6.9:1 molar ratio, 1.19% KOH at 57℃ reaction temperature for a reaction time of 1h and then settled for 24hrs to get maximum yield as well as minimum kinematic viscosity.

Selection of input variables for daily rainfall-runoff modelling using artificial neural networks

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ABSTRACT

In this study, ANN based daily rainfall-runoff model has been established for an agricultural hilly micro-watershed, named Khunt, located in the district of Almora, Uttarakhand, India. In the development of the model, daily rainfall and runoff data for the period 1st June to 30th September for years 2005-2009 were used to train the ANN and the years 2010 and 2011 were used for model validation. Input for the model development has been selected on the basis of step-wise linear regression method and cross analysis. The performance of the developed model was assessed based on parameters Nash-Sutcliffe Coefficient, Coefficient of determination (R2), root mean square error (RMSE).A network structure resulting in highest value of Nash-Sutcliffe Coefficient and simultaneously in the lowest value of RMSE was designated as the best. Both the methods selected for the input selection for the development of the ANN models performed well

for the study area, however the model developed on the basis of the input selection vide cross analysis method has a little edge over the other developed on the basis of input selection by step-wise linear regression.

Designing and development of fashion accessories using hand embroidered *Aipan* designs

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ABSTRACT

Handicrafts offer reflections to the artistic creativity and more precisely provides an artisanal expression rendered by the people of a region. The dual color traditional folk art of Uttarakhand is always fascinating and alive, which is known as *aipan. Aipan* is patronized by the women folk of Uttarakhand. The present study was an attempt to explore the application of exquisite aipan motifs in contemporary products using hand embroidery technique. The original *aipan* designs were collected and adapted according to their suitability for hand embroidery technique. Total five fashion accessories i.e. belt, wrist band, wallet, mobile pouch and hand bag were selected and five designs for each fashion accessories were chosen on the basis of current trends in the market as well as design of products available online. Out of twenty five, total of five line design patterns (one for each product) were selected for the preparation of design arrangements. The selected design arrangements were applied on fashion accessories using hand embroidery techniques. Further, these prepared fashion accessories were visually assessed on four parameters i.e. aesthetic, innovation in design and production, quality and craftsmanship and performance parameters. All the products were widely accepted by the consumers and most of the respondents stated that they would definitely purchase these products if available commercially in the market.

Printing of silk fabric with natural dye (*Acacia catechu*) and gum (*Cassia tora*)

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ABSTRACT

The present investigation concerns with the potential of Cutch dye (*Acacia catechu*) as a natural colouring material and *cassia tora* gum as a thickener for block and screen printing of silk fabric. The efficacy of cutch dye and *cassia tora* gum on silk fabric has been evaluated for colour strength and fastness properties. Samples printed with cutch dye exhibited light brown colour. Chocolate brown colour and black colour were noticed in samples printed of cutch dye with alum and ferrous mordants respectively.

Purchasing practices of jeans among university students

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ABSTRACT

Jeans is readymade garment which is found in the wardrobe of every age group. The present study was planned to find out purchasing practices of jeans among female university students. The college going students opt for jeans due to various reasons like better fit, comfort and so on. The interview schedule method was used as a tool in survey. It was found that both the undergraduate and postgraduate respondents adopted different purchasing practices of jeans.

Optimization of dyeing conditions for Reactive Green 19 on mulberry silk waste/wool blended fabric

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ABSTRACT

In the present study dyeing conditions were optimized for dyeing mulberry silk/wool blended fabric with Reactive Green 19. Optimization is done on the basis of CIE Lab, K/S values and wash fastness grades. Dyeing conditions included dyeing pH, time, temperature and dye concentration. It was found that optimum conditions for dyeing the mulberry silk waste/wool blended fabric were 5 pH for 70 minutes of dyeing at 90°C with 3 percent dye concentration was considered optimum for dyeing the blended fabric with reactive green 19.

Small scale dyeing and printing units of Pilkhuwa: A study

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ABSTRACT

The present study deals with the current status, constraints faced and changing scenario of small scale dyeing and printing units in Pilkhuwa (U.P).A sample size of 60 units was selected through purposive and snow ball method. The study revealed that around 200-300 small and 50-60 large units in this area are engaged in dyeing and printing with the male dominated workforce. The majority of workers (70%) lies between 35-55 years of age whereas 25% workers belong to 18-35 age group and only 5% workers were found to be of 55-75+ age group. Direct style of printing with rapid fast, indigo sol and pigment dyes are followed by traditional printers of Pilkhuwa. Other chemicals /auxiliaries used are sodium nitrate, urea, kerosene oil, hydrochloric acid, hydrogen peroxide, caustic soda e.t.c. On an average, the owners of these small scale dyeing and printing units were earning about Rs 40000-50000/- month, whereas the owners of large scale units were able to earn approximately Rs 1 lakh to 2 lakh per month. Furnishing items mainly bed sheets in beautiful designs and vibrating colours in a wide variety of fabrics and thread density are the main attraction of Pilkhuwa market. The prepared products are sold in

local markets to the retailer in whole sale whereas some large manufacturers export the quality products to other parts of the country as well as abroad. There is a growing opportunity for product diversification in the domestic market as well as in the export market. Concentrated, coordinated and focused approach for integration and modernization of dyeing and printing units of Pilkhuwa is the need of the hour.

Nutritional evaluation of underutilised *Diploknema butyracea* and sensory evaluation of its products

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ABSTRACT

The present study was undertaken with the objective to evaluate the nutritional quality of *Diploknema butyracea* (*Cheura*) seeds and physicochemical properties of fat obtained from the seeds. Four products viz., deep fried *poori*, shallow fried *paratha*, sautéed potato vegetable and chocolate cake were made by using the fat of the *Diploknema butyracea* (*Cheura*) seeds. The products were further analyzed for the sensory evaluation. *Diploknema butyracea*(*Cheura*) seeds contain 40-48 percent fat. Therefore, it is a good source of edible oil that can be employed in cooking and food industries. Physicochemical evaluation showed that the fat has a low smoke point and melting point which doesn't make it very suitable for deep frying. The cake using *Cheura* fat had good sensory quality and it can be incorporated with other fats in baking purpose as the strong flavour of *Cheura* fat is masked while making cake. On comparing the fat quality of *Cheura* with other oils it was found that if proper treatments would be given to the *Cheura* fat, it can prove to be a promising oil from tree in future.

Utilizing existing skills and resources at door step for income generation: Exemplary cases from rural women of Uttarakhand, India

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ABSTRACT

The participation of women in economic activities is necessary not only from a nation's development point of view but is also essential from the objective of raising the status of women in the society. The economic status of the women is now accepted as an indicator of a society's stage of development and therefore it becomes imperative for the government to frame policies for development of entrepreneurship among women. Women are courageously taking initiatives in order to challenge the existing stereotype rules and are availing opportunities to break the vicious circle of poverty. These ground-breaking efforts of women are rarely highlighted. The Child Development unit of All India Coordinated Research Project, Home Science, G.B. Pant University of Agriculture and Technology, Pantnagar identified one rural woman and five school dropout adolescent girls who were interested in utilizing their skills and resources for an entrepreneurial activity. The research team assisted them in enhancing their knowledge and skills fundamental for starting an enterprise and also assisted them in actually starting and extending their income generating activity or micro enterprise.

Ergonomic assessment of handloom weavers in Durrie unit of Kanpur Nagar

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ABSTRACT

Tradition of weaving by hand is a part of the countrie's cultural ethos. As an economic activity, handloom is the second largest employment provider next only to agriculture. This sector with about 35 lakh handlooms provide employment to 65 lakh persons but in the weaving profession some occupational health hazards are caused by unhygienic risk factors, workstation features, working posture and hand tool design. The present study was undertaken to assess ergonomic condition for handloom weavers in Durrie unit. Eighty male weavers were selected from durrie units of Sujatganj and Rail Bazar of Kanpur Nagar. Ergonomic condition at durrie unit was assessed by administering an ergonomic checklist developed for evaluation of hand woven carpet producing workshop. It includes issues of general working conditions (GWC), workstation design and adjustability (WD), working posture (WP), and hand tools (HT). Analysis of data reveals that general conditions at workplace were the major source of problem in durrie unit with mean general condition indices 57.01 per cent. Working posture index, workstation design index and hand tool index were 26.66 per cent, 23.83 per cent and 17.83 per cent respectively. Ergonomic condition fall in the action category 2 for 51.25 per cent weavers and in 3 for 48.75 per cent weavers which means further investigation is needed and corrective measures are required for improvement in working condition.

Status of Self Help Groups in Uttarakhand

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ABSTRACT

Self-help group (SHG) approach is used by the government, NGOs and other institutions involved in rural development to implement developmental schemes at the grassroots level. SHGs benefit its members by providing regular saving, employment opportunities, access to credit, participation in local government, and change in family decision-making. Present study shows that of the 400 SHGs surveyed in six districts of Uttarakhand only 24% remained active after eight years of their formation. These groups were engaged in individual income generating activities only and large number of them discontinued or were dormant i.e. involved only in collection of money and micro-finance. The credit was used only to add more heads of milch animals and no new enterprise was developed by the groups covered under the survey. A number of reasons were reported for the dormancy and discontinuation of these SHG's mainly lack of

interest and knowledge. But an important reason remains the lack of follow up by agencies responsible for their formation. The overall picture emerged that women SHGs in Uttarakhand were not very effective in improving their economic status and in generating any new enterprise.

Nutritional status of adolescents residing in Uttarakhand: A cross sectional study

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ABSTRACT

Present study was conducted to assess the nutritional status of adolescents (Girls=712 and Boys=290) studying in 6^{th} to 12^{th} standard (age group of 12 to 18 years) of two schools in district Udham Singh Nagar, Uttarakhand. Data on weight, height, mid upper arm circumference and waist hip ratio of adolescents was collected using standardized techniques. The nutritional status of adolescents was evaluated by using BMI Z score. The mean BMI combining all ages for girls and boys was 17.98±2.40 and 18.38±2.82kg/m^2, respectively. As per BMI Z score classification the results revealed that 75.98 per cent girls and 70.00 per cent boys were normal. The per cent of moderate and severe under nutrition was observed to be 15.87 and 5.06 per cent in girls whereas 19.66 and 4.48 per cent in boys, respectively. The per cent of overweight among boys was 5.86 per cent which was slightly higher than that of girls i.e.3.09 per cent. The mean waist to hip ratio was found to be 0.81±0.07 for girls and 0.84±0.09 for boys, which indicate that the adolescent girls are at risk of developing abdominal obesity. The present study revealed that the under nutrition was found among the adolescents of the study area. The implementation of nutrition education programs in schools could help to improve the eating habits and nutritional status of adolescents.

Growth and yield performance in relation to different herbicide preferred by the farmers in wheat crop

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Note: This is a short communication and as such, does not have an ABSTRACT. For details, see the print journal or contact the authors at above address.

Herbicides evaluation for control of weed flora in wheat (*Triticum aestivum* L.)

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Integration of herbicide and mulch for augmenting productivity and profitability of Soybean [*Glycine max* L. Merrill]

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