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Contents

SHORT COMMUNICATION

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TEXTILE PERFORMANCE OF TRANSGENIC COTTON FIBER

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Abstract: Cotton is the world's largest textile fiber crop and has been used for producing garments, paper products, cottonseed oil and other purposes for many years. It belongs to genus *Gossypium* of *Malvaceae* family and includes about 50 species. Out of these 50, only four species are commercially cultivated which produce spinnablefiber, two of these Gossypium arboreum, Gossypium herbaceum are are diploid (AA) while Gossypium hirsutum and Gossypium barbadanse are tetraploid (AADD). Cotton being white gold for textile industry faces a severe problem of low fiber quality. The most effective way to increase fiber quality and yield is to clarify the genetic factors conditioning fiber quality. A genotype which is developed by the techniques of genetic engineering is referred to as transgenic. The first transgenic plant (Bt cotton) was created by genetically altering the cotton genome to express a microbial protein from the bacterium *Bacillus thuringiensis*using Cry 1 Ab and Cry 1 Ac genes in 1987 in U.S.A. by Monsanto, Delta and Pine companies. Advantages of Bt cotton are improved fiber length, fiber strength, uniformity index, micronaire, maturity, and fiber elongation.

Keywords: Cotton, Fiber quality, Genes, Genetic modification, Transgenic

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GIS AIDED SPATIAL VARIABILITY MAPPING OF SECONDARY NUTRIENTS FOR DECISION SUPPORT IN COCONUT RESEARCH STATION, ALIYARNAGAR, TAMIL NADU

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Abstract: GIS aided spatial variability mapping in research stations is imperative to comprehend the native nutrient supply power of the soil and to assess the temporal and spatial variability so as to undertake decision support. A study was undertaken at Coconut Research Station, Tamil Nadu Agricultural University, Aliyar nagar to characterize the spatial variability of secondary nutrients Ca, Mg, S and free $CaCO_3$. Two hundred and fifty eight geo - referenced soil samples were collected from the surface (0-15 cm) and subsurface (15- 30 cm) layers of A, B and C blocks of the farm. The farm is predominantly sandy textured belonging to the taxonomic class Typic / Fluventic Ustropept. GIS aided fertility maps were prepared for all the parameters employing kriging. Exchangeable Ca and Mg were sufficient throughout the farm, deficiency of available sulphur was witnessed across 5 % of the farm area. The farm is moderately calcareous with sporadic spots of intense calcareousness. Thus spatial variability mapping employing GIS techniques is an ideal tool for the researchers and policy planners in decision support for crop selection and land use planning.

Keywords : Aliyarnagar, GIS, Spatial variability, Secondary nutrients

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EVALUATION OF TURMERIC GERMPLASM UNDER TELANGANA CONDITIONS

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Abstract: The present investigation entitled "Germplasm evaluation of Turmeric (*Curcuma longa* L.)" was undertaken to evaluate the performance of different types of germplasm of turmeric under Telangana conditions.The experiment was carried outduring kharif from 2017-18 and 2018-19 at Turmeric research station, Kammarapally, NizamabadDistrict, Telangana. MahalanobisD^2 statistics revealed that considerable genetic diversity exists within and among the four clusters. The characters Rhizome length (58%) Size of mother Rhizomes (58%), showed that the variation among genotypes. In addition to genetic divergence, considering the mean performance and horticulturally desirable attributes, five genetically distant lines *viz*.,Selam, Acc-94, Tekurpet, Lakadong, and Kasturiavidi, were selected as parents from cluster II, cluster III, cluster IV and cluster V for development of hybrids.

Keywords: Turmeric,Selam, Varieties, Biocontrol, Rhizome rot

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RAINFALL-RUNOFF MODELLING OF NAULA HIMALAYAN WATERSHED USING SOIL AND WATER ASSESSMENT TOOL (SWAT)

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Abstract: This study is based on Soil and Water Assessment Tool (SWAT) Model integrates with the GIS information database to modelling the rainfall-runoff of Naula watershed of Uttarakhand. SWAT is a physically based model which has been developed to estimate the runoff from Naula watershed. The watershed area has been delineated using the DEM and then divided into seven sub-watersheds. For preparation of LULC map of Landsat-8 image has been used and the soil map was collected from NBSS&LUP Nagpur.Rainfall, runoff, temperature of min and max and relative humidity data of 33 years (1980-2012) of monthlywere used for SWAT simulation to find out the runoff. The coefficient of determination (R^2), p-factor, r-factor and efficiency (NS) was 0.90, 1.14, 0.68 and 0.68 for calibration period and 0.17, 0.12, 0.64 and 0.42 for validation period respectively for the estimation of runoff of Naula watershed.

Keywords: Naula, Rainfall, Runoff, Watershed

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TRANSMISSION, HOST RANGE AND SYMPTOMATOLOGY STUDIES OF SOYBEAN YELLOW MOSAIC DISEASE THROUGH WHITEFLIES

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Abstract: Soybean (*Glycine max* (L.) Merrill) is a one of the major oil seed crop in the world. The Yellow Mosaic Disease (YMD) of soybean is caused by Mungbean Yellow Mosaic India Virus (MYMIV).The transmission, host range and symptomatology studies were conducted at glasshouse facility of MPKV, Rahuri. For these studies whitefly (*Bemisia tabaci*) was used as vector of this viral disease. In transmission studies of virus indicated that, the 100% transmission rate was recorded, when 15 and 20 whiteflies were used per soybean plant. Mungbean, dolichos bean, black gram, cow pea, cluster bean and horsegram act as host of yellow mosaic disease. The host range studies indicate yellow mosaic of soybean was able to infect these crops through whiteflies under glasshouse condition. In symptomatology studies, soybean test plant, JS-335 developed typical yellow mosaic disease symptoms like irregular bright yellow and green diffused patches on leaves, extensive mosaic and mottling of leaves, chlorosis and reduction in leaf size.

Keywords: Soybean, Yellow mosaic disease, Virus transmission, Whitefly, Virus host range

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CORRELATION AND PATH ANALYSIS IN ASHWAGANDHA (*WITHANIA SOMNIFERA* L.) FOR DRY ROOT YIELD

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Abstract: The experiment was laid out in a completely Randomized Block Design with 29 ashwagandha accessions as treatments during *Kharif*, 2018 at Medicinal and Aromatic Plant Research Station, Sri Konda Laxman Telangana State Horticultural University, Rajendranagar, Hyderabad. Each treatment was randomly replicated thrice. The results on genotypic and phenotypic correlation reveal that mostly genotypic correlation coefficient is comparatively higher than the intensity of phenotypic correlation coefficient. This indicates less influence of environment in association studies. The positive and significant correlation was observed between dry root yield per plant with root diameter, main root length, leaf length, starch estimation, leaf width, fresh leaf weight, dry leaf weight, days to flower initiation, plant height and number of secondary roots per plant. Direct selection based on these traits would result in simultaneous improvement of aforesaid traits and dry root yield per se in ashwagandha. Although correlation coefficients indicate the nature of association among the characters, path analysis splits the correlation coefficients into measures of direct and indirect effects, thus providing an understanding on the direct and indirect contribution of each character towards yield. From the foregoing discussion, it can be concluded that main root length, root diameter, leaf weight and days to flower initiation had positive correlation and positive direct effect on dry root yield per plant. These are identified as superior yield components. Hence, the genotypes which exhibited better performance for these characters can be used in further improvement of ashwagandha.

Keywords: Ashwagandha, Phenotypic correlation, Genotypic correlation, Path analysis, Dry root yield per plant

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EFFECT OF WOOL WASTE AND INORGANIC FERTILIZERS ON PRODUCTIVITY OF BOTTLE GOURD (*LAGENARIA SICERARIA*) AND SOIL PROPERTIES OF LOAMY SAND SOIL

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Abstract: Afield experiment was conducted on effect of wool waste and fertilizers on productivity of bottle gourd (*Lagenaria siceraria*) and soil properties of loamy sand soilat research farm of Agriculture Research Station, SKRAU, Bikaner during *Kharif*, 2018. The experiment consisted ten treatments viz., T_1- Control , T_2- Recommended dose of fertilizer, T_3- wool waste@ 20 t ha^{-1} , T_4- RDF +wool waste @ 20 t ha^{-1}, T_5- RDF +wool waste @ 20 t ha^{-1} + 1 per cent $FeSO_4$, T_6- RDF +wool waste @ 20 t ha^{-1}+ 1 per cent $FeSO_4$ + 0.5 per cent $ZnSO_4$, T_7- STCR recommendation fertilizer dose, T_8- STCR recommendation + wool waste @ 20 t ha^{-1}+ 1 per cent $FeSO_4$, T_9-STCR recommendation + wool waste @ 20 t ha^{-1}+ 1 per cent $FeSO_4$and T_{10} -STCR recommendation + wool waste @ 20 t ha^{-1}+ 1 per cent $FeSO_4$+ 0.5 per cent $ZnSO_4$.The experiment was laid out in randomized block design with three replications.Wool waste is a biodegradable, rich in nutrients and can be recycled in soil as a fertilizer for maximum benefits. Application of waste wool in soil significantly improved the fertility status of soil, and considerable improvement was also observed in organic carbon, macro and micronutrients. The activities of soil enzymes higher in waste wool treatment as compared to control. Application of waste wool not only improved soil health but produced 50% higher grain and dry fodder yield of barley over control. The improvement in physical properties of soil with waste wool resulted in higher water use efficiency of the system. The results revealed that application of wool waste significantly improved physical properties of soil such as bulk density, hydraulic conductivity and moisture retention etc. in treatments having wool waste @ 20 t ha^{-1}than treatments without wool waste. Addition of wool waste significantly enhanced the availability of nitrogen, phosphorus, potassium, sulphur, zinc and iron in soil as compared to control, RDF without wool waste and STCR recommendation without wool waste. Biological properties of soil such as dehydrogenese and microbial populationalso significantly improved in treatments having wool waste application. Significantly higher dry weight of straw, average fruit weight, vine length, number of inter nodes andyield were found inRDF +wool waste @ 20 t ha^{-1} + 1 per cent $FeSO_4$ + 0.5 per cent $ZnSO_4$.

Keywords: Bottle gourd, Fertilizer, Loamy sand soil

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CURRENT MARKET SCENARIO OF KHARI BAOLI MANDI, NEW DELHI: THE LARGEST MARKET OF AROMATIC AND MEDICINAL PLANTS IN ASIA

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Abstract: India's domestic herbal industry is represented by 8610 licensed herbal units, thousands of cottage level unregulated herbal units and millions of folk healers and household level users of thousands of herbal raw drugs on one hand and a complex trade web on the other that channels the herbal raw drugs from various supply sources to the end users. This study focuses majorly on the Asia's largest spice market India's largest medicinal plant market: Khari Baoli.KhariBaoli is a street in Delhi, India known for its wholesale grocery and Asia's largest wholesale spice market selling a variety of spices, nuts, herbs and medicinal plants.Considering the importance of Khari Baoli and its importance in Medicinal plant trade, the study its Current Market Scenario was taken .The first objective of the study was to conduct the survey in Khari Baoli. There are approx. 250 shops in Khari Baoli. From the process of random sampling, 30 were selected for survey by keeping the random sampling at 12%. The surveys were conducted in November 2020. The primary information was collected by open-ended interviews using questionnaires and secondary information was collected from research journals, magazines, related websites. The second objective was to document the current scenario of the market. For this the collected data was analyzed and tabulated using basic statistical principles.Under this objective the main things that were studied were imported species, exported species, medicinal plants from Kashmir traded in Khari Baolimandi and species most in demand and the cheapest and most expensive medicinal plant species sold at market.

Keywords: Kharibaolimandi, Medicinal plants, Retail market price

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ECONOMIC ANALYSIS OF COST –NET RETURN AND COST BENEFIT RATION OF ONION IN RAJASTHAN

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Abstract: Onion is a multi-faced crop; it brings cheers to traders, fear to farmers and tears to consumers. Growing onion demands a set of learnt practices to establish crop. Amongst the states, comparatively farmers of southern states are well equipped with the knowledge base of production practices than the northern plain zone. Problems/ constraints are the challenges that pose threat to production, mostly uncertain. Costs are key driver to ascertain in net farm income. It looks quite small on an individual basis but at aggregate level they add up to total cost. In spite of the fact that onion farming incurs huge cost, the net income from onion cultivation is fairly well in all the states except during the time when there is a glut in market. Onion is an important vegetable crop. There is no kitchen in the world without onion. Taking this into account the study aims to assess and quantify the yield gaps, which is vital in determining the reason less returns, apart from price fluctuation. Much of the yield gap was evidenced in the states with highest production. This uneven production due to wider yield gap directly impacted on the wholesale and retail prices of onion.Thus, the study has been taken within the demarcated objectives and the elucidation of data from the respondents inRajasthan. The policy measures thus, concluded are recommended based on the facts evidenced from the study.

Keywords: Onion, Cost, Yield, Economics, BC ratio

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SEASONAL VARIATION IN MICROBIAL BIOMASS ON PHYLLOSPHERE OF DIFFERENT FRUIT TREE SPECIES

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Abstract: The aim of the present study was to analyze seasonal variations in phyllospheric microbial biomass of different fruit tree species. Leaf samples were collected from seven fruit tree orchards viz. mango, guava, *aonla*, *ber*, bael, jamun, sweet orange during summer, rainy and winter season for estimation of microbial population. In phyllosphere of different fruit tree orchards maximum TBC was observed in mango during summer, jamun during rainy, *aonla* and sweet orange during winter season. Highest diazotrophs were observed in *aonla* during summer and in jamunphyllosphere during rainy and winter season. Microbial populations and fungal count decreased by 13.06 % to 42.02 % from summer to rainy season, whereas increased by 10.80 % to 32.39 % from rainy to winter season in respect to phyllosphere of all the fruit tree species.

Keywords: Fruit tree species, Phyllosphere, Microbial Population

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PRODUCTIVITY AND PROFITABILITY OF MUSTARD (*BRASSICA JUNCEA* L.) IN PEARL MILLET-MUSTARD CROPPING SYSTEM AS INFLUENCED BY FRONT LINE DEMONSTRATIONS INTRANSITIONAL PLAIN OF INLAND DRAINAGE ZONE OF RAJASTHAN

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Abstract: Front line demonstration is an appropriate means for demonstration as well as transfer of improved agricultural innovations to the farming community. Under centrally sponsored schemes on oilseed production technology under NFSM schemes, KVK Athiyasan, Nagaur-I conducted 425demonstrations on mustard covering 180 ha areaduring *Rabi*, 2015-16to 2019-20. The critical inputs were identified in existing production technology through discussion with farmers and on the basis of soil sampling. Lack of plant protection measures were the predominant identified causes of low productivity of oilseed crop in district Nagaur. In the same sequence the other parameters like technological impact, economical impact and extension gap were analyzed for impact assessment of frontline demonstration (FLDs) on mustard crop. The results of five consecutive years study revealed that the demonstration plots produced on an average 1954 kg/ha mustard grain yield, which was 22.51% higher compared to prevailing farmers practice (1597 kg/ha). The average increase in gross return, net return and cost of cultivation was in the tune of 22.36, 31.08 and 6.43 per cent, respectively. Further, data indicated that the average additional cost of cultivation (Rs. 1435/ha) under integrated crop management demonstrations and has fetched additional net returns of Rs. 12659 per hectare with incremental benefit: cost ratio of 0.41. The average technology gap, extension gap & technological index were found 636kg/ha, 356kg/ha and 24.44percent, respectively. The results clearly indicate the positive effect of FLDs over the existing practices.

Keywords: Economics, Extension gap, Frontline demonstration, Mustard, Satisfaction, Technology gap, Technology index

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EVALUATION OF VARIOUS INSECTICIDES AS SEED PROTECTANTS AGAINST PULSE BEETLE, *CALLOSOBRUCHUS CHINENSIS* L. CHRYSOMELIDAE ON PIGEONPEA *CAJANUS CAJAN L. SEED UNDER* AMBIENT STORAGE

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Abstract: Eight common insecticides were used as seed protectants Emamectin benzoate (Proclaim 5SG) @2ppm (40.0mg/kg seed), Spinosad (Tracer 45SC) @2ppm (4.4mg/kg seed), Indoxacarb (Avaunt14.5SC) @2ppm (13.8mg/kg seed), Rynaxypyr (Coragen20SC) @2ppm (0.01ml/kg seed), Chlorfenapyr (Intrepid 10EC) @2ppm (0.02ml/kg seed), Profenofos (Curacron50EC) @2ppm (0.004ml/kg seed), Novaluron (Rimon10EC) @5ppm0.05ml/kg seed), Delltamethrin2.8EC @1.0 ppm (0.04 ml/kg seed) along with one untreated control. All the chemicals were tested for their effectiveness in term of seed moisture, damage by test insect, weight loss, germination and vigour against *C. chinensis* under ambient condition for a period of 9 months. After 9 months of storage the results revealed that insecticides namely Novaluron 10 EC@ 0.05ml/kg with 1.33 per cent infestation, 7.08 per cent weight loss and other measuring traits followed by Emamectin Benzoate 5 SG@ 40mg/kg with 1.67 per cent infestation and 8.16 per cent weight loss showed best results. Infestation, weight loss increased significantly along with the increase in moisture per cent.

Keywords: Seed, Germination, Vigour, Infestation, Pulse beetle, Chrysomelidae

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EFFECT OF HERBICIDES IN WHEAT AND THEIR RESIDUAL EFFECT ON THE PULSES CROPS

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Abstract: The field experiment conducted at research farm, RARI, Durgapura for two consecutive years during *rabi* seasons 2013-14 and 2014-15. Results revealed that maximum reduction in weed density at 25 DAS was recorded with pendimethalin pre emergence @ 0.750 kg/ha and at 50 DAS with 2, 4-D ester @ 0.5 kg/ha, clodinafoppropanyl 15 % + metsulfuran methyl 1 % @ 64 g a.i./ha and metsulfuran methyl @ 4 g a.i./ha. All the weed control treatments produced significantly higher grain and straw yield compared to weedy check. Hand weeding, except weed free produced the maximum grain and straw yield of 46.40 and 56.20 q/ha and thus out yielded over rest of the treatment. Being at par with clodinafoppropargyl 15 % + metsulfuran methyl 1 % @ 64 g a.i. /ha and sulfosulfuran 75 % +metsulfuran methyl 5 WG @ 32 g a.i. /ha, application of clodinafoppropargyl 15 % +metsulfuran methyl 1 % @ 64 g a.i. /ha registered an increase of 32.6 and 35.1 per cent in grainand straw yield, respectively over weedy check and thus found as the next superior herbicidal treatment. Further, none of the applied herbicides/mixtures in *rabi* season (wheat) had residual toxicity on germination of predominant crops (pearlmillet, mungbean and clusterbean) grown in *kharif* season.

Keywords: Weed density, Herbicide mixture, Crop productivity, Wheat, Germination, Succeeding Crops

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EFFECT OF ORGANIC POTTING MEDIA ON SHELF LIFE OF TOMATO GROWN ON ROOF TOP

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Abstract: A study on the effect of different organic potting media on shelf life of tomato grown on roof top was conducted at roof top of Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore. Eight media composition and seven different foliar sprays were included in the study. Nutrients and organics used in the experimentincluded vermicompost, digested coir compost, red soil, farm yard manure, wood ash, panchagavya, groundnut cake extract and humic acid. The resultsof experimentrevealed that the fruits of the tomato plants grown in the nutrient media containingDigested coir compost 25% + Red soil 25%+ FYM 25% + Vermicompost 25%) along with organic foliar spray Panchagavya 5 % + Humic acid 2% recorded low physiological loss in weight(10.99), high pericarp thickness(0.4252), high fruit firmness(0.7022 kg cm^{-2}) and high shelf life(11.88 days).

Keywords: Potting media, Roof top, Digested coir compost, Panchakavya, Humic acid

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POPULATION DYNAMICS OF BIHAR HAIRY CATERPILLAR AND TIL HAWK MOTH ON SESAMUM IN NORTHERN HILLS OF CHHATTISHGARH

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Abstract: The field experiment was conducted at Raj Mohini Devi College of Agriculture and Research Station, Ambikapur (C.G.) during *kharif* 2020, to know the population dyamics of Bihar hairy caterpillar *Spilosoma oblique* and Til Hwak Moth *Acherontia styx* infesting on sesamum. Bihar hairy caterpillar appeared during 33rd SMW *i.e.* 12th - 18th August (2nd week). The peak population of Bihar hairy caterpillar was observed inthe second week of September with a mean population of 12.10 larvae/plant. The correlation between Bihar hairy caterpillar, *Spilosoma oblique* and weather parameters during *kharif* 2020 results indicated that the population demonstrated a significant positive correlation with maximum temperature (r =0.546) and Til Hawk Moth, *Acherontia styx* infesting on sesamum. Til Hawk Moth appeared during 34rt SMW *i.e.* 19th - 25th August (3rd week). The peak population of Til Hawk Moth was observed inthe second week of September with a mean population of 2.60 larvae/plant. The correlation between Til Hawk Moth, *Acherontia styx* and weather parameters during *kharif* 2020 results indicated that the population demonstrated a significant positive correlation with maximum temperature (r =0.698).

Keyword: Sesamum (*Sesamum indicum* L.), Correlation, *Spilosoma oblique, Acherontia styx*

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EFFECT OF DIFFERENT HERBICIDE MIXTURES ON PERFORMANCE IN WHEAT AND THEIR RESIDUAL EFFECT OF LEGUME CROPS

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Abstract: The field experiment conducted at research farm, RARI, Durgapura for two consecutive years during *rabi* seasons 2013-14 and 2014-15. Results revealed that hand weeding recorded the lowest weed dry matter of 173.04 kg/ha at harvest stage than rest of the treatments. Sulfosulfuran @ 25 gma.i./ha, clodinafop-propargyl 15 % + metsulfuran methyl 1 % @ 64 g a.i. /ha, sulfosulfuran 75 % +metsulfuran methyl 5 WG @ 32 g a.i. /ha, carfentrazone ethyl 40 % DF @ 20 g a.i./ha, metsulfuran methyl @ 4 g a.i. / ha, 2,4-D ester @ 0.5 kg/ha as post emergence was found effective herbicidal treatment in reducing weed dry matter production.Yield attributes of wheat were also significantly improved due to different weed control measures. The maximum number of effective tillers per square meter (279), spike length (12.6)and grains/spike (43.6) were achieved under hand weeding and weed free treatment. Clodinafop-propargyl 15 % + metsulfuran methyl 1 % @ 64 g a.i. /ha also enhanced these characters by 27.7, 24.2, 74.7, 31.6 and 7.1 per cent, respectively over weedy check and stood as the next best herbicidal treatment. Further, none of the applied herbicides/mixtures in *rabi* season (wheat) had residual toxicity on plant height of succeeding crops (pearlmillet, mungbean and clusterbean) grown in *kharif* season.

Keywords: Herbicide mixture, Weed dry matter, Wheat, Succeeding crops

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EFFECT OF FOLIAR APPLICATION OF POTASSIUM SOURCES ON MATURITY, YIELD AND LEAF NUTRIENT CONTENT OF PEACH (*PRUNUS PERSICA* L.) CV. SHAN-I-PUNJAB UNDER SEMI-ARID IRRIGATED CONDITIONS

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Abstract: The aim of present study was to study the effect of foliar spray of different nutrients (potassium sulphate, potassium nitrate and potassium orthophosphate) on yield and leaf nutrient content in peach cv. Shan-i-Punjab at different concentrations. The treatments were applied as foliar spray in the end of March at pit hardening stage. Highest total yield (63.03 kg/tree) and fruit weight (83.50g) was obtained with the foliar application of KNO_3 (3%) closely followed by 2% levels of KNO_3 and K_2SO_4.K_2SO_4 (1.5-2.0%) spray advanced fruit maturity 4 days by increasing the yield in first picking (70-72%) over control. Maximum leaf N & K (2.57 & 1.03%) was obtained in KNO_3 @ 3% spray whereas maximum P (0.22%) in KH_2PO_4.

Keywords: Foliar spray, Fruit yield, Peach, Potassium nitrate, Potassium orthophosphate, Potassium sulphate

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EFFECT OF PLANT DENSITY ON YIELD AND ECONOMICS OF PIGEONPEA [*CAJANUS CAJAN* (L.) MILL SP.]

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Abstract: An experiment was conducted during the kharif season of 2020-21to find out the effect of optimum plant density / geometry on yield and economics of pigeonpea. Pigeonpea crop sown at 80 and 60 cm inter row with 30 or 20 cm intra row spacing gave significantly higher seed yield, biological and stalk yield over rest of the plant densities. The lowest yields of seed, biological yield and stalk yield were found under broadcast @15 kg seeds ha^{-1} (0.97 lakh plants ha^{-1}) closely followed by broadcast @12 kg seeds ha^{-1} (0.78 lakh plants ha^{-1}), 40 x 30 cm (0.83 lakh plants ha^{-1}) and 40 x 20 cm (1.25 lakh plants ha^{-1}). Maximum harvest index (19.45) was recorded under wider spacing 80 x 30 cm (0.41 lakh plants ha^{-1}) and it was lowest (18.06) under broadcast @12 kg seeds ha^{-1}. Significantly higher gross return (Rs 87400), net return (Rs 58363) and benefit cost ratio (2.01) were found at spacing of 80 x 30 cm followed by 80 x 20 cm, 60 x 30 cm and 60 x 20 cm spacing.

Keywords: Pigeon pea, Plant density, Yield, Economics