Sustainable Bioeconomy in Livestock and Crop Production

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ABSTRACT BOOK

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ICSBLCP-2021-OP01

Integrated livestock and crop production systems for irrigated uplands

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ABSTRACT:

India is predominantly an agricultural country and the livestock is an integral and indispensable component of our agricultural system. In Tamil Nadu, small and marginal land holders account for 93% of the total land holdings operating 62% of the total culturable land. The remaining 38% of the total land holdings are occupied by 7% of semi medium, medium and large farmers. The average size of the land holding in the state is 0.75 hectare which is less than the average size of land holding of the country (1.08 ha). In general, these small and marginal farmers practice subsistence farming where they want to produce a continuous, reliable and balanced supply of foods along with cash for basic needs and recurrent farm expenditure. A field experiment on Integrated livestock and crop production systems for irrigated uplands was conducted in Tamil Nadu Agricultural University, Coimbatore in an area 1.20 ha under irrigated upland condition. The integrated farming system model comprised of crop + horticulture + dairy + goat rearing + biogas + vermicompost + boundary crops. In the crop unit an area of 0.17 ha was allotted for the Bajra Napier fodder grass (Co CN 4) and leguminous fodder *Desmanthus virgatus* to get year round green fodder supply. Among the components, crop unit recorded highest maize equivalent yield of 47.43 t/ha followed by dairy and goat unit (32.99 t/ha). Employment generation from the IFS model recorded was 778 man days. A total net return of 2,92,702/- per year could be realized from 1.20 ha farm unit In 2 m^3 biogas unit, 657 m^3 of bio gas equivalent to 498 litres of kerosene was produced. From the vermicompost unit through the recycling of livestock waste and crop residues 14.1 tonnes was produced and recycled in the crop component.

Key words: Integrated Farming System, irrigated upland

ICSBLCP-2021-OP02

Environment Monitoring of IoT based Smart Poultry Farm

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ABSTRACT:

This project is about monitoring the essential environmental parameters using Internet of Things (IoT) devices in a poultry farm. There are different ecological factors like temperature/heat, humidity and ammonia gas has a significant role in operations environment of Poultry. An operator will get updates as regards the interior environmental position of poultry farm by using IoT devices and accessing the data using android application. It's a combination of hardware like sensors and software is used which will start the action automatically to regulate the environmental factors according to preset standards, if there are any changes in parameters which go above the defined values system will act automatically and support to take actions to regulate the ecological parameters. IoT sensors are used to controller temperature/heat, water level, humidity and smoke or gas. All

sensors are attached with the microcontroller. The data is conveyed using WI-FI which is built-in with microcontroller device such as ESP32 and ESP8266 these are low energy and high processing devices, and complete record of poultry farm by position of environmental circumstances is maintained at android application. The system as a result focuses on keep up best possible environmentally friendly circumstances with least human power. One of the primary purposes of the project is to control environmental issues in the poultry farms. Due to unhandled change in climate and environment of poultry farms morality of chicks increase and farmer face losses, their lacs of investment drown with in few days due to un monitoring of climate effects. We are purposing an environment control system for poultry farmers; they just need to implement this Internet of Things based system into their farms. It will control environment and generate information for the farmer. Weather data is much essential for poultry farm, so we use IT tools to automate. We'll provide a platform using IT Tools like programming and android app which ease the end user to use or understand the system.

Keywords: Smart Poultry Farm, Internet of Things (IoT), Climate Monitoring, Wireless Sensor Network (WSN)

ICSBLCP-2021-OP03

Assessing the Validity of Copro-ELISA for Detection of Fasciolosis in Cattle and Buffaloes of Punjab, Pakistan

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ABSTRACT:

Fasciolosis is a food borne zoonotic trematode disease that causes liver damage in ruminants and humans. The information recorded on the prepatent diagnostic methods is limited with low sensitivity. The study aimed to investigate the diagnostic efficacy of coproantigens by using in house developed indirect enzyme linked immunosorbent assay (ELISA). Adult helminths were collected from the bile duct of buff aloes for the extraction of excretory secretory (ES) and somatic (SA) antigens. The polyclonal antibodies were produced by immunization of rabbits with SA and ES antigens of Fasciola. Kappa value of developed ELISA was calculated to check the diagnostic performance of the test. The mean absorbance values at different concentrations of coproantigens were significantly different ($P \leq 0.001$) from controls. However, the difference was not significant among the concentrations of coproantigen. A positive linear relationship was observed to the concentration of antigens used in fecal supernatant and the absorbance values. The sensitivity and specificity of diagnostic test with ES-polyclonal antibodies were 100% (95% CI: 89.42%-100.00%) and 76.19% (95% CI: 52.83.30%-91.78%), respectively. Kappa value revealed that the strength of agreement is almost substantial. The SA-polyclonal antibodies showed the specificity and sensitivity of diagnostic test were 100% (95% CI: 89.42%-100.00%) and 90.00% (95% CI: 68.30%-98.77%), respectively. However, Kappa value of the test revealed that the strength of agreement is perfect. The result provides information that will add sensitive diagnostic methods for the detection of fasciolosis to maintain sustainable livestock production and management in the country. "

Keywords: Copro-ELISA, Fascioliasis, Ruminants

ICSBLCP-2021-OP04

Characterization of Membrane-Associated Progesterone Receptor Component-2 (MAPRC2) from Trichinella spiralis and Its Interaction with Progesterone and Mifepristone

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ABSTRACT:

Trichinellosis is a foodborne zoonotic disease caused by *Trichinella spp.*, including *Trichinella spiralis*. In the present study, *T. spiralis* membrane-associated progesterone receptor component-2 (*Ts-MAPRC2*) gene was cloned and characterized using protein sequencing analysis. Furthermore, the expression, purification, immunoblot assay, binding ability with progesterone antibody, and immunofluorescence assay were performed. A direct effect of progesterone (P4) and mifepristone (RU486) on the *Ts-MAPRC2* gene was determined using in vitro cell culture that showed different expression levels at all developmental stages (muscle larvae (ML), female adult worm (F-AL), male adult worm (M-AL), and newborn larvae (NBL). Subsequently, the in vitro phenotypic effects of P4, RU486, and *rTs-MAPRC2-Ab* on F-AL and ML stages were measured. Later, the in vivo phenotypic effect and relative mRNA expression of mifepristone on the F-AL stage were studied. Our results revealed that the *Ts-MAPRC2* gene is critical to maintaining pregnancy in the female adult worm (F-AL) of *T. spiralis*. The 300 ng/mL of *P4* and 100 ng/mL of RU486 showed downregulation of the *Ts-MAPRC2* gene in F-AL ($p \leq 0.05$). This plays an important role in abortion and possibly decreases the worm burden of *T. spiralis* in the host. Only 30 ng/mL *P4* showed significant upregulation in F-AL ($p \leq 0.05$). The current study provides new insights regarding the antihormone (P4 and RU486) drug design and vaccine therapy of recombinant *(rTs-MAPRC2)* protein as well as their combined effects to control *T. spiralis* infection.

Keywords: hormones; *MAPRC2*; mifepristone; progesterone; progesterone receptor; *Trichinella spiralis*

ICSBLCP-2021-OP05

Exploring the potential of microalgae for sustainable treatment of wastewater

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ABSTRACT:

The disposal of large volumes of untreated wastewater is a serious threat to the environment. Treatment of wastewater through constructed wetlands system in a cheaper and environment-friendly strategy. The chemical wastewater treatment through the operation of treatment plants is an expensive process. Microalgae have shown tremendous potential in the wastewater treatment through constructed wetlands in recent years. This study aims to evaluate the efficiency of blue green algae in

a demonstrative wetland model develop by using small tanks. The three species of blue green algae were isolated from the natural habitats and multiplied in a controlled system. Three algal species spirulina, phormidium and chlorella vulgaris were used separately as well as collectively. In every tank 10 liters of wastewater and one liter of microalgal culture were added at the start of experiment. The treatments were consisted of five treatment time intervals including T0 = 0 Day (Control); T1 = 6th day of the treatment; T2 = 12th day of the treatment; T3 = 18th day of the treatment and T4 = 24th day of the treatment. Water samples were collected according to the experimental plan and analyzed for EC, pH, dissolved oxygen, biological oxygen demand, chemical oxygen demand, contents of Na, Ca, Mg, Ca, CO_3, HCO_3 and heavy metals. Results revealed that EC was decreased in all the treatments, but the maximum reduction (60%) was recorded with phormidium sp. at day 24 of the experiment. The microalgae increased the level of dissolved oxygen (DO) by 75% on day 24 of the treatment. The BOD of wastewater was reduced from 275.4 to 67.3 mg/L (75.5% reduction) on day 24 of treatment with microalgae. The reduction in the COD of wastewater by microalgal species spirulina, phormidium, chlorella vulgaris and mixture was 66, 63, 67 and 70%, respectively0% reduction in Na concentration of wastewater was recorded with culture of spirulina sp. On day 24 of the treatment, whereas reduction in K of wastewater was 67%. After 24 days of the treatment, reduction in Cd concentration in the wastewater was 25, 24, 23 and 24% with spirulina, phormidium, chlorella and mixture, respectively. A 40% reduction in Zn of wastewater was recorded with the culture of phormidium sp. It was concluded that the best result was obtained with a mixture of all three microalgal species, however, phormidium sp. performed well and can be used in integration with constructed wetland system for treatment of wastewater on a small scale. In short, this study explored the potential of microalgal use for treatment of domestic sewage water. A selection of suitable microalgal species can help increase efficiency of existing systems of wastewater treatment. The treated wastewater has wide scope for use in agriculture, urban floriculture, and forest production. Reuse of this water can mitigate environmental pollution on one side and water shortage issue on other side.

Keywords: Bioremediation; Wastewater; Blue Green Algae; Wastewater Treatment; Environmental Pollution; Heavy Metals

ICSBLCP-2021-OP06

Molecular Epidemiology of *Entamoeba, Isospora* and *Cyclospora* through PCR in Faecal samples of Bovines in District Faisalabad

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ABSTRACT:

Parasites of gastrointestinal tract in bovines are of great economic importance as they greatly affect the productive health of cattle and buffalo. *Entamoeba, Isospora and Cyclospora* are important parasites causing gastrointestinal tract infections in bovines. These gastrointestinal parasites are responsible for the symptoms such as diarrhea, anorexia, dullness and decrease in milk production in dairy animals which results in great economic loss to the farmers. Due to presence of limited data in Pakistan on molecular prevalence, the present study was proposed to detect and estimate the prevalence and associated determinants in bovines from district Faisalabad, Pakistan. Briefly, 384 faecal samples (as determined through epidemiological sample size calculation formula) were

collected from cattle and buffaloes from four towns of District Faisalabad through simple random sampling method. Parasitic oocysts were separated, DNA were extracted and PCR was performed using genus specific primer. The overall prevalence of *Cyclospora*, *Entamoeba* and *Isospora* was 41.67%, 35.42%, 27.60% respectively. The highest prevalence found was found for *Cyclospora* followed by *Entamoeba* and *Isospora*. The highest prevalence for *Cyclospora* spp. were observed in Lyallpur town 45.10% followed by Iqbal town 42.86%, Jinnah town 41.94% and Madina town 36.26%, respectively. Similarly, the highest prevalence for *Isospora* spp. were observed in Madina town 32.97% followed by Lyallpur town 28.43%, Jinnah town 26.88% and Iqbal town 22.45%, respectively. Similarly, the highest prevalence for *Entamoeba* spp. were observed in Jinnah town 43.01% followed by Iqbal town 36.73%, Lyallpur town 31.37% and Madina town 30.77%, respectively. The data regarding associated determinants with the occurrence of these parasites in study area were collected on a pre-designed questionnaire. The infection by upper-mentioned gastrointestinal parasites were significantly found in bovines and need appropriate preventive measures in order to prevent economic losses and zoonotic transmission.

ICSBLCP-2021-OP07

High Efficiency Seed Drill: A step towards precision agriculture

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ABSTRACT:

Employment of high efficiency technologies to improve the agriculture crop production is the key to overcome the rising food insecurity during the COVID-19 pandemic. Recently, many agricultural scientists are working to develop new technologies to increase crop and livestock production with reduced inputs. This research is focused on development and testing of multi-crop high efficiency seed drill, which is equally beneficial for cash and food crops. The mechanism of this machine is very different from traditionally available machines, which have limitations when tried to use for more than one crop. This machine has the core parts consists on mechanical timer, seed dividing head, seed distributer, automatic feeding box and s-type energy efficient tines to reduce excessive load from the tractor. The sole purpose of the machine to conserve agricultural inputs including but not limited to; seed, fertilizer, tillage, fuel energy and the time of sowing. Moreover, the unique and uniform seed distribution mechanism make it perfect for versatile crops. The Endowment Fund Secretariat, University of Agriculture Faisalabad has provided financial support for this project.
Keywords: Energy efficiency; Energy Conservation; Precision Agriculture; High Efficiency Seed Drill; Food Security

ICSBLCP-2021-OP08

Impact of various organic substrates on growing organic winter vegetables in potohar region of Pakistan

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ABSTRACT:

The present study was carried out to evaluate the performance of different organic substrates on the growth and yield of garlic, radish, and turnip. Compost is the product of organic matter decomposition and Humic acid is derived from lignatic coal (brown coal) which are beneficial to plant growth and development. Application of organic substrates appears to be suitable for saving chemical fertilizers and reducing environmental pollution. Hence, this field study was conducted at the field of Allama Iqbal Open University Islamabad during 2020. The study was conducted to evaluate the effects of different treatments of compost and humic acid on Garlic, Radish and Turnip. The treatments are (1) control (No compost& Humic acid) (2) compost 4 t ha-1 (3) compost 6 t ha-1(4) compost 8 t ha-1 (5) Humic acid10 Kg/ha-1 (6) Humic acid 12 kg/ha-1 (7) Humic Acid 15 kg/ha-1(8) compost 4 t ha-1 + humic acid10 kgha-1 (9) compost 6 Kg ha-1 + humic acid12kg ha-1 (10) compost 8 t/ha-1 + humic acid 15kg/ha-1ha were applied at sowing of vegetables, yield of garlic (Allium sativum L.) cv. Chinese, radish (Raphanus sativus L.) cv. Korean white and turnip (Brassica rapa) cv. Round purple. The results depicted that all treatments increased growth parameters, growth and yield of garlic, radish, and turnip. The growth parameters and yield were significantly increased by incremental application of compost & humic acid. Both organic fertilizers enhanced nutrient availability by mobilizing it by microbes. This ultimately enhanced plant nutrient availability and microbial nutrients dynamics in the soil. Microbial dynamics has resulted increase in organic matter and increase in organic C, N and P in the soil solution. This has ultimately increased reproductive growth and yield of the crop. The highest yield of Garlic, Radish & Turnip were 9.52 t ha-1, 72.60 t ha-1, and 31.83 t/ha-1) in treatment with Compost 8t ha-1 + humic acid15kg ha-1while in control treatments minimum yields were 4.32 t ha-1, 45.12 t ha-1 and 21.75 t ha-1. This study revealed that compost and humic acid has mobilized plants available nutrients and microbial dynamics has increased nutrients solubility in the soil's solution. This slow release of organic nutrients supply for the longer time is sustainable for soil and crop productivity."

Keywords: Garlic, Radish, Turnip, Humic acid, Compost, Organic matter, Growth, Yield.

ICSBLCP-2021-OP09

Role of potassium in enhancing wheat productivity under limited water conditions

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ABSTRACT:

Drought is one of the most important stress factor limiting wheat productivity. Vegetative and reproductive stages in wheat are critically influenced by water deficit. Water scarcity is one of the major constraints of wheat production in rain-fed area. Among multiple shotgun approaches, use of potassium as foliar spray is very viable option due to limited availability of nutrient as well as its deficiency on wider scale. Moreover, potassium availability is directed linked with water relations in plants. Keeping in view the role of potassium in alleviating the harmful effects of water deficit in wheat, a field experiment was performed in winter season of 2018-19 at Research Farm, MNS University of Agriculture, Multan. Experiment was laid out in RCBD with split plot arrangement. Different water regimes including; well-watered and water deficit at tillering stage, was kept in main plot. Five different potassium treatment including; soil applied recommended dose of potassium, without soil applied potassium, distilled water spray, 1% potassium spray and 2% potassium spray

was kept in sub plot. All agronomic practices were kept uniform throughout the research. Data for different agronomic and yield traits of wheat were collected by standard procedures. Data showed that different potassium treatments and water regimes significantly affected different agronomic and yield traits in wheat. Foliar application of potassium was more superior as compared to soil applied potash under water deficit conditions in terms of improvement in net photosynthetic rate (6.9 µ mol m-2 sec-1) and grain yield (4.02 t ha1) in wheat. However, chlorophyll content (SPAD units), cell membrane stability index and biological yield was recorded maximum in soil applied potash under water deficit conditions as compared to foliar applied potash and without potassium. Foliar application of potassium @ 2% improved grain yield of wheat 53.47%, while 1% potassium spray improved grain yield of wheat 35.76% as compared to distilled water spray, respectively. Based upon the research findings, It is recommended that 2% foliar application of potassium can be affectively utilized for improvement in various physiological and yield traits in wheat exposed to drought at tillering stage.
Key words: K, drought, grain yield, Triticum aestivum L.

ICSBLCP-2021-OP10

Effects of Organic Fertilizers on Seed Germination and Seedling vigour of Tomato (*Solanum lycopersicum*)

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ABSTRACT:

This study was conducted to evaluae the efficiency of different organic fertilizers on germination and early growth of tomatoes seedling (*Solanum lycopersicum*). Four different types of fertilizers viz. vermicompost, mustard cake, fish meal, cotton seed cake, and control (soil + cocopeat) were used as treatments. The Randomnized Complete Block Design (RCBS) was used in a five replication factor experiment. The data were statistically analyzed and the least significant difference (LSD) was calculated to test the differences between treatments at a probability level of 0.05 using the Social Science Statistics (2021). Organic fertilizers except mustard cake significantly I nfluenced germination and other growth parameters of tomato seedling. The results showed that the vermicompost performance was best in all parameters which was followed cotton cake.the poor performance exhibited by mustard cake. The results suggest that vermicompost is suitable for raising healthy seedlings in organic tomato production.
Keywords: tomato seedlings, organic fertilizers, vermicompost

ICSBLCP-2021-OP11

Improving Stand Establishment of Lentil through Pre-sowing Seed Enhancements

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ABSTRACT:

Seed enhancements such as seed priming and rhizobial inoculation can improve germination and seedling vigor under field conditions. A field study was executed to appraise the effect of various pre-sowing seed enhancements for improving stand establishment of lentil. The seeds of lentil *cv.* NIAB Masoor-2006 were primed for 6 h with osmoticas like $CaCl_2$ and KCl (2.2% w/w) or water (hydro priming), and subjected to rhizobial inoculation (peat based multi-strain inoculant-Rhizogold®) either alone or in combination with each other. Control treatment comprised of non-primed and non-inoculated lentil seeds. Productivity and profitability of lentil crop was remarkably affected by various seed priming treatments applied alone and in combination with Rhizobium inoculation. Seed enhancements improved dry matter accumulation (16-44%) and crop growth rate (22-52% and 5-59% at 90-105 and 105-120 DAS, respectively) over control. Effect of seed enhancements was significant for calendar time taken by lentil from flowering to pod initiation, and sowing to maturity. Likewise, improvements in physiological parameters like net photosynthetic and net transpiration rates were also recorded. Plants derived from $CaCl_2$ primed seeds manifested highest net photosynthetic rate. Maximum emergence (266 plants m^{-2}), branches $plant^{-1}$ (19.23) and seed yield (2.41 t ha^{-1}) were noticed in rhizobial inoculated plots. Both seed priming and rhizobial inoculation significantly enhanced yield attributes (19-89%) of lentil over control plots (non-primed and uninoculated). Rhizobial inoculated plots recorded 89% higher seed yield over control owing to improved total dry matter, branches $plant^{-1}$ and pods $plant^{-1}$. Maximum seed yield (2.41 t ha^{-1}) and economic returns (Rs. 236437) were recorded for lentil crop growing from rhizobial inoculation plots in comparison with all other treatments. All applied treatments performed better as compared to control. Seed priming alone or in combination with rhizobial inoculation had almost similar effect on seed yield, but yield advantage realized under these treatments was significantly higher compared to the control. Seed priming with KCl along with rhizobial inoculation improved 100-seed weight by 27% over control. Seed priming with KCl alone resulted in more number of pods per plant as compared to all other treatments. For higher lentil yields, pre-sowing seed enhancements should be carried out.

Keywords: crop dry matter, emergence and seedling vigor, legume seed yield, lentil productivity, rhizobial inoculation, seed enhancements

ICSBLCP-2021-OP12

Evaluating GHG Mitigation Potential of Biochar in N-Fertilized Paddy fields

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ABSTRACT:

Synthetic fertilizers are major agents of gaseous emissions including nitrous oxide (N2O), and rice cultivation is a primary source of methane (CH4) emission. Biochar (BC) addition to agricultural soils is a potential approach to mitigate N2O and CH4 emissions. This greenhouse study was conducted to assess the simultaneous effects of BC and nitrogen (N) fertilization to reduce N2O and CH4 emissions along with higher biomass accumulation in rice under controlled conditions. Nine treatment combinations of BC amendments at 0, 2 and 4% by weight (weight of BC/weight of soil) mixed into 3500 g of unsterile soil with 0, 70 and 140 kg N ha-1 were used in growing rice. Results show that BC-only treatments enhanced the volumetric water contents (VWC) by 9-14% and soil pH by 5-7% coupled with higher daily and cumulative seasonal CH4-C fluxes by 85-95% and 48-51%, respectively, compared with control treatment. Under 2% and 4% BC amendments, N at 140 kg ha-1

lowered the daily and cumulative seasonal CH4-C fluxes by 24-42% and 20-30%, respectively as compared to 70 kg N ha-1. Furthermore, BC amendments in N-treated soils reduced the daily and total seasonal N2O-N emissions by 27-67% and 49-61%, respectively, relative to N-only treatments. However, N addition in BC-amended soils showed 10-16% decreased VWC compared with the BC-only treated soils. In terms of rice growth, BC-only reduced the above- and below-ground biomass accumulation, delayed the tillering phase, and resulted in fewer vegetative tillers except for BC-treated pots with 140 kg N ha-1. Thus, this study suggests that the use of BC amendment at 2% with 140 kg N ha-1 may be a beneficial strategy to reduce the net GHG emissions from paddy rice in an Alfisol.

Keywords: Synthetic fertilizers; N2O-N emission; biochar addition; net GHG emissions; rice

ICSBLCP-2021-OP13

Molecular detection and antibiotic resistance profiling of *Escherichia coli* isolated from Fruits and Vegetables

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ABSTRACT:
Escherichia coli is normal microbiota of the gastrointestinal tract while some strains are pathogenic that can cause foodborne illness. Fresh fruits and vegetables could be the cause of transmission of *E. coli*. The current research was carried out to find the presence of *E. coli* from various fruits and vegetables. For this purpose, 5 fruits and 5 vegetables were selected (n=10 from each) and were collected from different fruits and vegetable markets of Faisalabad. Samples were collected using sterile bags and carried to the Department of Microbiology. Small amount of each sample was ground to paste and 1g of each was added to 9 mL of peptone water and incubated for 24 hours. All the samples were cultured on Eosin Methylene Blue agar (EMB) and MacConkey agar. Cultural and morphological characteristics were observed for each sample followed by biochemical tests i.e. catalase, oxidase, indole and TSI test. Antibiotic resistance profiling of the isolates was determined using disk diffusion method. The bacterial isolates were confirmed by PCR amplification of *uid*- A gene. On MacConkey agar, *E. coli* produced pink colonies while on EMB agar green metallic sheen colonies were observed. The results showed the prevalence of *E. coli* (32%) among fruits and vegetables. Antimicrobial resistance was observed as Gentamycin (18.75%), Doxycycline and Ceftazidime (25%), Colistin Sulphate (18.75%), Levofloxacin (25%), Imipenem (12.5%) and Tobramycin (9.3%). Altogether the current research has evaluated the burden of *E. coli* present in fruits and vegetables collected from different areas of Faisalabad, a potential source of food borne illness in humans as well as significant hurdle in sustainable production of good quality fruits and vegetables

ICSBLCP-2021-OP14

Immunogenicity and Protective Efficacy of Probiotics with EtIMP1C against *Eimeria tenella* Challenge

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ABSTRACT:

Coccidiosis is an endemic problem in broilers inflicting disastrous losses to worldwide poultry industry. Vaccines are generally effective in controlling the infectious diseases; the subunit vaccines effectiveness can hopefully be improved with concurrent use of probiotics as assessed in this experiment using an *Eimeria tenella* challenge. Immune mapped protein-1 (IMP1) is a novel immunogenic protein of Apicomplexans, including in *Eimeria tenella*. Anticoccidial performance of the cumulative effect of probiotics and EtIMP1C (Part of *Eimeria tenella* immune mapped protein1) was evaluated based on various parameters such as an intestinal lesion, oocyst scores, feed conversion ratio, and organ weight. Data were also analyzed on both immunological and hematological parameters. The EtIMP1C and probiotics administered group showed less intestinal lesion, decreased oocyst shedding, satisfactory feed conversion ratio (FCR) and improved hematological parameters as compared to EtIMP1C emulsified with FCA group. However, there was no statistically significant difference between the two groups ($P>0.05$), in aspect of lesion and oocyst scores, as well as immunological and hematological parameters. The experimental work showed that probiotics could be a good hope due to its antioxidant, immunomodulatory and growth promoting effect against poultry coccidiosis alone or in combination with vaccines, including IMP1C based vaccine, but further studies are required to formulate its dose with the vaccine as well as a different strain of probiotics effect against coccidiosis.

ICSBLCP-2021-OP15

Dairy farms and their products, a possible future threat to public health in Lahore, Pakistan

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ABSTRACT:

The prudent use of antibiotics in animals minimizes the risk of appearance of its residues in milk, which would, otherwise, make the milk contaminated for human consumption. Continuous intake of such contaminated milk could also result in the emergence of new drug resistant strains of bacteria. Hence, it is very necessary to address this issue in developing countries who normally struggle to keep the milk hygiene and contaminants free. To the best of my knowledge, this is the first study of its type which looked at the prevalence of certain antibiotic residues in milk, risk factors associated with the detectable antibiotic residue concentration at small farms and barriers towards the production of contaminants free milk in Lahore, Pakistan Mixed methodology was adopted to address the issue. Initially 120 milk samples were screened by using "*bacillus subtilis* quantitative field disc Assay" and positive samples were run on HPLC to confirm the concentration of each type of antibiotic residues. At the same time questionnaire based cross sectional survey was conducted to find the risk factors associated with the detectable antibiotic concentration at small dairy farms.

Semistructured interviews were conducted to identify the barriers towards safe milk production at small dairy farms. Result suggested that overall prevalence of unsafe antibiotic residues in milk is 70.73% (29/41) with highest individual prevalence of penicillin (73.3%) followed by amoxicillin (72.7%) and ampicillin (53.3%). Not marking treated cows, avoid vet consultation, same equipments for diseased animals, not tagging animals, neglect pre/post teat dipping, not keeping animal record and antiseptic unavailability at the farm were strongly associated with antibiotic residues appeared in milk with significant p- value of <0.05. Qualitative data revealed that poverty, lack of knowledge and lack of government interest are the barriers towards safe milk production. This study has confirmed the prevalence of certain antibiotic residues in the milk. However, the study suggested that bad management skills and lack of government support are responsible for this criminal negligence. This issue needs to be addressed on an urgent basis, otherwise it would be too late to cope.

ICSBLCP-2021-OP16

Studying diversification of microbes in soil around industrial zones of makori, gurguri, nashpa, district karak, khyber pakhtunkhwa

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ABSTRACT:

The most dangerous pollution in the environment are the unwanted hydrocarbon in form of oil and petroleum which is the result of leak from the coastal oil refiners, Which leads several researchers to investigate its distribution and effects in the environment and impact on human. This contamination affects almost every type of ecosystem (marine, fresh and terrestrial). Current study focused to evaluate the oil contaminated soil of the rigs and dumping sites located in District Karak, in terms of biological diversity (bacteria and fungi), and to evaluate them as a potential degrader of the hydrocarbon present in that soil. Soil sample were collected from four different sites of district Karak i.e. Makori CPF plant, Gurguri rig, Nashpa point andAmankot dumping site of district Karak. Initially the oil contaminated soil samples were assessed for physiochemical properties and revealed that significant changes occur in polluted soil. Secondly, the samples were processed through microorganism isolation and identification.Subsequently, the gram staining and microscopy analysiswas performed that showed that 50% bacterial isolates were gram positiveand 50% were found to be gramnegative bacteria. These bacteria were further confirmed bySanger sequencing of 16s rRNA molecular technique. Thirdly, from the biochemical test ofbacteria, it was revealed that high degradation was recorded for the strain of the Pseudomonas spp (1.65×109) and bacillus. Later on, the partial sequences of isolated samples were accessed in FASTA format using Bio Edit thereby checked for Basic Local Alignment Search Tool (BLAST) and constructed the phylogenetic tree that demonstrated highly conserved region of OCS G (Gurguri) with OCSM (Makori) sand close similarity of OCS K (Aman Kot) and OCS N (Noshpa). Pseudomonas spp present in sampling sites of Makori and Gurguri showed highest oil degrading activities as compare to Bacillus Spp which were Isolated and identified from the sites Nashpa and Aman Kotdaming. From the current study it is concluded that introduction of these potent bacteria can greatly reduce the petroleum pollution in the environment. Future study should be encouraged to dig out novel strains of bacteria, fungi and other microbes to control these pollutions.

Key words: Petroleum pollution, Biodegradation of oil pollutant, Bacteria, Pseudomonasspp, Bacillus.

ICSBLCP-2021-OP17

Comparative morphometry of digestive tract in domestic backyard poultry of Pakistan

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ABSTRACT:

In Pakistan, backyard poultry rearing cannot only compensate for per capita available quality protein source. Four indigenous desi breeds (Naked Neck, Fayoumi, Aseel and Misri Gold/ Desi), reared as backyard poultry are asset to rural small household. The study of gastrointestinal (GI) anatomy of these domesticated breeds is not only directly related to feed intake but also its efficient digestion and assimilation of nutrients for better muscle development and ultimately weight gain. Twenty birds of 26-week-old of each breed were collected from local rural areas in and around Faisalabad. Each bird was carefully eviscerated, and intact gastrointestinal tract was removed with caution. The digestive organs were observed for morphometric parameters such as length and width in centimeters and weight in grams using vernier caliper/scale and digital weighing machine respectively. Descriptive statistics were calculated for all parameters by the help of MS Excel. One-way analysis of variance was applied in Minitab® 19.2020.1 (64-bit) software and the group means were compared using Tukey's honest significance test (THS, $\alpha = 0.05$). In pre-intestinal digestive tract, length of cervical esophagus (10.11 ±0.48) was recorded highest in Misri Gold while other species varied non-significantly. Aseel recorded the maximum length of crop (4.53 ±0.17) and gizzard (4.65 ±0.12). Jejuno-ilium (104.10 ±3.43) was observed longest in Misri Gold. Weight (g) if gizzard (32.09 ±1.45), duodenum (9.51 ±0.89), colon (6.63 ±0.32) and caeca (6.66 ±0.29) was observed significantly ($P \leq 0.05$) higher than other breeds.

Keywords: Backyard poultry, Digestive system, Morphometry

ICSBLCP-2021-OP18

Bovine milk from semi-intensive dairy systems harbouring higher prevalence of antibiotic resistant *Escherichia coli*

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ABSTRACT:

Semi-intensive dairy systems, commonly overlooked for studies, are prevailing in tropical and subtropical countries in developing setups that need to be probed for public health concern pathogens

and their updates about the antibacterial response, and association with risks involved. The current study was designed to map trends in the prevalence of dairy–originated E. coli identified based on the 23sRNA gene, associated risk factors, and in-vitro drug susceptibility profile of these. A total of n=200 subclinical mastitis milk samples were collected using purposive sampling from semi-intensive dairy systems. Standard biochemical and microbiological methods coupled with polymerase chain reaction were applied to identify E. coli. The study, overall, found a 26.18% prevalence of subclinical mastitis and 13.50% E. coli from these samples. Among assumed risk factors, lack of use of teat dip (OR=8.26, C.I.=2.73–24.91), higher age groups (OR=17.87, C.I.= 4.42–72.16), parity number >3 (OR=3.68, C.I.= 1.59–8.49), underweight animals (OR=2.89, C.I.= 1.11–7.53), and mid-lactation (OR=14.94, C.I.= 3.04–73.24) were dominant potential risk factors for E. coli infection. The in-vitro antibiotic susceptibility showed resistance with the following order, enoxacin (100%) > amoxicillin-clavulanate (42.86%) > oxytetracycline (21.43%) > ampicillin and gentamicin (13.16%) > chloramphenicol (13.04%) > ciprofloxacin (10.71%) > levofloxacin (7.14%). The study concluded the higher prevalence of E. coli, most of the assumed factors proving to be potential risks and narrowing the range of antibiotic efficacy that in turn demands stern compliance with accurate measures and development of new antibiotic combinations.
Keywords: *E. coli*; antibiotic susceptibility assay; risk factors; subclinical mastitis; Resistance

ICSBLCP-2021-OP19

A survey of zoonotic parasites (Toxoplasma gondii and giardia) in dogs and cats presented to government and private veterinary clinics of Faisalabad

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ABSTRACT:

Toxoplasmosis has major public health significance due to social and economic influence on public. Protozoan parasite that lead to gastrointestinal problems characterized by acute or chronic diarrhea, commonly known as giardiasis. The occurrence of giardiasis in dogs and cats has eventual consequences according to clinical and public health. Instead of being a potential threat to public health, no study had been planned to detect the occurrence of these important zoonotic parasites in pets of Faisalabad or even in Pakistan. So, keeping in view the importance, the current study has been planned with the objectives to find the occurrence of T. gondii and giardia in owned dogs and cats of Faisalabad and to find the information that how much the owners know and are concerned about zoonosis. For this purpose, 150 (each for dogs and cats) fecal and blood samples were collected from pets presented to different veterinary clinics. Direct microscopy was used for screening of Giardia while toxoplasma was detected using Toxoplasmosis Latex Kit (ANTEC Diagnostic®, UK). Whereas, a questionnaire was filled out to reveal associated risk factors and awareness of zoonosis . Data thus generated was analyzed using Chi-square test. In dogs, an overall prevalence of 42% for giardia and 37% for T. gondii was found. The corresponding values for cats were 36% and 39.33%, respectively. These findings indicate a statistically non-significant (P>0.05) difference in terms of prevalence of the above-mentioned parasites in both the spp. Moreover, the findings of the study clearly illustrate that cats and dogs being kept as pet animals seriously pose a threat to human being and the owners are not aware of this alarming situation.
Keywords: Giardia, Toxoplasma, Zoonotic, Dog, Cat.

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The Effect of Myrtus communis L. Plant Extract added to drinking milk on Performance in Holstein Calves

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ABSTRACT:

This study was carried out to determine the effects of supplementation of the leaf (MPEL) and stem (MPES) extract of the myrtle plant with milk on performance, reproduction, some blood parameters and immune response of suckling female Holstein calves. The animal material of the study consisted of a total of 50 Holstein breeds, one week old female calves. Extracts were given with the milk of the experimental groups for 60 days and for an additional 12 days after the calves were weaned. In the study, a total of 5 groups were formed. The groups, with the control group not given the plant extract, according to the levels of the plant extracts; 25 ml/head/day of leaf extract; (MPEL-25), 25 ml/head/day stem extract; (MPES-25), 50 ml/head/day leaf extract; (MPEL-50), 50 ml/head/day stem extract; (MPES-50), respectively was formed. Feed consumption ($p<0.01$) and live weights increased in the experimental groups. While the experimental groups gave higher values compared to the control group in the body weight evaluations on the first 72nd day, 300th day and 400th day, only the 300th day ($p<0.01$) of these differences was found to be statistically significant. There was no difference between the groups in terms of feed conversion ratio (FCR). Although the first insemination time, which is one of the fertility parameters, was shortened in terms of duration, the number of inseminations decreased, the results were not statistically significant. As a result, it was concluded that the performance and fertility parameters were positively affected in female Holstein calves without any side effects when the extracts obtained from the leaves and stems of Myrtus communis L. plant were given at 25 and 50 ml/head/day levels for 72 days.

Key words: Calf, mrytus, performance, reproductivity

ICSBLCP-2021-S02

Parasitism Potential of Egg Parasitoid, Trichogramma chilonis on Spodoptera frugiperda on Maize

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ABSTRACT:

Fall armyworm, Spodoptera frugiperda is a destructive pest with polyphagous nature that feed on different crops such as maize, cotton, soybean, vegetables, and weeds. It is an invasive species of armyworm on maize in Pakistan. It causes economic losses by damaging foliage. The present study was aimed to evaluate the parasitism potential and performance of Trichogramma chilonis against S. frugiperda. About two hundred larvae of S. frugiperda were collected from maize crop from Multan and reared on maize under laboratory conditions. *T. chilonis* is an important egg parasitoid of lepidopteran pests. To observe its parasitism potential, *T. chilonis* was reared on the eggs of Sitotroga

cerealella. Egg densities were considered as different treatments/ independent parameters i.e., 20, 40, 60, 80, 100 eggs. Adult female *T. chilonis* was introduced in plastic jars possessing different egg densities. Dependent parameters i.e., longevity, parasitism frequency and emergence were noted with respect to different egg densities of FAW. In order to determine parasitism preference of *T. chilonis* two hosts i.e. S. cerealella and S. frugiperda eggs were used. The parasitism of 24h and 48h aged female of T. chilonis on S. frugiperda eggs were evaluated. Egg density of FAW has significant effect on parasitism and emergence of T. chilonis. Parasitism rate was recorded upto 46.10 % on FAW on eggs density of 100 eggs/female. Parasitism preference experiment demonstrated that T. chilonis had more parasitism on S. cerealella eggs (66.5%) than S. frugiperda (45.33%). Results further depicted that S. frugiperda eggs hatched on 3 rd to 4 th days. Maximum parasitism activity was noted on fresh eggs (57.75%) of S. frugiperda than 2 nd day old eggs (44%). Average longevity of T. chilonis was about 7.70 days. The parasitism of 24h aged female was 30% and 48h old female was 62%. As pre-oviposition period of FAW adult female is 3-4 days, to synchronize the use of parasitoid population, Trichogramma cards were installed 2-3 days before emergence. In field experiment, there were five treatments 1card per week, 2 cards per 2 week, 2 cards per week and 2 cards per 2 weeks with control, replicated three times. This trial was designed in RCBD. The data were recorded on weekly basis. Application of Trichogramma cards had significant effect on population reduction of S. frugiperda and its damage. Minimum damage and larval population of FAW was observed in treatment with 2 Tricho-cards per week. It could be used in IPM strategies at farmer's fields against fall armyworm.

Key words: Fall armyworm, S. frugiperda, T. chilonis, Parasitism, Emergence

ICSBLCP-2021-S03

Management of canine vector-borne diseases: hurdles and knowledge gap

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ABSTRACT:

A great range of pathogens transmitted by arthropods make a group of diseases which have worldwide distribution and swift spreading illnesses termed as canine vector-borne diseases (CVBDs) that not only have veterinary importance but zoonotic concern also. Geographic information system, remote-sensing, rising research concern, mathematical models and molecular technologies have increased the basic knowledge on several facets of CVBDs. Pathogen, host and vector interface are not quiet acknowledged properly. Research for the upshot of vaccine in case of different arthropods has been increased due to elementary acquaintance on immunomodulatory effects of molecules present in the arthropod's saliva. There is a lack of information about the biochemistry of arthropods antigens, primary progressive stages involved in spread and all those determinants which affect the transmission rates and restricted to lab information on ticks. In order to evaluate efficacy of the acaricidal or repellent effect of chemical amalgams used for regulation of CVBDs there must be investigation of role of immature stages of ticks as vector and importance of substitutive means of transmission. Regardless of an ostensible absence of competent vectors there should be better exploration of potential vectors in CVBDs diagnosed areas along with control of arthropod vectors, screening of active vector borne infection, reduction of stray dogs and awareness campaign in kennels. But for better results there should be less communication gap between researcher and more political health care agendas. Less genetic studies have scrutinized resistance or sensitivity of specific

breeds of dogs to different pathogens associated with CVBDs.Issues related to management of CVBDs could be better understood if there are improvements in diagnosis, treatment and prevention. If these issues are addressed they could subsidize to increase the reliance of erudite investigative tools and prognostic models now open for its control.

Key words: Canine vector borne diseases, Management, Control, Gap

ICSBLCP-2021-S04

Entomopathogenic nematodes: a biological model for the analysis of anthelmintic resistance

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ABSTRACT:

Nematodes are animal parasites of immense economic and zoonotic importance along with their ruinous effects on animal health and growth rate. Entomopathogenic nematodes are parasitic nematodes associated with the insect pathogenic bacteria are obligate parasites of arthropods. Due to the lethal nature of their associate bacteria with lethal dose of 10,000 or less cells they are named so. They have above 75 species classified into family Steinernematidae and Heterorhabditidae which inhabit the soil. Their use in veterinary field is emerging but in agriculture already in use for control of soil living pests. Entomopathogenic nematodes are currently in use as a cost-effective management tool for the farmers. They have some difference from the nematodes in anatomy and life cycle. Anthelmintic resistance is a crucial topic grabbing attention these days and researchers are working on alternate novel approaches. For this purpose, entomopathogenic nematodes can be used as biological model and it can eliminate the limitations of anthelmintic resistance investigation in-vivo as well as in-vitro due to their worldwide occurrence, small size, uncomplicated anatomy and cultivation, shorter life span, easy laboratory maintenance, quick isolation and identification, cost effectiveness, unchallenging handling and training. Currently scientists are challenging the use of targeted specie in experimental studies and advocating the use of non-target specie with more specific test. Limitations of using biological models like unreliable results are there due to different anatomy, physiology toxicity nature but entomopathogenic nematodes as a non-targeted specie can be used to standardize studies or precursory tests that allow establishing of the correct methodology. Entomopathogenic nematode are the great biological model to test resistance against drugs, assessment of new drugs, interactions of excreted chemicals with the rhizosphere and the environment and dispersion of resistance but researchers need to work on their limitations to get optimum benefits.

Key Words: Entomopathogenic nematodes, Anthelmintic resistance, Biological model

ICSBLCP-2021-S05

Genome Wide Characterization and Transcriptional Profiling of PERK gene family in *Oryza sativa L.*

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ABSTRACT:

Proline-rich receptor kinases play a vital role in the regulation of several imperative plant metabolic processes and pathways, especially under biotic and abiotic stresses. Although PERK genes have been characterized in various major crop plants like cotton, their identification and characterization in cereal is still in its infancy. Rice (*Oryza sativa L.*) is the most important cereal crop grown worldwide. We performed comprehensive and systematic genome-wide analysis to identify the non-redundant PERK protein in the rice genome. We have computationally identified 08 PERK encoding non-redundant genes which were randomly distributed on all the rice chromosomes. The evolutionary phylogenetic analysis classified the PERK proteins into five well defined clades. The PERK gene family is an evolutionary advance gene family that lost introns over the time. Along with the presence of absolutely conserved signatory PERK domain, 04 different domains were also found to be conserved in a group-specific manner and 10 different conserved motifs were also found. Insights of gene duplication analysis revealed the segmental duplications and tandem duplications. Purifying selection seems to be operated during the evolution and expansion of paralogous PERK genes. The transcriptome data-based Insilco expression analysis revealed the differential expression of OsPERK genes in seed, young leaf, mature leaf, seedling root, young inflorescence and inflorescence. Moreover, some of these genes showed identical expression, revealing the possibility of involvement of these genes in conserved abiotic stress–response pathways. This genome-wide computational analysis will serve as a base to accelerate the functional characterization of PERK especially under biotic and abiotic stresses.

Keywords: Trsancriptome, PERK gene, Plant

ICSBLCP-2021-S06

Effect of Nano-Technology on Meat Quality

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ABSTRACT:

The meat industries have significant importance in the provision of safe and nutritious meat. Consumers are now looking forward for the healthier and safe meat products containing the natural ingredients as a substitute for synthetic additives. Meat safety is linked with the consumer's health like food borne diseases is the main problem in meat industry. But the study of pathogens and their presence is important for the meat industry as E.coli is most important bacteria in fresh meat since 19 th century, it has been designated a contaminant in raw, non-intact beef products. Nanotechnology is becoming one of the most rapidly emerging research area with industrial applications like production, processing and packaging of food through Nano- emulsions, Nano-particles like silver Nano practical is used for the packing of fresh chicken. This technology serve the purpose by the application of various properties like mechanical and heat-resistant properties, enhanced barrier properties and improved biodegradability. In addition, nanomaterials could be also used in packaging as antimicrobial effects enhancer and spoilage detector through Nano-sensors. Moreover, Nanotechnology has the potential to improve meat and fishery product quality in terms of physicochemical qualities and the creation of active and intelligent packages. Nanoparticles and Nanostructures can be derived from metals, plant and animals. It possessed significant potential to

provide solutions of various problems in food production, processing, consumption and storage. Various research studies promised the noticeable and remarkable impact of nanotechnology on meat preservation and safety. In conclusion, Nanotechnology is the best way to preserve the meat for the longest and safest time period for the consumers.

Keywords: Nanotechnology, Nanomaterials, Nanoparticles, Nano-emulsion, Meat preservation, Safety challenges, Health Hazards, Synthetic additives

ICSBLCP-2021-S07

Nutritional Properties and Health Benefits of Rabbit Meat

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ABSTRACT:

Rabbit is one of the most versatile livestock species, responding successfully to bio-economic principles, which promote a clever use of resources and their conversion into added value products, such as functional foods (FFs). Rabbit meat is a highly digestible, tasty, low-calorie food, often recommended by nutritionists over other meats. The main components of meat, excluding water, are proteins and lipids. Rabbit meat is a lean meat rich in proteins of a high biological value and it is characterized by high levels of essential amino acids. meat is also an important source of highly available micronutrients, such as vitamins and minerals. Also, rabbit meat does not contain uric acid and has a low content of purines. Rabbit meat is characterized by its lower energetic value compared with red meats due to its low fat content. Fat content varies widely depending of the carcass portion from 0.6 to 14.4% (fat from edible meat with intramuscular and intermuscular fat content) with an average value of 6.8% with the loin being the leanest part of the carcass (1.2% of lipids). Meat is an important source of B vitamins. Consumption of 100 g of rabbit meat contributes to 8% of daily Vitamin B2, 12% of Vitamin B5, 21% of Vitamin B6, and 77% of Vitamin B3 requirements, and provides a fulfillment of the daily Vitamin B12 requirement. Meat contains several natural antioxidants such as catalase, superoxide dismutase and glutathione peroxidase. Rabbit meat is part of a recommended diet for people with diabetes, due to its low fat and low cholesterol qualities and the nutritive value that is on par with fish meat. A molecule found in rabbit meat, called conjugated linoleic fatty acid, may have potential anti-obesity, anti-carcinogenic effects and be able to ameliorate diabetes.

Keywords: Rabbit Meat, Nutritional Value, Functional Food

ICSBLCP-2021-S08

Weed-crop interference in proso millet

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ABSTRACT:

Proso millet *(Panicum miliaceum* L.) is short season summer cereals with low water requirements and high water use efficiency for both grain and and nutrious fodder for livestock. It is gluten free and has more minerals than wheat. Revival of old climate resilient cereal looks viable option in order to mitigate increasing abiotic stresses due to climate change. In this scenario optimizing crop production practices for proso millet is necessary. There are many factors responsible for low yield of proso millet per unit area in which weeds are the most important yield limiting factor, because weeds compete with crop for nutrient, space, light, moisture and can reduce its productivity up to 20-40%. Therefore, an experiment was conducted at MNS-University of Agriculture research Farm, Multan in February 2019 to study the weed-crop interference in Proso millet as T_1= Weed free, T_2= competition for 2 WAE, T_3= competition for 3 WAE, T_4= competition for 4 WAE, T_5= competition for 5 WAE, T_6= competition for full crop season. This experiment was laid out in randomized complete block design with three replications. All means was analyzed by using standard statistical procedures. The maximum number of weeds (108) plant m^{-2} were recorded when proso millet was allowed to compete with weeds for full crop growth season and it is statistically at par where weeds were allowed to compete for 2 WAE. The maximum plant height (87.6cm), and grain yield (752 kg per acre) were recorded when proso millet was kept weed free throughout the growing season and it is statistically at par where weeds were allowed to compete with proso millet for 2 WAE. While minimum plant height (45.3cm) and grain yield (548 kg per acre) were recorded where weeds were allowed to compete for full crop growth season and it is statistically at par where weeds were allowed to compete with proso millet for 5 WAE. Hence it is suggested that tter proso millet grain production will be obtained when weeds will be managed in first three weeks after crop emergence.

Key words: weed competition, emergence, fodder, climate change, climate resilient

ICSBLCP-2021-S09

Carbon emission, sink and balance in climate smart integrated farming system model

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ABSTRACT:

Climate change affects the food productivity of the whole world. Climate smart agriculture is to achieve sustainable higher productivity, ensure livelihood and food security, adaptation to climate change and reduce emission of green house gases. On the other hand, preservation of biodiversity, diversification of cropping, better residue recycling, mitigating climate change and enhancing the quality life of the farmers is the success for integrated farming system. Research work was conducted to study the green house gas measurement in Integrated Farming System (IFS) model comprising of enterprises *viz.*, Crop - Horticulture - Dairy - Goat - Poultry - Kitchen garden - Boundary planting - Vermicompost in an area of 1.0 ha. The CO_2-e (kg) of source and sink Crops - (CS-I Cowpea - Ragi - GM Dhaincha, CS-II Maize - Sunflower - GM Dhaincha, CS-III Prosomillet - Chillies - GM Dhaincha, CS-IV Pearlmillet - Cotton - GM Dhaincha and CS-V Fodder crops), livestock (cattle), goatary, poutry, energy (farm operations), crop residue incorporation, kitchen garden, chemical studies (pesticide-insecticide and herbicide interaction) and agroforestry) were calculated using user friendly IFS-GHG estimator developed by ICAR-

IIFSR, Modipuram in excel platform. The already available predicted value for fertilizer usage, machinery usage and chemical usage for different crops were used for calculation as per the emission factor given by IPCC. All the green house gas emission from different cropping sequences I, II, III, IV and V and other component were converted into carbon dioxide equivalent. The results showed that carbon sequestration (sink) by biomass was more than emission (source) in the existing IFS model and source sink relationship showed negative carbon balance indicate a profitable, soil health sustenance and an environmentally a safe model. Among the cropping, forage crops and tree crops can be recommended to build up carbon in integrated farming system model.

Keywords: Carbon source, sink, balance, Integrated farming system

ICSBLCP-2021-S10

Trichomoniasis, a major threat to animal reproduction and its innovative strategic diagnostic tools

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ABSTRACT:

Trichomoniasis is a venereal disease of cattle and cause significant economic losses in livestock production. It is characterized by early fetal death and infertility, resulting in extended calving intervals. In cattle and buffalo it causes serious threat that leads to vaginitis, endometritis and abortion in first trimester of pregnancy in cattle. However the pathogen is found in urethra and vagina of cattle and penis and prepuce of bulls. Traditional diagnostic methods include microscopy, staining method, Diamond trichomonad culture medium, Trichomonas fetus culture medium but less efficient results are seen. However, serological tests such as mucus agglutination test and intradermal test, an antigen-capture enzyme-linked immunosorbent assay, immunohistochemical techniques using monoclonal antibodies in formalin fixed tissues, conventional PCR and Real-time PCR (qPCR) showed greater Sensitivity and specificity for *T. foetus*. While, combination of Culture and PCR has been reported to yield highest specificity and sensitivity. Future measures to control *T. foetus* include proper artificial insemination protocols with semen from a reputable source in specific management groups or the entire herd to greatly reduce the risk of *T. foetus* transmission. Restrict the duration of the breeding season to less than 120 days to reduce the opportunity for transmission of the disease within the herd and to more easily monitor reproductive performance. Plan a pasture use program to restrict contact with neighboring cattle. Moreover, routine systemic testing of the herd provide early detection of disease and is the key component in prevention programs for *T. foetus*.

Keywords: Trichomoniasis, Diagnosis, qPCR

ICSBLCP-2021-S11

Evolution in mosquito borne diseases with intensive climate change

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ABSTRACT:

The world is experiencing rapid and severe climatic changes as a result of human-induced global warming and fluctuating weather patterns. In accordance with these varying environmental conditions many issues relating to parasites adaptability and survival are boosting. However, mosquitoes have developed thermal tolerance and adaptation to global warming which facilitate rapid evolution and adaptations. Mosquito-borne diseases are a major public health concern, causing an estimated 500 million cases and high mortality rates globally each year. A predicted list of more than half billion people is susceptible to mosquito borne diseases such as yellow fever, Zika, dengue and chikungunya in the next 30 years. An increase in temperature, rainfall, and humidity may cause a proliferation of the malaria-carrying mosquitoes at higher altitudes, resulting in an increase in malaria transmission. The abundance of mosquitoes varies massively with rainfall. The more rain there is the more perfect breeding ground for mosquito larvae. As a result of these changes, warmth-seeking mosquitoes will invade, making themselves at home in previously inhospitable patches of the globe. Future measures to control mosquitoes include environmental management by eliminating unnecessary containers in which Aedes aegypti can lay their eggs. This strategy is called source reduction. Furthermore, advanced techniques are performed experimentally by sterilizationof males that reduce mosquito prolificacy rate.

Keywords: Mosquito-borne diseases, Climate change, Public health, Male Sterility

ICSBLCP-2021-S12

Agronomic Biofortification of calcium contents in *Chloris gayana* Kunth through nutria-priming

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ABSTRACT:

Calcium is an essential element required for both plants and animals. Ca is regarded as an important mineral nutrient in the livestock feed. Its deficiency leads to several health problems to dairy cattle including hypocalcaemia or milk fever. Consumption of bio-fortified fodders can be helpful to overcome deficiencies of micronutrients like Ca. A quick solution to animal nutrition is the application of essential elements through soil, leaf or seed during crop cultivation period to improve the nutritional value of produce. Agronomic bio-fortification of micronutrients can be done through foliar spray, soil application and seed treatments. Among these, seed treatment is most convenient method to elevate nutrient levels in crops. This lab experiment was conducted to improve the calcium content in Rhodes grass (c*hloris gayana* Kunth) seed and seedling through calcium priming. Also, the effects of calcium priming on germination indices and nutrient composition of seed and seedling were evaluated. In this experiment, seeds of rhodes grass were nutri-primed with calcium sulfate ($CaSO_4$) at 0, (T_1) 0.25 (T_2), 0.5 (T_3), 0.75 (T_4) and 1.0 % (T_5) solutions for 12 hours. Germination indices, seedling growth attributes were evaluated up to 3 weeks. Nutrient composition of seed and seedling was also recorded. The recorded parameters were, Germination (%), Seedling emergence (%), Mean germination time (days), Germination index, Seedling vigor index, Radical and Shoot length (mm), Root and Shoot fresh weight (mg), Root and Shoot dry weight (mg), Seed and Shoot Ca, S, K, Na contents (mg kg^{-1}) after seed treatment, Ca/Na ratio, Na/K ratio in seed and seedling. The experiment was conducted under CRD and was replicated four times. $CaSO_4$ at 0.25 % solution (T_2) showed

improvement in germination indices and seedling growth parameters but the results were statistically non-significant. Maximum germination percentage (90%), germination index (5.8), seedling emergence percentage (86.2%), seedling vigour index (5109.6), radicle length (14.9 mm), shoot length (41.7 mm) root fresh weight (10.9 mg), shoot fresh weight (40.0 mg), root dry weight (3.35 mg) and shoot dry weight (5.52 mg) was recorded in T_2 while lowest mean germination time (2.78 days) was noted. Statistically, there was no significant difference among the treatments except for GI, SVI, radicle length and shoot length. Highest Ca and S seed contents (18.3 mg kg^{-1} and 9.1 mg kg^{-1} respectively) were recorded in T_5 while lowest contents (17.0 mg kg^{-1} and 5.9 mg kg^{-1} respectively) were observed in control treatments. Bothe K and Na seed contents were at highest levels in control treatments (12.7 mg kg^{-1} and 6.0 mg kg^{-1} respectively) as compared to all other treatments. The results pertaining to the shoot contents of Ca, S, K, and Na were non-significant. The principal component analysis (PCA) showed a positive cumulative effect in response to T_2 and T_3 but the effect was statistically at par with T_1 (control), while T_4 and T_5 showed negative cumulative effect on the parameters. T_2 also showed maximum score (5.30) on PC1 followed by T_1 (1.85) and T_3 (0.51). T_4 and T_5 showed negative scores (-2.20 and -5.46 respectively) on PC1. The cumulative response of seed, seedling attributes and nutrient composition towards calcium sulfate doses for seed priming by PCA showed that the response was non-significant in all the treatments including control.

Keywords: Priming . Rhodes grass . Calcium . PCA

ICSBLCP-2021-S13

Genome Wide analysis of *Glutathione Peroxidase (GPX)* gene family in Chickpea *(Cicer arietinum* L.*)* under salinity stress

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ABSTRACT:

Chickpea (Cicer arietinum L.) is an annual legume crop that belongs to the *Fabaceae* family. It is grown for its edible seed, which contains 20.6% proteins, 2.2% fats and 61.2% carbohydrates. Chickpea is a salt susceptible crop but the availability of huge genetic diversity stored in seed banks may help to produce highly salt tolerant chickpea plants. Salinity reduce the crop yield, identification of salt tolerant genes may play an important role in developing salt tolerant genotypes. Glutathione peroxidase (GPX) gene family plays a vital role in regulating plant response to abiotic stress, such as salinity and protects cells from serious oxidative damages. In this study, the *GPX* gene family is identified and characterized in Cicer arietinum by using bioinformatics. For this purpose, a systematic genome-wide analysis is performed to identify the non-redundant GPX genes in the genome of chickpea. This research aims to explore the function of *GPX* genes in chickpeas. Genomic and CDS sequences were used to reveal structural features. The evolutionary analysis was performed by constructing a phylogenetic tree. Synonymous and non-synonymous (Ka/Ks) ratios were also calculated for *CaGPX*. Gene expression analysis was performed by using the NCBI GEO dataset and a heat map generated to identify the Salt tolerant genes of *GPX* in chickpea. According to our results one out of five members *CaGPX3 (Ca_15444)* of *GPX* gene family was regulated under stress condition, and supported the chickpea plant under salt stress.

ICSBLCP-2021-S14

Recent Advances and Potential Role of Wireless and IoT-Based Health Monitoring in Livestock

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ABSTRACT:

The Pakistani livestock sector contributes about 60% of the value of agriculture and nearly 11% to the agricultural gross domestic product (AGDP). Production of livestock sector has been decreased due to poor diagnosis and ineffective manual manage mental practices. Traditional clinical techniques to monitor the health of livestock are insufficient. Especially in rural areas, owners and farmers have inadequate facilities to diagnose the disease and treatment. The proposed solution is based on Wireless Network Sensor to remotely monitor the early Pregnancy in dairy cattle and early diagnosis of disease for better treatment using a biosensor. These sensors help to monitor the body temperature of a female cow, that the optimal time to get pregnant can be detected. Breath sensor use for pre-caution about bacterium attack and stomach problems. We use thermal IR cameras for health and physical anatomy analysis (fever, body injury, infection, and habitation). Heart rate and real-time location will also have captured through sensors. Mobile and web applications can be used to monitor the health of animals remotely. Progressive Livestock Farmer can be benefited by using these types of advanced technologies to prevent infectious diseases in livestock.

Key Words: Livestock: Diseases: Sensors: IoT

ICSBLCP-2021-S15

Soil amended with chitosan evades drought-induced effects on forage yield of maize (*Zea mays* L.)

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ABSTRACT:

Climate change driven drought stress effects have extremely worsened the forage potential of maize plants. The current study examined the effects of exogenous chitosan as soil application viz. 25, 50, 75, 100 and 125 mg kg^{-1} on seedling growth, water relations and chlorophyll contents of maize (Sgd-2002) under drought stress (60% FC) and well-watered (100% FC) conditions. The experiment comprised of twelve treatments, arranged randomly under CRD factorial arrangement and replicated thrice. The drought stress conditions remarkably reduced the forage production, chlorophyll pigments, and water status of maize plants. Soil incorporated with chitosan considerably increased the forage yield of maize exposed to drought stress. A significant decrease in shoot and root lengths were recorded under drought stress; whereas, chitosan soil application at 25 and 50 mg kg^{-1} enhanced their lengths to a significant level. The deleterious effects of drought stress in terms of reduced shoot and

root dry weights were more pronounced in drought prone maize plants. Supplemental chitosan as soil application (25 and 50 mg kg^{-1}) considerably increased the shoot fresh and dry weights, respectively under drought stress conditions. A remarkable decline in green fodder yield of maize was observed under drought stress owing to decrease in chlorophyll contents and water status. The maize plants grown in the soil amended with 25 mg kg^{-1} chitosan showed highest increase in chlorophyll contents and green fodder yield. A significant increase in relative turgidity and water potential was also recorded with chitosan soil application under drought stress. Conclusively, soil amended with chitosan (25 mg kg^{-1}) is considered essential to improve maize forage production under water limited conditions.

Key words: Forage production, water scarcity, chitosan, maize, chlorophyll contents

ICSBLCP-2021-S16

Wastewater treatment through surface wetland

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ABSTRACT:

Different sectors of economy like industry, agriculture, power generation, household and the environment are competing to meet their water requirement. Water scarcity challenge is becoming so serious that two third of world population may face drastic water shortage in 2025, while in 2030, Water scarcity will affect half of the world's population According to the reports by World Water Assessment Program and 2030. The Water Resources Groups all sectors of production will face the rise in water requirement, and by 2030, more than one third of the world population will face water stress. Despite of big need of alternative water supplies in Pakistan, a very small volume (1%) of wastewater discharged by industry is treated before it is disposed into drains, rivers, and other bodies. Being 7th largest city of Pakistan, Multan is producing wastewater (66 × 106 m3) annually and its receiving water bodies include river Chenab, irrigation canal, and agricultural land, causing significant health and economic hazards. It is Pakistan's leading, agricultural center and political, with a population of 1.9 million people and a land area of 304 km2. On the east bank of the Chenab River, it is located at 710 meters above sea level. Water pollution is caused by natural and manmade elements that not only degrade water quality but also add to a country's economic hardship, health problems, and social dis-prosperity. Pakistan's current estimated population of 141 million people is predicted to expand to almost 221 million people by 2025. Population growth may directly affect the water resources in order to full fill the water requirements for food production for people like farming of crops, industrial and urban development, and other agricultural practices. There is a continuous reduction in per capita availability of water which was 5000 m3/year in 1951, and decreased to about 1100 m^3/year, and due to depleting resources, the country is at the risk of serious water deficit. In the past wetland area was considered as natural depression that can accumulate water through gravity flow. Further natural vegetation growing over wetland associated with micro-organisms was treating wastewater. During the last 50- years, researchers have worked on different aspects of wetland, its construction, operation, maintenance, and efficiency. Noticeable work amongst them was studied earlier and their conclusion on CWL was recorded as studied to develop own CWL system along with its practical implementation with the help of three case studies. Generally, these systems exhibit best removal efficacy for organic compounds like COD, BOD and suspended materials while type of wetland affects nitrogen removal. Treatment of wastewater through CW can reduce the burden of economic effects on households resulting from diseases caused by wastewater exposure. Study site is located in C-block of MNS-University of Agriculture, Multan. Canal water source is Wali

Muhammad Distributary, which contains all the industrial and domestic wastewater. All industries and domestic wastewater from WASA are directly being discharged into the canal without any treatments polluting the local environment comprising soil, surface, and sub surface water. Data was statistically analyzed using R software and statistical significance was calculated by analysis of T-test at $P<0.05$.Study site is located in C-block of MNS-University of Agriculture, Multan. Canal water source is Wali Muhammad Distributary, which contains all the industrial and domestic wastewater. All industries and domestic wastewater from WASA are directly being discharged into the canal without any treatments polluting the local environment comprising soil, surface, and sub surface water. Data was statistically analyzed using R software and statistical significance was calculated by analysis of T-test at $P<0.05$. The total reduction in pH, EC, Carbonate, Bicarbonate, TDS, TS, TSS, BOD COD, K, Na, Ca, and Mg was 16%, 93.30%, 82%, 66%, 75%, 84.43% 75%, 84.23%, 39%, 53%, 75%, 68% and 34%, respectively.

Keywords: Wetland, Wastewater, Bioremediation, Phytoremediation, Heavy metals, Sewage, Wastewater treatment.

ICSBLCP-2021-S17

Molecular Detection of Antibiotic Resistant Bacteria Isolated From Goldfish (Carassius auratus)

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ABSTRACT:

Goldfish (Carassius auratus) is common ornamental fish. During transportation, C. auratus are highly vulnerable to bacterial infections. To avoid infections, fish are treated with antibiotics which can develop antibiotic resistance in the normal bacterial flora. Therefore, the current study aimed to isolate and identified the drug resistant bacteria from C. auratus. A total 20 samples were collected from local ornamental fish market and isolate the bacteria from skin, gills and intestine through serial dilution method. Five different bacterial species Bacillus spp, Salmonella spp, Staphylococcus spp, E. coli spp and Pseudomonas spp were isolated and identified on the basis of biochemical test and sequencing of 16SRNA gene using universal bacterial primer. Antibiotic sensitivity of the identified bacteria was checked against the selected antibiotics. All the isolates were resistant against Kanamycin, Ciprofloxacin, Cefixime, Ampicillin, Azithromycin and Erythromycin. The use of novel and improved drugs are recommended to prevent the drug resistance in bacterial flora of C. auratus in order to control bacterial infections during transportation. Therefore, the present study will be helpful in efforts of formulating the antibiotic treatment policies to control bacterial diseases associated with fish.

Key words: C. auratus, Drug resistant Bacteria, Isolates, Antibiotics

ICSBLCP-2021-S18

Molecular characterization of gut microbiome of fasciolosis infected cattle with comparison to healthy cattle

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ABSTRACT:

Parasitic infestation fasciolosis affect the health of dairy animal as well as decrease the milk production. Acute infection can cause abdominal pain, hepatomegaly, intermittent fever, urticaria, and weight loss due to liver damage. It has been hypothesized that there is gut microbial dysbiosis in fasciolosis. Considering the significant impact of the intestinal microbiome on animal health it is considered as one of the main health and milk production concerns of the animal around the globe. Therefore the current study was intended to explore the relative abundance of intestinal microbiota in fasciolosis patients. For a comparative analysis, a total of forty samples were collected (n = 20) from fasciolosis patients and (n = 20) form healthy ones, respectively. The faciolosis infection is diagnosed by examining stool (fecal) specimens under a microscope by sedimentation technique Fecal bacterial DNA was extracted and amplified V3+V4 region of 16S rRNA gene by using universal primers. Illumina based 2500 High through-put sequencing was performed for the characterization of gut microbiota. Compared to healthy animal, a significant difference in bacterial diversity suggested gut microbial dysbiosis in fasciolosis effect animal. At the phylum level, a high relative abundance of *Firmicutes* while a low abundance of *Bacteroidetes* was observed in fasciolosis effected animal. The bacterial families, including *ruminococcaceae* and *enterobacteriaceae*, were statistically higher while *lactobacillaceae* and *veillonellaceae* had a lower abundance. Regarding the genera, *bifidobacterium* and *Shigella* were significantly higher while *Prevotella_9* and *Dialister in* were sufficiently low. Moreover, the species analysis showed a significantly high abundance of *prevotella copri* and *Escherichia coli* in fasciolosis group. The results of current study are aligned with proposed hypothesis of gut bacterial dysbiosis in fasciolois. The findings of the current study provided a basic foundation to understand gut microbiota in treatment of fasciolosis , disease pathway, mechanism, and probiotic development.

Key words: Fasciolosis, gut microbiota, Highthrough-put, dysbiosis

ICSBLCP-2021-S19

Immuno-stimulation through carbon dots prepared from precursor BSA against viral disease in dairy cow

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ABSTRACT:

Many factors contributed towards the financial loss to the modern cattle industry i.e. climate change, trade globalization, spread of existing pathogens, udder health, poor fertility, low milk quality, bacterial and viral diseases. However, viral infection in dairy cow effect the health of dairy animal which ultimately led towards fetal malfunctions and abortion. It has been hypothesized that the bovine viral diarrhea virus (BVDV) cause immunosuppression. Considering the significant impact of BVDV on animal health it is considered as one of the main health and production concerns of the animal around the globe. Therefore the current study was intended to explore the relative effect of positively charged carbon dots synthesized from precursor bovine serum album. For a comparative analysis, a total number of seven (n = 7) samples were collected from infected animals. Seven groups of model organism mice was taken each having six mice. All groups were infected with the sample taken from infected animals samples. A formulation of 400 L of positively charged carbon dots was injected into all groups except one. A significant difference was noticed in mice groups injected with positively charged carbon dots compared to the one untreated infected mice groups against BVDV infection. The results of the current study showed that the positively charged carbon dots cause up regulation or immuno-stimulation which helped mice to survive against lethal BVDV compared to untreated infected mice group. The finding of this study provided basic foundation of understanding how the positively charged carbon dots led towards the up-regulation or immuno-stimulation.

Key words: Carbon dots, Bovine Viral Diarrhea Virus, Immuno-stimulation, dairy cow

ICSBLCP-2021-S20

COVID-19 Effects on Livestock Production: A One Welfare Issue

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ABSTRACT:

The COVID-19 pandemic highlights that we exist in a global community. From a single city, it spread to 188 countries across the world and infected 30 million people by September 18, 2020. Decades of modeling pandemics predicted potential consequences, but COVID-19's impact on the food supply chain, and specifically livestock production was unexpected. Clusters of cases among workers in meat processing plants evolved quickly to affect human, animal, and environmental welfare in several countries Because of their close proximity to one another, COVID-19 spread rapidly between workers and the lack of sick leave and health insurance likely resulted in workers continuing to work when infectious. In the United States (U.S.) many processing plants shut down when they identified major outbreaks, putting pressure especially on pig and poultry industries. At one point, there was a 45% reduction in pig processing capacity meaning about 250,000 pigs per day were not slaughtered. This resulted in longer transport distances to plants in operation with extra capacity, but also to crowding of animals on farm. Producers were encouraged to slow growth rates, but some had to cull animals on farm in ways that likely included suffering and caused considerable upset to owners and workers. Carcass disposal was also associated with potential biosecurity risks and detrimental effects on the environment. Hence, this is a One Welfare issue, affecting human, animal, and environmental welfare and highlighting the fragility of intensive, high-throughput livestock

production systems. Such a One Welfare approach will ensure that food production systems are resilient, flexible, and fair in the face of future challenges.

Keywords: livestock, pandemic, COVID-19

ICSBLCP-2021-S21

Evolution of domestic livestock through animal husbandry

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ABSTRACT:

The ancient Romans developed sophisticated agricultural systems that integrated livestock and crop production, with particular attention to use of animal manures and composts. They developed the art of animal husbandry and selectively bred well-determined breeds of livestock. Their capacity for food production enabled the building of the Roman Empire. Cattle were a significant source of wealth and prestige to the early Romans and to early Germanic peoples. Life in the Middle Ages revolved around farming, as the majority of people lived off the land. When hunting became a privilege reserved for the nobility in medieval Europe, livestock became even more important as food sources. But compared to Roman practices, animal husbandry suffered decline during the fifth through the thirteenth centuries. Animals became smaller and less productive with the loss of Roman breeds and selective breeding techniques. Still, the lasting effects of Roman breeding kept medieval stock in the areas of the former Roman Empire superior to those in neighboring regions. The U.S. Department of Agriculture expects global trade in livestock products will continue to expand, based on ample global supplies and steady growth in demand. Livestock production is expanding globally to meet demand for meat and dairy products in the growing economies of Asia and Latin America. Livestock development will continue to be a part of economic progress in the developing world.

Keywords: livestock, evolution, goals,

ICSBLCP-2021-S22

Strip intercropping system of chickpea, lentil and arugula crop as a successful intervention in spate irrigated area of Punjab, Pakistan

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ABSTRACT:

Effect of legumes and oilseed crop strips on inter-cropping properties and yield related parameters during the Rabi season 2017-18 in Mithawan Hill Torrent (spate) irrigated fields of Dera Ghazi Khan Punjab- Pakistan. The experiment was laid out in Randomized Complete Block Design (RCBD) having three replications. The sole strips of chickpea, arugula (locally called taramira), lentil were evaluated. Chickpea-arugula alternate strip, chickpea-lentil alternate strip, arugula-lentil alternate strip and chickpea-arugula- lentil alternate strip in combination were also investigated. Data was analyzed through ANOVA technique and differences among the treatments were tested using HSD Tukey's test. The obtained results shows that the Land Equivalent Ratio (LER) of sole chickpea was 0.97 and LER of strip intercropping was 1.79 which shows distinct advantage of strip

intercropping. Relative Crowding Coefficient (RCC) value for chickpea, arugula and lentil were 25, 9.44 and 0.1, respectively when compared with the sole strip cropping. It shows that intercropping of chickpea and arugula were effective. Chickpea and arugula strip inter crop resulted in better LER and RCC with reasonable yield of both crops under the spate irrigated conditions of Mithawan hill torrent command area Dera Ghazi Khan Punjab (Pakistan). Area time equivalent ratio could not bring significant differences among the strip inter cropping treatments. Lentil could not succeed in strip inter cropping in spate irrigated situations of Mithawan hill torrent. The obtained results recorded maximum 1000 seed weight of chickpea (144.80 g) and arugula (4.72 g); seed yield of chickpea (800.16 kg ha^{-1}), arugula (433.14 kg ha^{-1}), respectively when both crops were grown in the form of separate sole strip. Hence for achieving maximum yield, the farmers of spate irrigated area of Mithawan hill torrent area should sow chickpea or arugula as a sole strip. Furthermore alternate strips of chickpea and arugula proved to be effective resource conservation strategy.

Keywords: Arugula, Chickpea, Inter cropping, Lentil, Mithawan hill torrent, Spate irrigated area, Strip cropping, Yield

ICSBLCP-2021-S23

Fitto Monitoring System Framework for High Value Plantation

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ABSTRACT:

Internet of Things (IoT) is a widespread technology that provides reliable solutions in several domains: smart health care system, industries, robotics, agriculture, smart homes, smart grid system, and many more. In this paper, the proposed system is the Fitto Monitoring System (FMS) that will help to transform traditional farming into the new technological era in terms of sensor-based farming. A network of sensors is intended to follow Artificial Intelligence (AI) based algorithm to manage and monitor different farming parameters. These parameters are soil moisturization, air quality, air temperature, air humidity, the temperature of plants, irrigation, the moisture of plants, and nutrient's control mechanism. An AI-based dehydration prevention algorithm is applied to the crops that prevent them from decreasing in photosynthesis. An efficient algorithm is applied for the irrigation control system. The cloud services are used to record current and previous data of crops. The growth and production are measured through Machine Learning (ML) practices. For the communication of sensors, the Message Queue Telemetry Transport (MQTT) IoT protocol is applied. The production level of crops is predicted through ML procedures. The proposed system is automated and follows an AI-based algorithm that helps control all these factors that directly affect the growth and production of plants.

Key Words: Agriculture, Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), Sensor Based Network, Cloud Computing.

ICSBLCP-2021-S24

Developing heat tolerant cotton germplasm in changing climate paradigm under field conditions

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ABSTRACT:

Cotton (Gossypium spp.) is produced in about 76 countries, covering more than 32 million ha across a wide range of environmental conditions. World cotton commerce is about US$20 billion annually. As the world's leading textile fiber plant, cotton forms a vital part of global agriculture and is a mainstay of the economy of many developed and developing countries. Cotton is the main source of employment for millions engaged in production, processing, ginning, textile, and trade-related activities, and contributes to a significant portion of the gross national product of many countries, including India, China, Pakistan, Uzbekistan, Australia, and Greece. About 65% of world cotton production is between 30 N and 37 N latitudes, which includes United States, parts of the former Soviet Union, and China. Approximately 25% of the total production comes from the northern tropics up to 30 N. Today, upland cotton is being grown globally across both tropical and temperate latitudes. Cotton is generally regarded as a crop of the hot, semi-arid regions of the world, but is also an important crop in arid-irrigated regions and extends to semi-humid tropics. High temperature had a strong negative correlation with lint yields, with yields decreasing about 110 kg ha1 for each 1^{o}C increase in maximum day temperature. High temperature rarely occurs alone and is often accompanied by high solar irradiance, drought, and wind, all of which exacerbate plant injury from high temperature. In Pakistan, cotton is cultivated in Punjab and Sindh where day temperature exceeds to more than 45^{o}C at flowering stage and results in square shedding during these spells of heat induction ultimately leading to significant loss of lint yield. During this experiment more than 50 lines of cotton from different cotton research stations of Pakistan was planted in field in two sowing dates and data for morphological and quality traits was estimated. During the flowering time the lines showing high levels of tolerance were identified and pictures were captured. The most heat tolerance lines were IPBB 3, 33, 43, and 47 where the lines IPBB, 9, 17, 24 and 38 were found to be most susceptible. These lines will be used as a baseline to develop the heat tolerant material in future.

Keywords: Cotton, Heat stress, Germplasm, Morphology, Selection, Breeding.

ICSBLCP-2021-S25

Characterization of drought related gene family in soybean

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ABSTRACT:

Function of Histone protein is to provide support to the structure of chromosomes. It helps in binding a long thread of DNA into a more condensed shape to fit into the nucleus. From histone variants histone H3 (*HH3*) are reported to play numerous important roles in plant growth and development. However, the biological function of histones is not yet reported in *Glycine max*. In this study we identified 17 *HH3* members in *G. max* by doing local BLASTp using *HH3* members from *Arabidopsis* as a query. Phylogenetic analysis classified *HH3* genes in seven clades. Sequence logo analysis of amino acid residues among *Arabidopsis*, rice and *G. max* showed higher conservation in amino acids. Further, conserveness of *G. max HH3* genes was also confirmed by Gene Structure Display. By collinearity analysis we identified 10 paralogous gene pairs among *HH3* genes in *G. max* genome. Paralogous and the *Ka/Ks* ratios indicated that *G. max HH3* genes experienced strong purifying selection pressure with restricted functional divergence resulting from segmental and whole genome duplication. KASP marker was developed for *GmHH3-3* gene. Genotyping was performed on 46 *G. max* genotypes that differentiated soybean genotypes on the basis of presence of either *GmHH3-3*-C or *GmHH3-3*-T allele at 165nt in CDS region. *GmHH3* gene family is evolutionary conserved and experienced strong purifying selection pressure. Genotyping results showed that *GmHH3-3* has potential to be used in molecular breeding in soybean against drought. The results showed that *G. max* accessions containing *GmHH3-3*-T allele at respective locus showed higher thousand grain weight as compared to those that accessions contain *GmHH3-3*-C allele under normal and drought conditions. Taken together, this work provides important information to decipher molecular functions of *HH3* genes in *G. max*.

Keywords: Drought, gene family, molecular breeding.

ICSBLCP-2021-S26

Screening cotton germplasm against root zone salinity tolerance under filed conditions

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ABSTRACT:

Deprived cotton yields are an alarming threat worldwide particularly in Pakistan due to increasing soil salinity and abrupt climate change. Cotton growers fail to get yielding potential of cotton genotypes due these issues during last decade. Moreover, increasing use of low quality ground water has made this problem more critical and threatening. The problem of salinity is usually controlled either by sowing salt tolerant/resistant varieties or preferring good quality irrigation water. It is estimated that out of 1.89 million hectares saline patches, 0.45 million hectares present in Punjab, 0.94 million hectares in Sindh and 0.5 million hectares in NWFP. Out of 19.3 mha area available for farming, irrigated agriculture is practiced on about 16 mha. Salinity significantly affects growth-related traits by decreasing, seed germination, shoot length, leaf numbers, leaf area, stunted growth and finally decreasing economic yield of crop plants. Although cotton is classified as relatively salt tolerant crop, but higher salt concentration affects the vegetative growth negatively. Salt stress reduces shoot/root ratio and shoot growth is more sensitive to salinity than roots. The 70 elite lines/accessions/varieties from 10 diverse research institutions/stations of Punjab and Sindh were tested were planted in field at MNS University of Agriculture Jalalpur Peerwala Farm for root zone salinity ranging 5 to 20 d S m^{-1} EC. The data for morphological and quality traits was estimated. At maturity, the lines showing high levels of salinity tolerance were identified based on data and pictures

were captured. The most salinity tolerance lines were IPBB 7, 21, 25, 54 and 71 where the lines IPBB, 3, 33, 58 and 74 were found to be most susceptible. These lines will be used as a baseline to develop the saline tolerant material in future.

Keywords: Cotton, Saline soils, Stress, Tolerant, Susceptible, Selection, Breeding

ICSBLCP-2021-S27

Improving the quality of cotton and lint supply chain through selection of cotton varieties

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ABSTRACT:

Supply chain of any cop plant is an important element to manage properly for better post-harvest yield and quality. Cotton supply chain consists of different stages starting right from provision of quality seeds to the cotton growers, management, picking, ginning and weaving in textiles. The picking element is very critical as being baseline for the provision of quality lint to the ginners and then to textiles. The better boll opening termed as fluffy opening and locule angle along with all other morphological parameters are very important to highlight. The ease in picking will provide the smooth effects to the pickers and ultimately will be source of good quality picking. Cotton quality is also important towards value chain improvement. Ginning is an important transfer point in the cotton value chain. After picking of seed cotton by the farmers, it is transported directly or indirectly to the ginning factories for further processing. Ginning sector acts as bridge between the farmer field and textile industry. picking stage of cotton plays a significant role in determining the quality of raw material for textile and clothing industry. Lint accounts for about 30-35 percent of the cotton. Challenge in quality picking is the boll opening and locule angle with more lint weight. The boll with small size create problem in picking and causes injury to the labour and also carried trashes with it. This type of fiber causes problem in ginning. The study was planned and executed using 20 recent approved cultivars of cotton to evaluate the picking easiness and quality in cotton at MNS University of Agriculture, Multan. Three (03) best lines were identified with fluffy opening, easy in collecting, lint and better angle of locule. The recommendation and breeding for the fluffy opening will ensure the quality of cotton improve the supply of quality lint cotton.

Key words: Cotton, Value chain, Opening, Locule, Lint,

ICSBLCP-2021-S28

Effects of probiotics on the growth performance, proximate analysis, hematological parameters and *digestive enzymes activity* of GIFT Tilapia (Oreochromis mossambicus*)*

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ABSTRACT:

The efficiency of *Lactobacillus* (L) *acidophilus* and *Saccharomyces* (S) *cerevisiae* wereevaluated as potential probiotics for improving the growth performance, body composition,

hematological parameters, and digestive enzyme activities of GIFT Tilapia (*Oreochromis mossambicus*). The study was carried out for 30 days to investigate the influence of different levels (0.15%, 0.30% and 0.60%) of *L.acidophilus* (LA1, LA2 and LA3) and *S. cerevisiae* (SC1, SC2 and SC3) separately on selected parameters. Better growth performance was observed in SC3 groups fed with *S. cerevisiae* as compared to the treatments fed with *L. acidophilus* and control (C) group. Highly significant, maximum final body weight (FBW, g), Weight gain (WG, g), Specific growth rate (SGR, %/day), feed intake (FI, g) and Protein productive value (PPV %) were observed in SC3 (22.87±0.24, 14.42±0.69, 1.44±0.05, 68.61±1.00, 11.23±0.62) fed with *S. cerevisiae* as compared to the treatments fed with *L. acidophilus* and control (C) group. Feed conversion ratio (FCR %) was observed minimum in SC3 (4.76±0.15). Protein efficiency ratio (PER %) was significantly increased and maximum in SC3 (0.70±0.03). The outcomes of the proximate analysis indicated that moisture and ash content was recorded highest in SC3 (79.73±0.71 %, 16.37±0.23 %). Significant differences in crude protein were observed among the control group and various treatments. Maximum crude protein was observed in SC3 (55.23±0.88 %). The crude lipid was observed minimum in SC3 (20.93±0.16 %). Significant differences in crude protein, crude lipids and ash contents were observed among the control group and various treatments after 30 days. The highly significant maximum value of crude fiber was observed in SC2 (2.94±0.09 %). The highly significant carbohydrate was found in SC3 (4.20±0.08 %).Hematological parameters indicated that RBC ($x10^6$ μl^{-1}) count was significantly higher in SC3 (4.63±0.13). The maximum Hb (g/dl) and Hct ($x10^3 \mu l^{-1}$) were recorded in SC3 (6.31±0.12, 7.01±0.20). Minimum MCV (fl) was observed in SC3 (5.53±0.08). MCH (pg) value was recorded maximum in SC3 (13.65±0.29). Maximum MCHC (g/dl) value was recorded in SC3 (24.69±0.51). Digestive enzymes assay indicated that protein contents were maximum in SC1 (13.61±0.11 mg ml^{-1}). The maximum total and specific amylase activities were observed in SC3 (40.45±0.36 Uml^{-1} and 4.59±0.14 Umg $protein^{-1}$), which were significantly higher in treatments fed with dietary probiotics as compared to control (C). The maximum total and specific protease activities were observed in SC3 (6.07±0.09 Uml^{-1} and 0.90±0.02 Umg $protein^{-1}$). The maximum total and specific lipase activities were also observed in SC3 (4.24±0.10 Uml^{-1} and 0.85±0.03 Umg $protein^{-1}$). The addition of0.60% *S. cerevisiae* to the diet enhances the growth performance, body composition, hematological parameters, digestive enzyme activities, stress resistance and shelf life of GIFT Tilapia (*O. mossambicus*).

Keywords: Probiotics, digestive enzymes, GIFT Tilapia, growth performance, haematology, proximate analysis

ICSBLCP-2021-S29

Effect of global warming on pathogenecity of giardia species

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ABSTRACT:

Giardia is a zoonotic protozoan parasite. Complications associated with giardiasis include: diarrhea, abdominal discomfort and bloating, that might lead to progressive anomalies Transmission cycle starts when its cysts are found in the environment and are transformed to trophozoites on consumption by host. After ingestion by the final host through contaminated water or food it can cause significant health losses. It requires water, temperature, and humidity to live in the environment

and reach the infective stage. In water and soil, it thrives best in colder environments with higher humidity and less sunshine. The temperature of water reservoirs and land is shifting in an unusual way as a result of global warming. The growth and transmission of living organisms affected by changes in environmental variables at every stage of their life cycle assists in understanding different factors in regions of climatic variations. In future, changes in lifecycle, transmission and pathogenicity of giardia species can be helpful for the investigation of evolving pathogenicity of this organism in comparison with global warming.

Keywords: Giardiasis, Global warming, Zoonosis

ICSBLCP-2021-S30

Global warming: threat to livestock production system

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ABSTRACT:

Livestock act as backbone for the economic growth of a country. Impact of climate change on livestock is categorized as: availability of feed in the form of grains; health improvement; reproduction; pasteur crop production, quality and disease spread. Live stock production system based on climate change agroclimatics; arid and semiarid zones; humid and semi humid system; grassland farming system and irrigated farming system. Intensive and extensive livestock is affected by climate change which emphases on adaptation. Heat stress has negative effect on animal health and welfare which leads to less milk and meat production. This environmental condition can cause oxidative stress, immune suppression, metabolic disruption and ultimately death. So, adaption strategies need to develop which include production system adjustment and genetic improvement for thermotolerance. Physically modifying environment is currently the ultimate strategy to cope up with heat stress. Warming of climate is unequivocal and anthropogenic. However, warming continues due to time scale associated with climate feedback. In future, restoration of livestock is needed to cope with loss of production efficiency, decreased quality of animal product and increased land desertification in next decades.

Keywords: Global warming, Livestock production, Immune suppression

ICSBLCP-2021-S31

Socio-ecological Factors Affecting the Camel Production

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ABSTRACT:

The camel is a highly adaptable animal that provides milk, meat, wool, hair, organic manure as well as used for tourism, cultural events, ploughing and irrigation. No other domestic animal can provide as many services to humans. Despite the aforementioned benefits, the camel has been one of Pakistan's most misunderstood breed. There are a lot of socio-ecological factors affecting camel production in the country. The early calf death rate, outdated management & treatment methods and unstable market are the major hurdles that are badly affecting overall camel production. The climatic factors are affecting on camel production. Even, camel can produce milk in scarcity of drinking water but, its feed intake and milk yield are affected. Even though, camel has extreme thermo-tolerance ability, but still drought during current years has reduced grazing areas, and the heat stress results into malnutrition and health issues for camel herds. Heat stress remarkably enhance the total protein, albumin, PCV, Hb, AST, ALT, T3, T4 and serum glucose concentration level in camels. In addition, climatic changes also increase the prevalence of emerging and vector-borne diseases particularly. Camel marvelous adaptive features predict it as the future animal as the world is preparing itself to face the unexpected challenges of ecological change. The camel is the animal of poor and neglected populace; hence it is seldom considered in research and development policies of the country. Camel is considered as principal sustainable food security animal if its potential is explored to its highest possible extent that will definitely give courage to the breeders. But this purpose can surely be achieved if government give education, veterinary and marketing facilities, fulfil the urgent needs, address the problems of farmers and give interest free loans to camel farmers. Therefore, productive research is need of the day to develop this neglected animal in the changing climate framework.

Keywords: Multipurpose animal, Social factors, Climatic factors, Heat stress, Blood parameters

ICSBLCP-2021-S32

Use of machine learning for accurate parasitology diagnostics

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ABSTRACT:

Parasites and their eggs are detected by using different techniques such as simple microscopy and McMaster technique. They are further confirmed by using techniques like PCR and ELISA. However, the commonly used method is the microscopy. In detection techniques we get the image of egg or parasite on the screen attached with microscope. This image is our specimen to identify and confirm. Machine Learning is the future of diagnostics as it can predict better than humans. Examples of this are already accepted as use of machine learning models to predict breast cancer based on different parameters of breasts, identifying different chest conditions from chest X-ray film and also prediction of new drugs. This research is proposing such application of machine learning for identification of the common animal parasite eggs in Fecal Flotation Method. We will build our model by feeding it pictures of the microscopic view of fecal floatation slide of different parasites while the parasite in the slide is also confirmed using PCR analysis for minimizing human errors. Once we are able to provide our model with enough images that cover all expected possible conditions, our model will pick up most of the features of each image. Once the model is built, it can identify almost all possible and mutated eggs pattern with better accuracy than humans do. After it is

ready, it can be deployed as a website or application for students, Diagnostic Centers and University Labs to use.

Keywords: Machine Learning, Diagnostics, Bioinformatics

ICSBLCP-2021-S33

Nanomedicine: A breakthrough in treatment of myiasis

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ABSTRACT:

Nanomedicine is one of the most recent development in the field of medicine. To administer a particular medication topically or trans dermally, nanoparticles and nanofibers are being employed. This approach employs the ability of controlled release of drug for prolonged period of time. Ointments and skincare products are being made via this technology as it works efficiently with both hydrophobic and hydrophilic compounds. One of the biggest challenges during wound management is myasis. Flies lay eggs on wounds and their larvae, called maggots, cause delay in wound healing by their movement and feeding activity. There are compounds being used which are proved to be effective against treatment and prevention of maggot infestation but they need a prolonged activity for better efficacy. Nanoparticles and nanofibers can be used to deliver the molecules of such compounds inside the wound for a gradual and sustained release resulting in increased availability and efficacy of medication. Such bandages can be developed to emit fly repellent substances for days and provide wound with antimicrobial protection as well. This breakthrough can change the treatment regimens for wound management.

Keywords: Nanomedicine, wound, maggots

ICSBLCP-2021-S34

Microbial inoculation: A tool in increasing fodder/forage for livestock farming

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ABSTRACT:

With the increasing food demand, the need for increased production of livestock and agriculture is rising. Microorganism act as backbone of soil environment, in order to achieve an enhanced agricultural production. Microbial inoculants containing a plant growth promoting bacteria i.e rhizobacteria, arbuscular mycorrhizal fungi and endophytes are innovatively used. To increase plant production, implementation of environment friendly methods such as planting cover crops, rotating crops and embracing diversity, reducing tillage, adopting agroforestry practices and applying integrated pest management should be adopted. In agriculture, chemical fertilizers with alternatives have been used. These microbial inoculants are applicable to the most common feeds such as maize, wheat, barley, oats, soybean, sorghum, alfalfa and trefoil. Environmental conditions such as, stress, pollution, nutrient deficiency are considered while dealing with microbial inoculants. The

rhizobacetria promotes plant growth, especially the roots and ariel parts of plant yield production, nutrient uptake and lessens the stressful environmental condition. Thus the role of microbes as protective agents against crops diseases proves to be a powerful tool. For future use microbial inoculants in fodder, plants cultivation and as biopesticides would be advantageous.

Key words: Livestock, Feeds, Microbial inoculants, Agriculture

ICSBLCP-2021-S35

Role of plant production stimulating microbes in sustainable agriculture

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ABSTRACT:

With the increase in human population, demand on food, fuel and raw material increases, ultimately various stress factors activate. These factors include heat stress, drought stress, biotic and abiotic stress. However, environmental stress poses major constraint to plant growth, causing low crop productivity, affecting global food security. To overcome these situations, chemical based fertilizers and pesticides are being used but it leads to land and biodiversity degradation. Plant growth increases by increasing soil acidity and alkalinity. Beyond certain levels of pH, multiple stress factors such as hydrogen ion toxicity stress, nutrient imbalance stress, and plant growth stress are highly degradative. But microbes beneficially are used in plant growth to reduce the problems related to soil salinity, fertility, degradation, and habitat loss. Cyanobacteria and the mycorrhizal fungus are most beneficial soil microbes used in agriculture to increase the plant production and development. Active soil microbial entities are unique as they are directly involved in enhancing soil fertility, growth and promotion of plants with lowering biotic and abiotic stresses. Beneficial microbes not only used for plant growth-promoting attributes, but also plays major role in the decomposition of organic waste and detoxification of toxic substances such as pesticides and in alleviation of soil stressors. In future, growth-promoting rhizobacteria and trichoderma filamentous fungi can be used to suppress soil-borne plant pathogens and stimulate plant growth by different direct and indirect methods such as production of phytohormones.

Key words: Microbes, Crop productivity, stress, food security

ICSBLCP-2021-S36

Nutritional and Therapeutic Properties of Camel milk

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ABSTRACT:

Camel milk defines as “food for hungry and sick” contains higher amount of minerals and fats, rich in manganese, selenium and iron .It contains 20 times more manganese and 10 times more iron than human milk, its insulin content is higher as compare to buffalo milk. Pakistan ranked 8th in the world for camel milk producing country. Camel milk contains 3.5% fat, 3.4% protein, 4.4% lactose, 0.79% ash and 87% water. Nutritional and therapeutic properties of camel milk include anti-

diabetic, anti-inflammatory, anti-allergic, act as nutritional supplement for tuberculosis patient, Increase immunity against disease . It used as important vehicle for boosting strong immune system response against strains of corona virus, Nano-antibodies present in camel milk and serum have ability to neutralize virus outside and inside inferred cells and able to gain access into the blood stream as intact antibody molecules . Besides the health benefits of camel milk itself when camel milk combined with nutraceutical agents/herbs it will be natural therapy for disease, Nutritional benefits, availability in extreme conditions .Functional foods and herbal remedies has less side effects and prolonged health impacts. Improvement in glycemic index in the individual health when given or mixed with camel milk. Age, geographical area, physiological changes, seasonal changes, genomic status are the factors effecting the camel milk composition. Camel milk has less consumptions than other milks due to lack of knowledge lack of resources, lack of awareness about it attributes and its unique taste and flavor.

Keywords: Camel Milk, Nutritional benefits, Immunity, Functional foods, Glycemic index

ICSBLCP-2021-S37

Livestock farming system – A way forward for sustainability in small and marginal farm holdings

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ABSTRACT:

Agriculture is the main source of employment, income and food for more than 70% of the population in India. Small and marginal farmers comprising 84% of the total farmers depend mainly on crops and livestock and they contribute to about 78% of the total production. Integrated crop-livestock is advocated to be very promising in boosting food productivity, sustainability in income and pave the way to increase soil fertility. Farming system consists of several enterprises like cropping system, milch cows, buffaloes, goats, sheep, poultry, fishery, beekeeping etc. The interaction and choice of components varies with the ecosystem. Crop + aquaculture + poultry is ideal for wetland system., Instead of rice monoculture in wetland ecosystem, rice based farming system comprising of rice - fish - poultry - mushroom, rice +poultry/pigeon + fish + mushroom, rice + poultry/pigeon + goat + fishery+ azolla systems expose farmers for diversification and integration for resource management which generate additional man days, capital saving, increase productivity, profitability and it also safe guard the environment from pollution. In garden lands, crop + dairy + biogas + vermicompost + silviculture as components provides sustainable income and dung form the rich source of organic manures. The crop by products are used as feed for cattle and maintenance of milch animals generate enough cowdung for the production of biogas and compost production provide better bioresource utilization and recycling. In drylands, crop + goat + buffalo + agroforestry + farm pond is practised in dryland system. Buffaloes are maintained for solely milk purpose and farm pond for collecting the runoff water to be used in moisture stress and silt collection. This system combination provides nutrition security, enhance economic returns, residue recycling and employment generation. Based on the farmer participatory approach it was concluded that farming system approach was better than traditional system in creating three times more additional employment over arable farming which ensure food security and provide better standard of living for small and marginal farmers.

Keywords: Integrated farming system, ecosystem, sustainability

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Honeycomb gum as an immune's boosting agent in poultry for its application in COVID-19; A review

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ABSTRACT:

The immune system is a biological mechanism that protects humans and animals from pathogens. It identifies and reacts to a number of pathogens, including bacteria, fungi and viruses. The immune system is presented by a variety of public health-related bacterial strains such *Salmonella typhimerum, S. enterica serovar Enteritidis, Staphylococcus aureus, listeria monocytogenes, Klebsiella pneumoniae,* and some viral strains such as Influenza virus, Newcastle disease virus, Infectious bronchitis virus and COVID-19. These microbes not only undermine the body's immune system, which protects against bacteria, but also enable the infected host to live longer, enabling the microbes to thrive and spread to healthy subjects. The poultry sector is the most dynamic division of Pakistan's agricultural industry. These bacterial and viral strains have catastrophic economic consequences in terms of morbidities and mortalities.Honeycomb gum or propolis has been studied for decades and has always been classified as an immunomodulatory tool. Propolis is a thick bee's resin produced from developing seeds, flowers, and gum extract. Plant resins, waxes, aromatic and essential oils, pollens, and organic substances make up natural propolis. Propolis exhibited a wide range of biological and pharmacological properties, including antimicrobial, antioxidant, antidiabetic, anticancer, and immunity boosting features. However, since propolis has been used as a raw form, it must be refined by processing to eliminate waste material while preserving the flavonoid component that is mainly responsible by its function.This treatment therapy will open the new era to safeguard the serious bacterial and viral diseases, ultimately benefiting Pakistani poultry farmers and people.

Key Words: Immunity, Pakistan, Viral, Diseases, Honeycomb

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Insects as sustainable animal feed

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ABSTRACT:

Global population growth, urbanization, rising income, changes in consumption patterns, lifestyles, food preferences, rising demand for animal products, and a lack of conventional feed components all contribute to the quest for alternative protein sources for animal feed. Insect feed has minimal land and water needs and a high feed conversion efficiency into insect biomass. Insect

methods of production minimize dependency on traditional feed sources while bringing valuable ingredients back into the food chain from organic waste materials, agriculture, the food industry, and other sectors. High nutritional value, feed efficiency, and reproductive capacity are all advantages of utilizing insects for livestock feed. There is a broad variety of appropriate insects, such as black army fly larvae, house fly maggots, mealworms, silkworms, locusts, grasshoppers, and crickets. Black soldier fly larvae are thought to have the highest feed potential since their dry weight contains up to 50% crude protein (CP), up to 35% lipids, and an amino acid profile. Insect feed is a sustainable alternative to traditional feed since insects are raised on waste streams and may provide a diverse source of revenue. Insects used in the feed may help developing nations solve socio-economic and environmental problems, aligning with the United Nations' Sustainable Development Goals. Smallholder insect farmers have good possibilities to enhance production, improve their livelihood, and contribute to food security and a circular economy with modest initial capital inputs.

Keywords: Insects, Feed, Livestock

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Integrated Pest Management of Livestock

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ABSTRACT:

Livestock farming is a vital sector that provides milk, meat, eggs, fiber and leather to humans. The livestock industry is majorly affected by the arthropod pests like mites, ticks, fleas, lice muscoid flies, grubs, mosquitoes, and others. Insect pest infestation in livestock vary by season and geographical region, and pest species possess a different degree of the host. These pests cause substantial damage to animals both directly and indirectly through disease transmission. To improve the living circumstances, health, and wellbeing of animals, these pests must frequently be monitored, controlled, or avoided. The concepts of integrated pest management (IPM) apply to the operational practice of pest control for animals, whether the pests are on the animals themselves or in the environment in which the animals live. Essentially, it is the combination of monitoring, detection, and application of all effective control methods to reduce pest populations below an economically viable level. The conventional techniques of monitoring as a basis for control decisions, as well as chemical, cultural, and biological controls, are examples of management tools. IPM is the adoption of all suitable and cost-effective techniques to keep pests and their impact to a minimum while minimizing environmental disruption.

Keywords: Livestock, Insect pest, Integrated pest management.

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Comparative Efficiency of Biogas Production from Livestock and Agricultural Residues

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ABSTRACT:

The study was carried out in lab scale anaerobic digesters in order to evaluate the comparative efficiency of biogas production from cow dung with and without different mixtures (wheat straw, goat manure and poultry droppings). Wheat straw, goat manure and poultry droppings were added to the cow dung in three different proportions, i.e. 10, 20 and 30% respectively. The study was designed with ten treatment plans. In T_1 (control) only cow dung was used while in T_2, T_3 and T_4, dung-wheat straw mixtures were used in proportion of 90:10, 80:20 and 70:30 percent, respectively. In T_5, T_6 and T_7 treatments, dung-goat manure mixtures were used in the ratio of 90:10, 80:20 and 70:30 percent, respectively. While in T_8, T_9 and T_{10} treatments, dung-poultry droppings mixture were used in the ratio of 90:10, 80:20 and 70:30 percent, respectively. The amount of biogas production from anaerobic digester and rate of slurry production were measured daily. It was observed that co-digestion of cow dung with different organic substances like wheat straw and poultry droppings not only increased biogas production but also enhanced nitrogen, phosphorus and potassium (NPK) value of bio-slurry. Study indicated that dung-goat manure mixture was not a good combination for biogas production. The best combination for improvement of biogas yield was dung-wheat straw mixture. The NPK of all the treatments revealed that dung-poultry droppings mixture produced best bio-slurry.

Keywords: Comparative efficiency, Biogas production, Anaerobic digester, NPK value of slurry

ICSBLCP-2021-S42

Growth and yield response of wheat cultivars to sowing method under diversified environments

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ABSTRACT:

Environmental conditions and sowing methods are the important factors that are affecting wheat (*Triticum aestivum*) productivity. The study was carried out during two consecutive growing seasons to investigate the impact of sowing methods on morpho-yield performance of wheat cultivars under diversified ecological conditions, using Arid (Tandojam, Sindh) and Semi-arid (Quetta, Balochistan) as experimental sites. Six wheat cultivars (Sarsabz, Mehran-89, Kiran-2004, Zardana, Sariab-95 and Rasco-2005) were sown for through broadcast, furrow and drilling method. The crop response to environmental conditions indicated that grain yield at Tandojam vs Quetta was 3642 kg vs 3809 kg ha^{-1} while among various sowing methods furrow method was more effective and efficient than broadcast and drill sowing methods with optimum agronomic observations. The maximum seed index 38.38 g and grain yield 3905 kg ha^{-1} recorded under furrow sowing method. The varietal performance on the basis grain yield ha^{-1} was superior in the cultivars Mehran-89 with grain yield 4110 kg ha^{-1}. Interactive effect of cultivars Mehran-89 × Furrow sowing resulted in the highest yield performance over rest of the interactions at Tandojam with 4729 kg grain yield ha^{-1}. Therefore, furrow sowing method with site specific wheat cultivars is best crop management practice for obtaining the maximum wheat growth and yield.

Keywords: Morpho-yield, sowing methods and multi-environments

ICSBLCP-2021-S43

Evaluation of Compost Windrow Turner Machine for Optimum Crop Production

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ABSTRACT:

Anthropogenic climate change is a serious threat to Pakistan. Climate change is affecting all the sectors of Pakistan including agriculture, health, and water, which ultimately cause of harmful food and nutritional security. There is dire need to adapt strategies to save food and water for increasing crop production under changing climate. The proposed product is a composting through compost windrow turner machine, which is used to prepare land for different crops according to season and early decided as wheat or any other crop to be sown after cotton. The farmers are the end users of the proposed machine due to low cost of production, Integrated of pest control management and improving soil fertility or soil organic matter and increase crop yield. Since the required machine is not available locally, therefore, they are constrained to use conventional composting which have several drawbacks as discussed earlier. It is expected that once locally made machine is available, farmers and service providers will buy and use it. It is estimated that cost of locally produced machine will be about Rs. 1 to 1.5 million depending on volume of production. In order to promote extensive use of the machine, government will be requested to provide the machine on subsidized cost. Keeping in view the feasibility of providing the proposed machine on custom hiring basis by the service providers in each District will bring a success of the project.

ICSBLCP-2021-S44

A World-Changing Climate's Possible Solution to Pollution: Green Revolution

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ABSTRACT:

Overpopulation, Industrial, agricultural activities, and greenhouse effect are the major causes for changing climate in an entire world. The loss in biodiversity, changing weather patterns, rise in sea level, changes in freshwater supply, and disastrous increase in extreme weather events like floods, droughts, and glaciers melting's are some major effects of climate change. It's a major issue that's affecting human health, plants as well as and animals. The idea behind the green revolution is based on plantation activities, increasing afforestation, overgrazing, and decrease in deforestation, etc., and these processes save the economy, habitat, people, and planet. CO2 and other harmful chemicals are used by plants and can persist in the atmosphere. Plants serve as the Universe's lungs, releasing oxygen and ensuring that the air we breathe is of high quality. It is a strategic path toward a long-term future. The green revolution's ideals include the development of green belts and the use of non-toxic reagents. The plantation operations should be considered on a broad scale for environmental quality

control and modeling. To combat climatic changes, we must reduce various forms of pollution and increase plantation operations.

Keywords: Climate Change, Green Revolution, Pollutants

ICSBLCP-2021-S45

Rice straw management is an effective strategy for increasing crop production while reducing GHG emissions

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ABSTRACT:

Global warming, accelerated by greenhouse gases, is a major area of concern to mankind. Methane (CH4) is a major greenhouse gas with a global warming potential 30 times that of carbon dioxide. Paddy cultivation is one of the major sources of anthropogenic CH_4 emissions in the global agricultural sector. Global rice production is projected to be responsible for 12% of total CH_4 emissions. Straw management is a crucial part in trying to control the emission levels and mitigation potential of rice primarily by carbon losses from burning. Biochar production from rice straw is the best option for mitigating climate change by carbon sequestration in soil. Straw burning is one of the major causes of CH4 emissions. Biochar is a C-rich solid material made from organic matter and formed at high temperatures with low oxygen. Biochar incorporation in the soil will change soil properties, reduce GHGs and increase crop productivity. Biochar improved water retention, electrical conductivity, and increases soil organic carbon, C/N, and NH4 + -N. It also reduced soil bulk density, increased soil moisture contents, increased soil pH, electrical conductivity, and aggregate stability. Achieving this climate-smart rice management with an increase in yield and farm income and reduction in GHG is a win-win situation.

Keywords: Rice straw, Biochar, GHGs emissions, Global warming, CH4 emissions

ICSBLCP-2021-S46

Ultrasound application as pretreatment on protease inactivation in poultry processing

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ABSTRACT:

Ultrasound (US) is classified as a non-thermal treatment and it is used in food processing at a frequency range between 20 kHz and 1 MHz. Currently, US is widely used in meat industries to enhance procedures, such as meat tenderization, emulsification mass transfer, marination, freezing, homogenization, crystallization, drying, and microorganism inactivation. When poultry meat is treated using US, the expected quality is often better than the traditional methods, such as sanitization and freezing. US improves the physical and chemical properties of meat proteins and can lead to a decrease in the α-helix in intramuscular protease complex. Therefore, ultrasonic treatment can be applied to enhance the textural properties of chicken meat. This study aimed to investigate the effect of combined ultrasound along with low-temperature short-time heating as pretreatment on proteases inactivation and textural quality of meat as compared to the pretreatment of chilling. Lipid and protein oxidation of meat pretreated with ultrasound will be reduced during refrigerated storage period. The

functional properties of food proteins are responsible for texture, yield and organoleptic of food products. US treatment could provide the possibility for creating novel functional properties of new foods with desirable properties due to the modification of protein During meat processing, US can modify the structure and thereby improve the functional properties of myofibrillar protein (MP), leading to the quality enhancement, low fat and/or salt products development and the shelf life extending

Key words: Ultrasound, poultry, protease, protein

ICSBLCP-2021-S47

Effect of Climate Change on the Yield of Cereal Crops

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ABSTRACT:

Owing to the huge emission of greenhouse gases (GHGs) into the atmosphere, the average global temperature is expected to rise. Climate change has the potential to lower crop yields, resulting in food shortages. Agricultural activities, on the other hand, are a significant source of GHGs, and lower yields would result in increased activity to fulfill the demand for food, resulting in increased GHG emissions. Climate change is reducing the yield of main cereal crops. Implementing effective adaptation techniques, such as improved seed access, integrating smart agriculture into the cereal sector, managing irrigation and fertiliser effectively, and diversifying crops, and enhancing pest management may help reduce the susceptibility of cereal production to climate change. Apart from these, farmers would benefit from accurate local weather information and early warning systems to reduce the possibility of climatic threats.

Keywords: Climate Change, Cereal Production, Cereal Yield, Irrigation and Fertilizers Efficiency

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Climate-Smart Horticulture: A Solution to the Impact of Climate Change

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ABSTRACT:

Climate Change has emerged as a major global environmental concern that affects all aspects of life. It raises the level of greenhouse gases such as carbon dioxide, nitrous oxide, ozone, and methane, which may lead to higher temperatures, increased water demand, and an increase in biotic and abiotic stresses. It has a direct impact on horticultural crops. Horticultural crops can play a much bigger role in mitigating the negative effects of climate change by providing a better carbon trade and carbon sink. One of the most problematic physiological responses to climate change is the shortening of the growing season, which results in a significant reduction in fruit and vegetable production. These responses will leave a negative impact on the growth and development of horticultural crops. Climate-smart horticulture is perceived as an unnecessary requirement for improving production in

such a challenging environment, integrating location-specific and knowledge-intensive premises. The main strategies for meeting the challenges will be the development of new cultivars that are resistant to high temperatures and produce a high yield under environmental stresses.

Keywords: Climate Change, Horticultural Crops, Carbon Trade, Carbon Sink

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Water security! A new dilemma for the developing world

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ABSTRACT:

Water scarcity is rising as a global issue. The essentiality of water has long been known to mankind yet very less has been done to sustain its prevalence. In recent years adequate water supply for the rapidly increasing population is becoming one of the main challenges for the world. The dilemma is more crucial for developing countries where no accountability has been held for its use. The agriculture sector in developing countries is always resource intensive. Pakistan being an agriculture driven economy faces the same situation. The country has rapidly moved from a state of water abundant to a water scarce nation in last few decades. The 10 percent of the population does not have access to clean water. In addition to that poor water management practices both at urban and rural level are worsening the situation. The irrigation system opted for agriculture is outdated and results in losses. The urban areas have unrestricted rights for ground water pumping both for commercial and domestic uses. Water scarcity serves as a threat to the food system as it being the core input to produce crops and livestock. The transition to ground water use along with surface water is drastically effecting the groundwater table of the country. The impacts are evident in terms of ecosystem degradation, socio-economic challenges and compromised living conditions. In the last few years, many efforts have been made to mitigate this issue, but cooperation between various stakeholders is required to address it. In the current situation, a holistic approach backed by modern technologies, policies at user levels, awareness, valuation of resource and sustainable measures is needed to devise recommendations for a sustained/water secure country. The relevance to Sustainable Development Goals particularly; public health, energy security, climate resilience, and poverty reduction and cleaner production can be achieved through devising recommendations such as In conclusion, a balance between socio-economic and environmental components is necessary for achieving a water-secure world, as a study mentioned that adequate integration of different measures such as storing, transportation of water to the end users and protecting itself the available water resources.

Key Words: Water security, SDGs, Water scarcity and challenges

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Molecular detection and cloning of cellulase gene of thermophilic bacteria isolated from hot spring of gilgit baltistan

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ABSTRACT:

Microbial cellulases have been found to be uses in diverse industrial processes. The goal of thisresearch was to isolate cellulase producing thermophiles from Gilgit Baltistan hot spring and clone the cellulase gene. About 20 strains were isolated which have cellulase production ability, in which four strains were selected for further processing as they have high efficiency of cellulase production using a selective culture medium containing glucose as carbon source and 1.0%carboxymethyle cellulose to stimulate the cellulase production by their morphology and 16S rRNA gene sequence analysis as Rhodobacterthermarum, Bacillus safensis, Bacillus paramycoidesand Bacillus albus. Bacterial strain withhigh cellulase activity were checked at various parametersi.e temperatures, pH andincubation periods. A high thermostable cellulaseproducing bacteria having more capacity for cellulase production was Rhodobactorthermarumin all of these isolated strains which was purified and selected for further processing. The optimum temperature and pH for Rhodobactorthermarum was 60oC and 9 respectively. Gene responsiblefor cellulase production was amplified using specific primers and transformed to E.coli (DH5α strain) using thermo scientific clone JET PCR cloning kit (00715987, k1232, Lithuania).Three different types of juices (apple, pear and orange) were clarified using both the wild cellulase and cloned cellulase and compared their clarification efficiency. The cloned strain efficiency of juice clarification were high than the wild cellulase. These finding can be used for various industrial applications.

Key words: Thermophiles, hot spring, cellulase, cloning, E. coli DH5α

ICSBLCP-2021-S51

Potential application of turmeric coated film on meat products

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ABSTRACT:

Turmeric (*Curcuma longa*) is rhizome belong to Zingiberaceae family widely consumed as food preservative and spice used in subcontinent and South East Asia. It possesses a wide range of properties, containing antibacterial, antioxidant, anti-inflammatory and wound healing properties. The major polyphenolic component of turmeric is curcumin, shows high antioxidant ability. Therefore, the use of turmeric extract in aquaculture to replace the antibiotics and for the prevention of diseases in fishes. Turmeric films applied on meat are effective against Staphylococcus aureus, Escherichia coli, lactic acid bacteria, Salmonella typhi, enterobacteriaceae, Bacillus cereus, Candida albicans and Enterococcus faecalis. The application of 0.3% turmeric powered is effective against the growth of Escherichia coli, yeast-mold in meat balls. During the storage of meat ball, turmeric has a potential as natural antioxidant. ROS are known for the deterioration of meat product causes the off flavor and odor, they are inhibited due to antioxidant potential of turmeric powder and enhance the shelf stability of meat product. Antioxidants can protect a tissue from oxidative damage in two ways, directly by scavenging free radical species and indirectly by improving the natural immunity. Incorporation of turmeric in the alginate based edible polymer packaging for meat shows significant results. Turmeric based packaging specifically reduces the oxidation of lipids and act as a quality enhancement factor in beef, poultry and pork. Use of turmeric in packaging increases shelf life of meat about 12 to 16 days in refrigerated conditions.

Key words: Turmeric, Anti-oxidant, Anti-microbial, meat ball

ICSBLCP-2021-S52

Rhizobial inoculation improves growth, yield and economic returns of irrigated chickpea

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ABSTRACT:

Effective nodulation and subsequent N-fixation in legumes depends on inoculum quality as well as its application techniques. Genotypic variation also exists among crop species regarding response to introduced bacterial strains. Field study was conducted to explore efficacy of different rhizobial inoculants. Seeds of two chickpea genotypes belonging to distinct groups, i.e. Desi (Bhakkar-2011) and Kabuli (Noor-2013) were seed inoculated with "N_2-biofertilizer" from Ayub Agricultural Research Institute, Faisalabad, and "Rhizogold"-a patent biofertilizer of University of Agriculture, Faisalabad using two step method with 10% white sugar as sticking agent. Soil application of these inoculants was also done. Effectiveness of inoculants and their application methods was assessed as improvement in growth and yield attributes of chickpea genotypes. Both seed and soil inoculation methods significantly influenced yield attributes of chickpea over un-inoculated plots. Soil inoculation of both inoculants was better than their seed inoculation. Chickpea Desi genotype (Bhakkar-2011) seed inoculated with Rhizogold accumulated maximum dry matter (826.67 g m^{-2}). Upper limit of crop growth rate was observed for soil inoculation with N_2-Biofertilizer. The rhizobial inoculation improved chickpea productivity by enhancing nodulation, dry matter, branches per plant and number of pods over control. Inoculation with Rhizogold resulted in better resource utilization and its partitioning as indicated by greater harvest index. Soil application of Rhizogold resulted in higher harvest index (48.64%) as compared to other treatments. Maximum net benefits (216438 PKR ha^{-1} and 213825 PKR ha^{-1}) were associated with the soil application of Rhizogold in Kabuli and Desi chickpea genotype, respectively. It is therefore concluded that soil inoculation with effective rhizobia must be carried out for successful chickpea production.

Key words: Irrigated chickpea, Inoculation, Net benefits, Nodulation, Rhizobia, Seed yield

ICSBLCP-2021-S53

Sustainable Bioeconomy in Milk and Poultry Processing

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ABSTRACT:

Sustainable agriculture refers to farming practices that meet society's current food, textile, and other needs without compromising current and future generations' ability to meet those needs. It's also a site-specific integrated system of plant and animal production strategies that will pay off in the long run. Environmental health, social and economic equality and economic profitability are the three fundamental goals of sustainable agriculture. This goal has been achieved through a number of beliefs, policies, and practices. Bioeconomy refers to the efficient conversion of renewable biological resources into value-added products such as feed and fodder. Milk processing can contribute to sustainable bioeconomy. Milk can be processed further to produce high-value, concentrated, and readily transportable dairy products like lactose free milk, butter milk, skim milk, scalded milk,

condensed milk, evaporated milk, baked milk, powdered milk, infant formula, soured milk, cultured butter milk, butter (ghee) cheese, yogurt, cream (heavy cream, sour cream, whipped cream, sour cream, clotted cream) ice cream, whey, casein (caseinates) and ice milk. which have extended shelf lives. Small-scale dairy producers can earn more money from processing dairy products than they do from selling raw milk and they have more options to reach regional and urban markets. Milk processing is required for all milk procedures that remove germs and bacteria from milk before it is consumed. There are numerous technologies added in the processing technique to help milk processing plants work more efficiently. Moreover, these types of all milk production process have done in the dairy farm with exact process. The final procedure is packaging of the product in the bottle, cartons and plastic bags. These packaging processes are frequently stamped with long life of products. It is transported from the milk processing plants to the different places. Poultry processing also contributes to the development of a sustainable economy. Raw packaging of whole or specific parts of birds for direct sale is possible. Fresh poultry is usually cut into a number of pieces and placed on plastic foam trays before being covered with plastic film. The majority of frozen poultry is vacuum-packed and frozen in high-velocity refrigerators. Until they are needed, the birds are stored in cold storage. Poultry can be processed into a variety of goods. For frying, some poultry products are battered (for example, with beer batter) or battered and breaded (for example, with cracker meal, bread crumbs, or cornmeal). Prior to coating, the meat might be cooked or raw. In massage and tumbling, meat is blended with a range of nonmeat substances, such as flavorings, spices, and salt, in the production of numerous chicken items. It is permissible to smoke poultry. The backs, necks, and bones are suitable for processing after deboning and grinding for further processed poultry products. The resulting minced product has a texture comparable to ground beef and has been utilized in a variety of chicken products, including hot dogs and bologna.

Key Words: Sustainable bioeconomy, Milk processing, Poultry processing, Improved Packaging.

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Bio-ecology, management practices for invasive Fall Armyworm Spodoptera frugiperda (Lepidoptera: Noctuidae): A review

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ABSTRACT:

Maize (Zea mays) is an important cash crop in Pakistan grown in the spring and winter seasons used as a source of food for human beings as well as by animals as silage and fresh fodder. There are some biotic and abiotic factors are impeding its production. Among biotic factors fall armyworm (Spodoptera frugiperda) (J.E. Smith) (Lepidoptera: Noctuidae) is the most destructive invasive pest in present time for various crops. It is a polyphagous insect pest distributed globally with a quick lifecycle at optimum climatic conditions. The pest has spread to major areas of Pakistan since its first report in 2017. The most culprit stage of this pest is a larva, causing damage to foliage and cob also. In this paper, we reviewed the fall armyworm biology, climate change impact on pest prevalence, and different control measures adopted in world scenarios to cope with the pest's infestation. A keen intention is shown towards integrated pest management to minimize the complete reliance on pesticides to avoid the development of pesticides resistance, to save biodiversity, natural

enemies, and the environment also. Advancement in biological and ecological control strategies will be very helpful to overcome the constraints and foster sustainable pest management. The African experience to manage the fall armyworm is also highlighted. A few innovative scientific methods were used as alternatives to the African context. The use of local beneficial fauna, parasitoids and the potential of entomopathogens needs further research for integrated pest management. A comprehensive positive and negative impact of each control strategy is described.

Key words: Maize, Fall armyworm, Invasive species, temperature, rainfall, integrated pest management

ICSBLCP-2021-S55

Rural Youth's Perceptions about Climate Smart Agricultural Practices for Crop Productivity in South Punjab, Pakistan

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ABSTRACT:

Climate Smart Agricultural Practices (CSAP) has been adopted to improve crop productivity and reduce climatic effects. Engaging rural youth in CSAP is being recognized as a critical factor to achieve sustainable agricultural development. In third world countries, youth accounts for almost 85%, therefore, youth is a big human resource to be engaged in agriculture. For achieving the Sustainable Development Goals (SDGs) and solving the problems of climate change, and improving crop productivity, it is imperative to engage youth in CSAP. In this scenario, the present study was conducted to explore perceptions of rural youth regarding CSAP for crop productivity in South Punjab of Pakistan. For this purpose two districts; Multan and Muzaffargarh were selected conveniently from southern Punjab, Pakistan. From each district, 100 respondents were selected randomly. The sample size was decided with the help of Krejcie and Morgan's table of sampling. A well-structured interview schedule was developed for data collection. The results indicate that 88% of respondents were male. More than 30% of the respondents were illiterate and 30% possessed middle-level education. Results also show that about 50% of the respondents have a farm area of 6-10 acres. More than 54% of respondents were earning their income from agricultural sources. More than 64% of respondents have medium-level awareness about climate smart agricultural practices. Respondents ranked 'intercropping' as the most impacting climate smart agricultural practice, 'crop rotation' and 'improved seed verities' were ranked 2nd with a mean value of 2.97. The government should initiate policies to train youth farmers for CSAP to intensify crop production and to improve rural livelihoods targeting rural youth.

Keywords: Rural youth, Climate Smart Agriculture, Crop productivity, South Punjab

ICSBLCP-2021-S56

Perennial Bajra Napier Hybrid Grass CO (BN) 5 - A Tool for Achieving Nutritional Security in Livestock Production

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ABSTRACT:

Livestock plays an important role in Indian economy. But supply and production of quality animal products is a challenge faced by farmers due to poor availability of quality fodder. Scarcity of

green forages is mainly due to non availability of quality planting material, high production cost and water scarcity which made the livestock to suffer continuously with malnutrition resulting in their production potentiality. This also affects the human nutrition and health. Currently India faces a net deficit of green, dry fodder and concentrate feed ingredients. This can be overcome by cultivating bajra napier hybrid grass CO (BN) 5. It is an inter specific cross between bajra or pearl millet (*Pennisetum glaucum*) and napier grass (*Pennisetum purpureum*). Field experiment was conducted at TNAU – Coimbatore, to find out the suitable crop establishment methods and irrigation methods on B.N. hybrid grass. Among crop establishment methods, horizontal planting of setts with sett treatment (S_2) recorded significantly higher green (331.5 t/ha/year), dry fodder yield (71 t/ha/year), crude protein yield (8.99 t/ha/year) and WUE (21.47 t/ha/mm). In irrigation methods, subsurface drip irrigation (M_3) produced higher green (335.0 t/ha/year), dry (71 t/ha/year) fodder yield, crude protein yield (8.85 t/ha/year) and WUE (23.74 t/ha/mm). In quality parameters, except crude protein yield other quality parameters showed non-significant difference by irrigation and crop establishment methods. On economics, subsurface drip irrigation (M_3) recorded significantly higher net income (₹ 5,36,877/ha) and benefit cost ratio (4.86). In crop establishment methods, horizontal planting of setts with sett treatment (S_2) recorded higher net income (₹ 5,29,497/ha/year) and benefit cost ratio (4.88). By adopting horizontal planting of single budded setts with sett treatment in subsurface drip irrigation save 25 per cent of water and 50 per cent of planting material which creates more interest among the farmers to cultivate additional area on BN hybrid grass thus improves the productivity of livestock.

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Effects of climate and climate change on ticks and tick-borne diseases: a one health context

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ABSTRACT:
Zoonotic diseases have demonstrated to be one of the most severe threats to the survival of domestic animals. This has encouraged researchers and health policy makers to focus their efforts on the prevention and control of potential vectors worldwide. Hard ticks can transmit several deadly maladies to human-related hosts and to those species reported in these studies. This is becoming even more concerning, as anthropogenic alterations of the environment may unchain the spread of tick-borne diseases through the large region. Developing countries with a high dependency on livestock economy are a suitable hotspot for these problems. Here in this poster, a model is presenting showing the interrelationships of all those factors contributing in the rapid spread of ticks in livestock.
Keywords: Zoonotic disease, hard ticks, tick-borne diseases, livestock.

ICSBLCP-2021-S58

Role of fodder trees for sustainable advancement of livestock

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ABSTRACT:
Climate change is one of the burning issues of the 21st century and the international institutions are quite serious about mitigating its impact on the world. In such a scenario, the forestry

and livestock sector make an economically as well as environmentally feasible combination for sustainable solutions to the issues like food insecurity, global warming, ozone layer depletion and ever-increasing natural calamities. Forests draw their importance from the products and services they supply. So forests have value to people and contribute to meeting human needs in a number of ways. Forests provide food, fodder, fuel wood and shelter. After wood, fodder is a basic important product that we get from forests. Fodder from forests includes palatable tree species, shrubs, herbs, and grasses that are fed to or browsed by animals. Fodder species are an important feed source for livestock in dry season when green grasses are not available. They also contribute to reduce competition in land for food and feed. Moreover, fodder trees reduce pressure on range lands. As the change in climate will increase the intensity of droughts and floods, there would be surge in the demand of fodder in forests for survival of live stocks in calamity stricken areas. Livestock diets are usually composed of green grasses, crop by-products or fodder trees, with little or no concentrate feed. Over 50% of the total fodder supply comes from forest resources with forest trees supplying 20%. Fodder trees also provide significant amounts (15–29%) of crude protein. Fodder trees that have the strong potential to be grown in forest areas are Grewia oppositifolia, Morus alba, Morus nigra, Acacia modesta, acacia nilotica, Ficus sarmentosa, Zizyphus jujuba, Robinia pseudoacacia and Melia azedarach among many others."

Keywords: Fodder, trees, Forest, live stock

ICSBLCP-2021-S59

Parasites and livestock: A review on socio-economic impact and potential solutions

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ABSTRACT:

A parasite is a pathogen that injures as well as feeds on its host and unavoidable components of the ecosystem. They are typically considered to be a negative element in farm animal practices. In the majority of cases, they serve as an entrance point for other pathogenic agents. Rough hair coat, diarrhea, emaciation, weight loss, blood loss and even death are the common outcomes of parasite infections. Regarding the socio-economic impact, studies have been shown that cattle were not infected with flukes and gained an extra 0.2 pounds per day in the feedlot as compared to calves that had been infected with flukes. The young scientists and researchers are always trying to come up with new as well as innovative ways to reduce these production losses. To fight parasitic insects, insecticides are still widely used. Currently, needed more effective pesticides with fewer adverse effects and have no long-term residual accumulation in the environment are required. Some biological control techniques also have a bright future. Sterile males or females with cellular incompatibility are being introduced into normal populations for genetic control studies. Antibodies elicited in hosts by inoculation of tissue derived from infesting arthropods are also being considered. The aim of this

review is to reveal the impacts on the production performance of livestock to attain new approaches to prevent these losses.

Keywords: Parasites, Socio-economic impact, Potential solution, Livestock

ICSBLCP-2021-S60

Agroforestry Potential for Livestock and Environment

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ABSTRACT:

Trees are the vital resource for the climatic sustenance as well as for the economic point of view. Trees possess major potential to buffer the environment i.e., to overcome the challenges of the climate change. Moreover, trees are the major source for the livelihood of the farmers. If we utilize trees on sustainable basis; we will mitigate the ecosystem hazards and economic exploitation of the farmer's altogether. Agroforestry is the basic key to utilize the natural resources on sustainable basis. Planting beneficial trees and maintaining the previous trees would give farmers the basic livelihood opportunities (fodder for livestock, fuelwood for household, timber wood for furniture or trade, and many non-wood products i.e., gums, resins, honey, bark for medicinal uses). Moreover, planting trees on farmlands would also beneficial for the environment i.e., climate change mitigation, soil health, carbon sequestration and biodiversity potential. The need of crops and livestock is increasing with the increasing population. But without sustainable usage of these resources, we merely destroying our climate and making it worst. To feed the cattle many of the forests have been converted to croplands for fodder production. Doing so, put our environment in serious threats leading to climate change i.e., greenhouse gases emission, ozone depletion, global warming. We should definitely move to the agroforestry practices to rear the livestock and produce the crops. We should aware farmers of the importance of trees and their economic potential on their lands. Farmers should plant such trees which are harmless to their crops and produce good amount of fodder. Some of them trees are Vachellia nilotica, Morus alba, Ziziphus mauritiana, Moringa olefera, Syzygium cumini, Delbegia sissoo, Azadirachta indica, Albizia lebbeck.

Key Words: Sustainable agroforestry, fodder trees, climate change, livestock rearing"

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Role of insect pollinator in sustainable fodder seed production

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ABSTRACT:

Insect pollinators are an important part of a sustainable agriculture. They play a great role in the food production not only for humans but for animals as well. The fodder crops are known as the backbone of the livestock. Around 70% of the population of Pakistan is directly involved with livestock as livestock is a primary income source and food source therefore fodder has a special place in the country. Livestock is such a sector of Pakistan which contributes around 11.1% to the GDP of Pakistan economy. In Pakistan, 0.19 million metric ton seed of fodder is imported annually. The fodder crops such as alfalfa/lucerne, Egyptian clover (berseem), red clover, white clover, jantar and many fodder grasses are cross-pollinated depend upon insects specifically bees for their seed

production. Honey bees, wild bees and bumble bees play a significant role in the seed production of such crops. Experiments have proved that pollination by honey bees A. mellifera improve the seed set production of white clover while solitary bees i.e, leaf cutter bees are also very vital for increase the seed production of clovers and lucerne. Keeping the bee hives near the fields of fodder crops and providing better nesting sites for solitary bees can help in getting a sustainable fodder seed production which ultimately overcome the fodder seed deficit in local market.

Keywords: Fodder seed, livestock, pollinators, honeybees, wildbees.

ICSBLCP-2021-S62

Role of Organic Farming in Maintaining Biodiversity of Beneficial Insects

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ABSTRACT:

Organic farming is the growing of plants using completely natural things avoiding the synthetic materials. Organic farming excludes the use of pesticides, synthetic fertilizers and growth regulators. Organic farming is very beneficial for the health of humans, animals and also good for the environment as it has less hazards. From the past few years, the biodiversity of plants and many beneficial insects have known to be declined due to various reasons of which the main are agricultural intensifications, use of chemicals, environmental pollution and habitat degradation. Studies have proved the benefits of the organic farming on the biodiversity of the beneficial insects. By the less use of fertilizers, pesticides, water recycling and more use of natural practices the biodiversity of the beneficial insects; mainly insect pollinators have been enhanced. The studies show that on organic crops the beneficial insects were around 34% more dominant as compared to other crops. In sunflower, the organic farming practices significantly increased the abundance of beneficial insects as suppressed the pest populations. Cover cropping is also practiced in organic farming. It increased the populations of ground beetles in winter wheat. It has been concluded that in order to get a healthy agricultural system and enhanced populations of the beneficial insects we must practice organic farming. This would reduce many environmental hazards and will also help in combating with the high pest resistance problem by suppressing them in natural ways.

Keywords: Environment, Fertilizers, Insecticides, Pests, Pollinators"

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Hemorrhagic Septicemia is a Constant Threat to Buffalo Population: A Review on Diagnosis and Treatment

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ABSTRACT:

Hemorrhagic Septicemia is an acute and highly fatal disease caused by a gram-negative bacterium Pasteurella multocida, serotype B2 and E2 as defined by OIE, affecting mainly buffaloes

and cattle. Natural disease has also been reported in sheep, goat, pigs, yaks, camel, horses, and other wild animals. Serotype B2 is mostly encountered to cause the infection. It seriously devastates the economy of smallholder farmers. Outbreaks were reported from Africa, Asia, Middle East, Southern Europe, and America. Disease associated risk factors are stress, high humidity and temperature, concurrent disease or parasitic infestation and weakness and transmission takes place directly or indirectly via oro-nasal discharge and contact with contaminated feed or water. Clinical signs include fever, hypersalivation, nasal and lacrimal discharge, swelling at pharyngeal, neck and brisket region and dyspnea. Identification can be carried out through conventional methods such as microscopic characterization, serotyping, antibiogram determination and pathogenicity testing as well as molecular assays (pulse field gel electrophoresis, southern blot, polymerase chain reaction (PCR) protocols, and loop mediated isothermal amplification technique) and characterization (random amplified polymorphic DNA analysis, restriction endonuclease analysis, and repetitive extragenic palindromic PCR). A wide variety of injectable antibiotics namely ceftiofer, florfenicol, tilmicosin, tetracycline, and various sulfonamides are available for treatment purpose. Disease control and prevention can be achieved through mass vaccination. Protective vaccines with long lasting immunity are still needed. Further studies on virulence factors and diversity among stains are highly recommended.

Keywords: Hemorrhagic septicemia, dyspnea, pathogenicity, vaccination

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Potential of Glycyrrhiza glabra (Licorice) Extract as alternative biochemical and therapeutic against Coccidiosis in Broiler Chicken

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ABSTRACT:

To control coccidiosis, anticoccidials are generally used as feed additives. Though, the frequent usage has given rise to the occurrence of resistant strains to available anticoccidial drugs. Botanicals may work as substitute to anticoccidial drugs. The current research was designed to evaluate the efficacy of aqueous methanol extracts of Glycyrrhiza glabra (roots) as anticoccidial in different concentration i.e. (100, 200 and 300 mg/kg of body weight). For In vivo trial 105 day old broiler birds were grouped in seven equal units (A, B, C, D, E, F and G). At the age of one week, groups A, B and C were orally treated with three doses (100, 200 and 300 mg/kg of body weight). Group D was medicated with Vitamin-E and Group E worked as infected medicated control group (Baycox® treated), Group F served as infected non medicated control group (PBS treated, -ve control) and Group G designated as normal control group non infected and non-medicated (+ve control) group. At the age of 14th day, all unit groups were infected orally with 60,000 sporulated oocysts of different Eimeria species. Though, comparable with reference drug (Baycox), Glycyrrhiza glabra showed good anticoccidial efficacy against following parameters. i.e., feed conversion ratio, lesion score, fecal score and oocyst score. Results of serum profile showed no adversative effects of aqueous methanol extract of Glycyrrhiza glabra on the trial broiler birds."

Key words: in vivo, Glycyrrhiza glabra extract, Eimeria, coccidiosis

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Green Energy: Future Prospects and Concerns

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ABSTRACT:

Rising concerns of global warming and increasing cost of production at livestock farms is one of the major apprehensions round the globe. Green energy production at livestock farms using biomass can help cater both the issues. According to Union of Concerned Scientists, using green energy can add more than $10 billion dollars to livestock farm income. This will be equivalent to taking about 70 million cars off the roads. Farmers can use this energy as a fuel source for the farm vehicles and machines. Burning of biomass can provide heat and electricity. Incorporating green energy to our local domestic farmers will help alleviate the poverty in the country as well. In a project in Guangxi province of China, 23000 biogas tanks were provided to poor households, which is equivalent to the conservation of 7,470 hectares of forest. Using these strategies and making policies based on promotion of green energy help curb the deleterious effect of global warming and climate change which will in turn ultimately increase the living standards, improve the production of livestock, help control food shortage and conserve biodiversity. By implementing Renewable Energy Technologies (RETs) at small scale will help stem the greenhouse gases. These affordable energy resources using animals or plant residues can prove to be a major turning point in a global setting. Global leaders must take responsibility and start making policies to promote and implement green energy concept."

Keywords: Green energy, Global warming, Climate change, Renewable Energy Technologies (RETs).

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Efficacy of Monolaurin in conjunction with Zinc against SCM in dairy cows and its effects on milk composition

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ABSTRACT:

To determine the efficacy of monolaurin in conjunction with zinc against SCM, a total of 30 dairy cows SCM positive were selected and divided into 2 groups (G1, G2), eachhaving 15 cows.G1 received monolaurin in conjunction with zinc (FRA® udder health) @ 50gm/oral/animal for 28 days while the G2 was kept as an untreated control. Milk samples have been collected aseptically at day 0

(pre-treatment), 14thand 28th(post-treatment). Evaluation parameters were surf field mastitis test (SFMT) score, bacteriological infection cure rate, milk yield, composition of milk and somatic cell count (SCC). Data were analyzed by ANOVA under RCBD. SFMT score was markedly reduced from 1.339±0.298 at day 0 to 0.732±0.309 at 28th day in G1. The SFMT based cure rate of G1 was maximum (71%) at 28thday.The bacteriological infection cure rate was higher (67%) at 28th day in G1. SCC was significantly reduced to 3.13 at 28th day in all tested milk samples of G1. Fat (%) was significantly ($P<0.05$) increased from 1.606±0.418 at day 0 to 2.5±0.476 at 28th day in G1. Total solids were non-significantly ($P>0.05$) increased from 10.268±0.126 at day 0 to 10.576±0.182 at 28thdayin G1. Solid not fat was significantly ($P<0.05$) decreased from 8.661±0.291 at day 0 to 8.076±0.294 at 28th day in G1. Milk yield was non-significant ($P>0.05$) and increased (20%) at 28th day in G1. The use of monolaurin in conjunction with zinc (FRA® udder health) against SCM confirmed better effects in contrast with traditionally used antibiotics."

Keywords: Antibiotics, Mastitis, Monolaurin, Somatic Cell Count,Zinc

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Emerging livestock industry, climate change, and mitigation strategies

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ABSTRACT:
The livestock sector has a broad-spectrum ecological impact concerning climate change. According to FAO, 18% of the total greenhouse gas (GHG) emission is of livestock origin, making it a fatal polluter of second-ranked more than the gas emission caused by transportation (13%). The GHGs released naturally by the livestock industry include methane, carbon dioxide, nitrous oxide, and ammonia. Scientists have warned that by the end of 2030 the CO2 emission due to the fast rearing of animals will reach up to 565 gigaton which is lethal. Changing climate due to anthropogenic activities, large animal production, and consumption; needs awareness to mitigate this global issue, therefore, researchers, climate change activists, government individuals, stakeholders, the general population should play their role in addressing this hot issue as it might worsen the suitable life conditions in near future. Critical ecofriendly education in terms of public and environmental health through stable animal production and consumption should be taught to the people. For the reduction of methane gas, animal feed should be changed with the addition of food additives, fats and fatty acids in animal feed, biogas plants or anaerobic digesters should be implanted at the animal production units, manure should be stored and used as a fertilizer to enhance soil fertility. Herd health, dietary manipulation, and breeding policies should be altered to enhance production quality and minimize GHG production.

Keywords: Livestock industry, climate change, mitigation strategies

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Novel techniques for control of tick and tick-borne diseases

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ABSTRACT:

Ticks are ravening blood-sucking ectoparasite of veterinary and public health significance. Numerous deadly diseases vectored by ticks viz; babesiosis, theileriosis, anaplasmosis, kyasanur forest disease (RFD), tick-borne encephalitis, Lyme's disease, possowan fever, and allergic reactions. Cattle, cynosure of developing livestock industry, are under assaults of tick greediness and about 80% of the world cattle population is infested with ticks. To control ticks, there are several conventional methods viz: manual removal of ticks, use of dips, acaricidal treatment, and use of disinfectants. These methods, however, cannot prove to be as helpful as they were. A neoteric and eco-friendly method of control is transgenesis of tick symbiotes residing in the tick's gut. The crux is to manipulate the symbiotes genetically to impede the transmission of pathogens. Tick-associated rickettsia isolated from tick gut is modified genetically with cecropin A (an antimicrobial peptide) to form a stable pathogen. A few stable insect germ lines have been developed using transposons. Aedes, Anopheles and Culex mosquitoes have been altered genetically and successful results were seen in case of Plasmodium species and Dengue virus. Inoculation of ticks with modified rickettsia will aid in creating a hurdle in the transmission cycle of pathogens carried by ticks. One of the main limitations in acquiring transgenic ticks/ vectors is their survival in natural habitat followed by two hurdles that are the lack of a transgene(s) that effectively reduce pathogen load, and the inadequacy of transposons as gene-drive mechanism(s). At present, a lot of work need to be done before releasing the transgenic vectors free in natural habitat. In a long run, this study will anticipate a better and permanent strategy for the control of ticks and tick-borne diseases in human as well as animals.

Keywords: Tick-borne diseases, Transgenesis, control of ticks

ICSBLCP-2021-S69

Use of arthropods and their metabolites.; Nature- friendly innovation in nanotechnology

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ABSTRACT:

Nanotechnology and nanoscience have been multifaceted discipline and navigate science and technology. The quest to get benefits from green nanoparticles is due to their cost effectiveness, nature friendliness, safe manipulation and handling as compared to chemically synthesized nanomaterial has been a successful attempt. Now in recent times, nanotechnology has encroached arthropods and their metabolites as an effective contender for the green mediated metallic nanoparticle synthesis. Previously biological agents such as algae, fungi, plants and their extracts and bacteria have been used to nanotechnology including control of blood sucking parasites in animals. Silkworms, bees, spider, paper wasps and their metabolites were found potent to synthesize nanoparticles. Biomolecules present in arthropods results in bio reduction of metal ions to their metallic states which plays significant role in nanomedicines. Extensive literature on potential of arthropods and their metabolites necessitate to relate it to nanotechnology and effectively utilize them in livestock and veterinary medicine as well. It could be expected that use of arthropods minimally harms the environment that will encounter the challenge of contamination of environment caused by chemical methods used in nano-synthesis. Moreover, the studies on the use of arthropods for the synthesis of nanoparticles are inadequate. The research on the synthesis will provide innovation to the cost effective, ecofriendly, and even safer therapeutics in medico-veterinary field including vector borne diseases in humans and animals.

Keywords; nanotechnology, arthropods, livestock, metabolites, nanomedicine

ICSBLCP-2021-S70

Bioactive potential peptides extracted from goat and camel milk

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ABSTRACT:

Bioactive peptides (BP) defined as 'with hormones peptides act similar to drugs which legalize the physiological functions when binding occur through receptors on the targeted cells foremost the physiological responses. Goat milk is very important and highly demanded because of its therapeutic properties. The present study aimed to evaluate the functional properties of peptides extracted from camel and goat milk. Peptides were extracted through centrifugation, microbial hydrolysis and enzymatic hydrolysis and qualitatively assessed through SDS PAGE, antioxidant potential through DPPH and antimicrobial potential (against *Escherichia coli*, *Salmonella typhimurium* and S*taphylococcus aureus*) through disc diffusion method. Goat milk peptides possessed 17.3±0.06% antioxidant potential as compared to camel milk peptides 16.78±0.03%. Antimicrobial activity results also showed parallel results. Although camel and goat milk possessed significant strong therapeutic potential but on comparison, goat milk is better in its nutritional profile and other therapeutic parameters.

Keyword: Goat Milk; Peptides; *Escherichia coli;* Antioxidant; antimicrobial

ICSBLCP-2021-S71

Parasites: Friends or Foes

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ABSTRACT:

The eukaryotes that lodge in or outside another organism for their feed, shelter, production, and reproduction are knowns as parasites. Parasites are well renowned for their enemite role for mankind and livestock. They instigate lot of damage in terms of skin irritation, blood loss, emaciation, diarrhea, eye infection, bronchitis etc. However, their positive role is masked over the decades. The eukaryotes are somewhat necessary to sustain the ecosystem by activating the immune response. Immunomodulatory effect of the notorious organisms enables them to be the foes or friends. Viral, protozoal, and bacterial infections are increased due to the suppressive mechanism on T helper cells that are the proinflammatory and inflammatory mediators. However, with this suppressive activity and activated T helper2 immune cells the proinflammatory and hyperinflammatory response is reduce which instigate the regulation against inflammatory bowel disease, many allergic and autoimmune diseases. Type1 diabetes, Rheumatoid arthritis, Multiple sclerosis, Addison's disease, and Grave's disease are the main highlighted diseases that are controlled by T helper2 cells that is instigated by the parasites. The immunomodulatory mechanism of helminth against diabetes is well explored. Few studies reported that the parasites have also shown the positive role in reduction of the COVID-19. However, the measurable benefits to the immunoregulatory effects of parasites infection on individuals coinfected with SARS-COV 2 are required to be addressed. Further investigations are

indispensable that specific species or types of helminths have differential effects on SARS-CoV-2 susceptibility and COVID-19 outcomes or all helminths have the friendly role in truncating the autoimmune diseases.

Keywords: SARS, COVID-19, Foes, Type1 diabetes.

ICSBLCP-2021-S72

Dung Beetle: Dividend for Agriculture Production

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ABSTRACT:

The dung is animal feces which is basically used as a source of fuel. Two billion people in economically developing nations use biomass fuels such as dried animal dung, wood and crop waste as their major source of domestic energy. The biomass for cooking and heating purpose generates high indoor particle concentration. The particles instigate respiratory infection, chronic obstructive lung disease, cancer, and increased heart rate. The species and physiological state of animal, and quality of ingested herbage are three main factors for physicochemical characteristic of animal dung. Previous studies estimated that approximately 57 million tons of cattle manure, and 6 million tons of chicken manure are produced each year at the national level. At the regional level, the Middle Delta region has the highest cattle manure production of all regions, at 31 million tons per year, or 55 percent of total manure production in Pakistan. Dung degradation and time to disappearance is dependent on both climate factors and coprophagous invertebrate activity. These invertebrates play a key role in modifying the properties of both animal dung and soil (aeration, water porosity), which in turn promotes microbial activities. In general, large dung patches have an adverse effect on vegetation immediately below the dung, and lead to local rejection of herbage by grazing animals. In the longer term, dung has a positive effect on surrounding pasture growth which may last up to two years after dung disappearance. Dung beetles are the coprophagous insects that instigate the fertilization of soil. Whilst the chemical transformations of dung and effects on flora and fauna are relatively described, further work is needed to assess the importance of coprophagous insects for ecosystem services. There is need to investigate the rational application of dung beetles for production of sustainable agriculture

Keywords: Dung beetle, Biomass, Coprophagous insects.

ICSBLCP-2021-S73

Medicinal and Nutrional Effect of Saffron in Milk

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ABSTRACT:

Saffron is a spice derived from the flower of Crocus sativus, commonly known as the ""saffron crocus"". The vivid crimson stigma and styles, called threads, are collected and dried for use mainly as a seasoning and colouring agent in food. Saffron has long been the world's costliest spice by weight Although some doubts remain on its origin it is believed that saffron originated in Iran. Saffron is an effective tonic to treat cold and fever. Basically saffron milk is milk that is infused with saffron and sweetened. It is one of the widely recommended drink for women during pregnancy. kesar milk can be made plain or you can add some crushed nuts for some texture. According to Macrobiotic

nutritionist and Health practitioner Shilpa Arora, saffron mixed in milk and applied over the forehead quickly relieves cold. It consists of various healing properties and is warm in nature that helps reduce the risk of catching a cold. Crocetin present in saffron helps in reducing the cholesterol levels present in the blood, and thus prevents heart-related diseases. Saffron tea or saffron mixed with warm milk can keep seasonal ailments like cold, cough and fever at bay. The warm nature of this magical herb helps in relieving the discomfort caused by the flu and cold. “Saffron has exceptional benefits and is not just used as a food colouring agent or to add flavour in one's dish

Keywords: Saffron,Healing properties,Cold and Cough remedy

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Effect of coated strap on shelf life of fresh lettuce

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ABSTRACT:

Following research aimed to study the effect of cotton cloth strap coated with of Beewax (BW), Almond Oil (O), and Silver leaf (Ag) and in combination on shelf life of fresh lettuce. Fresh lettuce were tied with straps coated with T1: Control: Fresh lettuce only, T2: (BW), T3: (O) T4: (Ag) ,T5: (BW+O), T6:(BW+Ag), T7: (O+Ag), T8:(Bw+O+Ag).The result showed that T5 exhibited the best with the moisture loss of 43.45% and increase the shelf life of lettuce by 7 days, while T1 i.e. control performed the worst with moisture loss of 84.03%, with shelf life of 3 days and highest pathogenic appearance.

ICSBLCP-2021-S75

Molecular detection and antibiotics resistance profiling of Escherichia coli isolated from Fruits and Vegetables

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ABSTRACT:

Escherichia coli is the normal microbiota of intestine, some of the strains are pathogenic and cause foodborne illness among humans. Fresh fruits and vegetables could be the cause of transmission of E. coli. The current research was carried out to find the presence of E. coli from various fruits and vegetables. For this purpose, 5 fruits and 5 vegetables were selected (n=10 from each) and were collected from different fruits and vegetable markets of Faisalabad. Samples were collected in sterile bags and carried to the department of Microbiology. Small amount of each sample were ground to paste and 1g of each was added to 9 mL of peptone water and incubated for 24 hours. All the samples were cultured on Eosin Methylene Blue agar (EMB) and MacConkey agar. Cultural and morphological characteristics were observed for each sample followed by biochemical profiles i.e. catalase, oxidase, indole and TSI test for the initial identification of the isolates. Antibiotic resistance profiling of the isolates were determined by disk diffusion method. The bacterial isolates were confirmed by PCR using specific primers for amplification of uid-A gene. On MacConkey agar, E. coli appeared as pink while on EMB agar green metallic sheen colonies were observed. The results showed E. coli prevalence (32%) among fruits and vegetables. Out of positive samples, resistance was observed as Gentamycin (18.75%), Doxycycline and Ceftazidime (25%), Colistin (18.75%),

Levofloxacin (25%), Imipenem (12.5%) and Tobramycin (9.3%). Altogether the current research has evaluated the burden of E. coli present in fruits and vegetables collected from different areas of Faisalabad, a potential source of food borne illness in humans as well as a potential threat for sustainable production of safe foods for human consumption. "

Keywords: Antibiotic resistance, Escherichia coli, Fruits, Vegetables.

ICSBLCP-2021-S76

Economic aspects of livestock production in Pakistan: Past, Present and Future Scenario

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ABSTRACT:

The agricultural industry is critical to the Pakistan's economic growth, food security, job creation, and poverty reduction, notably at the rural level. It generates 19.2% GDP and employs around 38.5% of the labor force. Over the time, livestock has risen to become agriculture's largest subsector with 11.5% to GDP and 3% increase in Gross Value Addition in 2021. More than 8 million rural people rely on livestock for more than 35-40% of their income. Among the livestock animals, goats have outdone the rest with 80.3 million populations while the cattle are increasing with the highest percentage of 3.8%. Of the total, 80.62% milk has been consumed by the humans while 19.38% got wasted due to lack of chilling facilities, faulty transportation, and calf nourishment. In milk production, buffaloes are the largest producer with 60.24% of total milk production and 59.78% of the total milk is consumed. There is no net increase in sheep milk production and consumption. Among the red meat, beef is chiefly consumed that is 75.67% of the total red meat production and 48.02% of the total meat production. Cattle's milk production and consumption is increasing with the greatest percentage of 3.77 and 3.8, respectively. In hides production, cattle with 50.04% is the largest contributor but camels have the highest hide production rate of 1.8%. From the previous years, wool, dung, and blood consumption has increased with decrease in consumption of edible offal. Livestock is facing investment related issues that can be resolved by taking regulatory measures including modern slaughterhouses, diseases (like FMD, PPR, HS) free zones, proper animal breeding practices, better health care and artificial insemination units and principled management practices. The emphasis should be on breed development for increased production, the formation of a nucleus herd, and the identification of breeds that are well adapted to Pakistan's diverse agricultural climatic zones.

ICSBLCP-2021-S77

Evaluation of reproductive hormonal profile and haemotology of Chinkara deer (Gazella bennettii) in Pakistan

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ABSTRACT:

The present study was performed to investigate the blood and reproductive profiles of Chinkara deer in breeding and non-breeding seasons and to explore breeding potential of Chinkara deer farming practices in Punjab. Deer data including weight, feeding, sex, breeding was collected from government and private deer farms. Blood collection was done at different time intervals to evaluate the seasonal variations in the reproductive hormones. A total of 6 clinically normal male Chinkara deer were selected for the present study. The experiment was conducted in three phases. Phase-I was conducted for blood sampling before the start of breeding season in February. Phase-II was involved blood sampling at the onset of breeding season from March and April. During Phase-III, blood was collected after breeding season in May and June. Blood was collected via jugular vein in gel activated vacutainer. After blood sampling, it was immediately centrifuged at 10000 xg for serum separation. The serum samples were further analyzed for testosterone, FSH and LH hormone levels. Blood haemotology was conducted to determine PCV, RBC, Hb, WBC, MCV, MCH, platelets, and fibrinogen. Statistical analysis was performed to identify the significant association for blood and reproductive parameters of breeding and non-breeding season. There was a significant change in values of the hormones related to season."

Keywords: Chinkara deer, Breeding and non-breeding season, Haemotology

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Comparative efficacy of coconut oil and antibiotics in treatment of subclinical mastitis in dairy cattle

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ABSTRACT:

To determine the efficacy of coconut oil and antibiotics in SCM 30 cows affected with subclinical mastitis were randomly selected and allotted in to three equal groups viz G1, G2 and G3 respectively. Group 1 was treated with procaine penicillin @ 2,000,000 I.U intramammary route for 5 days and G2 was treated with coconut oil at the rate 50 ml orally per animal for 14 days regularly and G3 was kept as control. Milk samples were collected in sterile method from each quarter of udder at day 0, 7 and 14. Evaluation parameters were included Surf Field Mastitis Test, microbiological cultures, milk somatic cell count, effect of treatment on milk yield and composition. Surf Field Mastitis Test score was noticeably decreased to 1.027±0.135 in G1 and 0.842±0.429 in G2 on day 14. Surf Field Mastitis Test based cure rate was better 60% in G1 and 79% in G2 on day 14. The bacteriological cure rate was improved 55% in G1 and 70% in G2 on day 14 respectively. Somatic cell count was highly significant ($P<0.01$) and decreased to 4.50 in G1 and 3.2 in G2 on day 14. Milk yield was non-significant ($P>0.05$) and improved to 7% in G1 and 27.2% in G2 on day 14. Milk fat percentage was highly significant ($P<0.01$) and increased to 1.77±0.14 and 2.17±0.394 in G1 and G2 on day 14. Total solids were non-significant ($P>0.05$) and reduced to 10.044±0.104 and 10.069±0.099 in G1 and G2 respectively on day 14. Solid not fat was highly significant ($P<0.01$) and reduced to 8.274±0.217 in G1 and 7.899±0.509 in G2 on day 14. Comparison of therapies described that coconut

oil therapy is an economical, residue free and easily accessible for subclinical mastitis therapy in dairy cattle than antibiotics. Thus may be used as cost effective alternative therapy to antibiotics."
Keywords: Antibiotics, Mastitis, Coconut oil, Somatic Cell Count

ICSBLCP-2021-S79

Effect of probiotic Bacillus subtilis supplementation in Salmonella gallinarum challenged broiler chicks

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ABSTRACT:

Non-therapeutic use of antibiotic supplementation in poultry as growth promoters spans well over 50 years. The use of antibiotic growth promoters (AGPs) in poultry has been effective in controlling disease outbreaks, improving feed conversion ratio (FCR), and enhancing overall growth performance. However, the routine use of AGPs in poultry is being labeled as a health risk for humans due to the development of resistance against antibiotics. The commercial poultry industry is challenged to find sustainable natural alternatives to antibiotic growth promoters (AGP). To counter this challenge, probiotics have emerged as sustainably viable candidates to replace antibiotics use in poultry. The present study was conducted to find out the effects of B. subtilis in S. gallinarum challenged broiler chicks. For this purpose, B. subtilis was isolated from soil samples and further grown on nutrient broth for mass production. During the trial, one hundred chicks were divided into four different groups. Birds of group A were kept as control negative which was neither supplemented with B. subtilis nor was infected with S. gallinarum. Birds from groups C and D were supplemented with B. subtilis from day one. Group B and D were infected with S. gallinarum infection on the 14th day. Throughout the trial period, symptoms of the birds were recorded on daily basis. For hematological and immunological parameters, blood was collected from the wing vein of the birds with EDTA and without EDTA respectively. After the appearance of clinical signs, birds were slaughtered on weekly basis, and organs were collected for histopathological studies. Data were statistically analyzed using MSTAT-C software. The results of the study showed a significant improvement in weight gain and clinical signs along with histopathological parameters in birds supplemented with B. subtilis compared to control positive. Morbidity rates were also significantly lower in the probiotic-fed group (44% vs 88%) and mortality (32% vs 64%) compared to the non-supplemented group. The present study concluded that probiotic B. subtilis supplementation improves health parameters and survival rate in S. gallinarum challenged chicks.
Keywords: Probiotics, Bacillus subtilis, Salmonella gallinarum, Poultry, Broiler

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Computational and In-silico Analysis of Sorghum bicolor secondary cell wall gene CesA7 of CesA Family

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ABSTRACT:

Sorghum bicolor is an important annual C4 crop. It can be used in almost all renewable energy schemes proposed for renewable fuels and green technologies. Sorghum is also used as animal feed. CesA7 gene was focused from the CesA gene family, which is a gene that plays a role in the architecture of the secondary cell wall structure. By using different bioinformatics tools, the protein of CSL gene was analyzed. Firstly, nomenclature was constructed by using NCBI. Nomenclature involves the information which includes, gene name as cellulose synthase A catalytic subunit 7 [UDP-forming], gene symbol as LOC8076609, chromosome number 1, at position 4088 bp DNA linear, 5 exons are present along with accession number NC_012870 of the related gene. Subcellular localization found by using WOLFPSORT tool predicted that it is found in chlorophyll and mitochondria. Post/Co-translational Modifications Prediction were done GlycoEp, NetPhos and NetAcet. These tools predicted that no serine and threonine are present at 1-3 position. MotifFinder tool was used to predict number of motifs according to the superfamily which turned out to be 5. By using ARGOT2.5 web server 13 GO terms were observed. Protein-protein interaction was predicted by STING database and it showed that this protein is interacted with 10 other neighboring proteins. PFP-FunDSeq computed that this protein consists of (TIM)-barrel. CESA7 is required for cellulose synthesis and for secondary cell wall cellulose biosynthesis. Focusing on CesA gene family will lead us to cell wall architectural structuring.

Keywords: "CesA gene family, Secondary cell wall, Bioinformatics Tools, Protein Analysis

ICSBLCP-2021-S81

Computational and In-silico Analysis of Sorghum cell wall related DPH4 Protein Gene CSL

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ABSTRACT:

Biomass-based fuels provide a solution to the demand for ever-increasing energy. By being able to produce high-quality biomass in isolated areas with low input, grains have great potential to meet the needs of second-generation biofuels. Focusing on CSL gene from CSL gene family is important and characterizes as the gene playing role in architectural structuring of secondary cell wall. By using different bioinformatics tools, the protein of CSL gene was analyzed as nomenclature by using NCBI gene symbol as LOC8063709, chromosome number 2, 3 exons are present, and position of 3407 bp DNA linear is predicted along with accession number NC_012871. Subcellular localization was done by using WOLFPSORT tool and find out location on chloroplast and mitochondria, cytosol and plastids. CDD predicted 3-D structure and observed its alpha and beta helixes. Post/Co-translational Modifications Prediction used for prediction of O, N,C linked glycosites and predicted that no serine and threonine are found at 1-3 position against our sequence. PRISPRED tool predicted that there are more helixes and coils in the protein structure. Ebar plant predicted that this specific protein is connected with 49 neighboring proteins. Aside from the importance of sorghum plants in the biofuel and fodder industry, there is no comprehensive information on gene-related genes and family cells. It is important to identify the cell wall-related genes to understand the process of cell wall formation and to facilitate biomass management.

Key words: "CSL gene family, Secondary cell wall, Bioinformatics Tools, Protein Analysis

ICSBLCP-2021-S82

Computational and In-silico Analysis of Sorghum bicolor secondary cell wall related of GT47 Gene Family

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ABSTRACT:

Sorghum (Sorghum bicolor) is a valuable biofuel crop. Its biomass mainly contains cellulosic and non-cellulosic polysaccharides, both of which can be converted to biofuels. Biomass- based fuels provide a solution to demand for ever-increasing energy. By being able to produce high-quality biomass in isolated areas with low input, grain have great potential to meet the needs of second-generation biofuels. Glycosyltransferases (GTs) have many functions in plants, but the majority are likely to be involved in the biosynthesis of polysaccharides and glycoproteins in the plant cell wall. The glycosyltransferase (GT) 47 family is involved in the biosynthesis of xylose, pectin, and xyloglucan and plays a significant role in maintaining the normal morphology of the plant cell wall. GT47 gene family characterizes as the gene playing role in architectural structuring of secondary cell wall. By using different bioinformatics tools, the protein of GT47 gene family was analyzed by using NCBI. Subcellular localization was done by using WOLFPSORT tool and find out location on chloroplast and mitochondria, cytosol and plastid. CDD predicted 3-D structure and observed its alpha and beta helixes. Post/Co-translational Modifications Prediction used for prediction of O, C, N linked glycosides and predicted that no serine and threonine are found at 1-3 position against our sequences. PRISPRED tool Predicted that there are more helixes and coils in the proteins structure. Ebar plant

tool Predicted that specific protein is connected with 39 neighboring proteins. Aside from the importance of sorghum plants in the biofuel and fodder industry, there is no comprehensive information on gene-related genes and gene family cells.it is important to identify the cell wall-related genes to understand the process of cell wall formation and to facilitate biomass management."
Keywords: GT47 gene family, Sorghum bicolor, Biofuel, computational biology

ICSBLCP-2021-S83

Apitherapy in veterinary medicine

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ABSTRACT:

Medicine has failed to provide cures for so many diseases without having intolerable side effects. Whatever the problem natural medicines, herbal meals and vitamin supplements claim to be able to achieve which modern medicine has failed. This alternative healing treads has been arisen which are less harmful than synthesized medicines is called Apitherapy. It is the products of the honeybee hives i.e. honey, propolis, royal jelly, bee venom. Honeybee produce honey and other vital products are used in many types of diseases in livestock. Propolis have antibiotic properties that are used in treatment of animals in serious condition such as dog bite injury, Cushing's Syndrome in dogs, prostatitis in dogs, oral, gynecological, allergies, deep wounds and gastrointestinal disorders. Bee venom therapy was most effective in curing bacterial diarrhea in pre-weaning diseased animals and have anti-inflammatory affect which boost up the immune system of animals. Glycoprotein is isolated from honey which is anti-resistant to different types of drugs. Royal jelly is used as medicine in Asiatic apitherapy because it have many properties like anti-fungal, anti-viral and anti-bacterial and used in reproduction, wound healing and Graves' disease in dogs. Bee's products have a pharmacologically-active ingredients and every product have its own unique properties. Recognized actions contain anti-catarrhal, anthelmintic, anti-bacterial, anti-inflammatory, anti-fungal, anti-emetic, anti-oxidant, anti-spasmodic, stimulant diuretic, expectorant, sedative, astringent and tonic. So bee products should be used to solve animal pathologic problems i.e. mastitis in dairy herds, burn and wound management, surgery and dermatology in carnivores.
Keywords: Medicinal, anti-inflammatory, Propolis, Glycoprotein, Mastitis.

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Coexisting occurrence of ND and coccidiosis in pigeons in Multan

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ABSTRACT:

Pigeons (Columba livia) have been kept by human beings from decades due to their rousing characteristics. The most important diseases found in pigeons are Newcastle disease and coccidiosis. In Pakistan, there were limited studies on the combined effect of Newcastle disease (ND) and coccidiosis. To find out the combined effect, a survey was conducted to determine the point prevalence of Newcastle disease in pigeons. One hundred randomly selected pigeon farms were visited. From these pigeon farms, 34 sick birds were collected on the basis of clinical signs & symptoms. Then fecal examination was performed to find out the presence of coccidial parasite by

floatation technique. During survey 9% point prevalence of ND was found. Total 34 clinically sick birds were acquired on basis of clinical signs and symptoms from infected farms. The clinical sings & symptoms were found greenish mucoid diarrhea (100%), Torticollis (47%), Blindness (35%), shivering of neck (23%), paralysis of wings (5%). Whereas, feacal examination of sick birds revealed no coccidial parasite. So it is concluded that there was 9% prevalence of ND in Multan and the most repeated clinical sign showed by infected pigeons is greenish mucoid diarrhea, 2nd most occurred clinical sings is totticollis. Blindness, shivering of neck, paralysis of wings are 3rd, 4th and 5th respectively. Meanwhile, coexistence or mix infection of Newcastle Disease (ND) and coccidiosis is not observed during survey. "

Keywords: Newcastle Disease, Coccidiosis, Pigeon.

ICSBLCP-2021-S85

Drastic Effect of the Animal Lice on the Health of the Animal

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ABSTRACT:

Lice are tiny, flat-bodied insects with specialized legs that allow them to grab hairs. They are almost ectoparasite and belong to order Phthiraptera. There are about 5000 species of the lice in the world. About 4000 species of the lice are harmful for different birds and 800 species are harmful for the mammals. There are two types of the lice (sucking and biting) which affected the animals. Biting lice consume skin detritus while sucking lice take blood from the host. At the base of the cattle's hair, the species' female will deposit an egg. The eggs are attached to hairs separately and will hatch in two weeks. Lice are often seen on animals housed in crowded, filthy conditions, and might indicate additional welfare concerns or mistreatment. Animals with lice infestations generally have an unclean look, with a thin, scattered hair covering and patches of hair loss. These are very harmful for the animals because they don't live without the host blood. Due to this animal feel weakness and have maximum chance of anemia. According to the USDA, cattle producers lose up to $125 million per year as a result of lice infestations. It is very necessary to eradicate these lice for the betterment of the livestock. Most of the insecticide i.e. permethrin ivermectin and benzyl benzoate are useful for the eradication of the lice. Manual removal of the eggs of lice is useful for reducing the effect of lice. Regular monitoring of the high density animals, same treatment should be done at the same time on all the animals presented at a same place.

Keywords: Livestock, Lice, Insecticide, ectoparasite

ICSBLCP-2021-S86

Prospects of insects rearing as alternate food source for poultry: A review

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ABSTRACT:

Due to continuous increase in global population food security is becoming a serious concern for the policy makers and stakeholders. Poultry sector provides 40% of the total meat consumed worldwide and is a cheap and easy source of protein for ending malnutrition. The global poultry market stands at 231.5 billion US dollars. Every year, 50 billion birds are consumed across the world

that constitute 130 million tons of biomass. Poultry meat is enriched with high protein content as well as niacin, selenium and phosphorus. Poultry farming leaves lower carbon footprints, that's why it is regarded as ecofriendly as compared to other livestock. Poultry feed is mainly made from soyabean and corn. Both of these crops require large area of land and labor and are time consuming. Loss of agricultural land to residential areas, low crop yield due to climate change and new chicken breeds need more dietary supplements. All these factors force to look for a sustainable protein substitute that requires less energy and is environment friendly. Insects appears to be that one alternative protein source for poultry feed that has sufficient amount of protein content. Larvae of Black soldier fly (BSF) and mealworm, as well as maggot and pupae of housefly can be used as meal by the chicken. Larvae of BSF has higher levels of calcium. When facts were accessed regarding environmental loading ratio (ELR) or emergy sustainable index (ESI). The ELR improved from 1.99 to 1.04, while the ESI from 0.86 to 0.96. Mass rearing of insect larvae is beneficial not just for poultry farming but for environment also. It takes less space, less resources, less time to make insect based feed as compared to plant based feed. According to current estimates the insect feed market is valued at 687.8 million USD. Better infrastructure, processing, storage, distribution and marketing can help to enhance this approach for future needs."

Keywords: Food security, protein, poultry feed, protein substitute, energy, black soldier fly, ELR, etc,

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Use of fertilizer for sustainable agriculture production

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ABSTRACT:

For years chemical fertilizers are used to fulfill the soil requirement of nutrients and yield, but a large amount of these chemical fertilizers are dangerous for the environment, beneficial microbes, animals, and humans as well. Therefore, environmentally friendly and cost-effective biofertilizers are used. Biofertilizer are the substances which contain microorganisms those microorganisms may be fungi, bacteria, and protozoa which have the ability to increase the fertility of soil by Nitrogen fixation, Phosphorous solubilization, and Iron sequestration. These processes convert the insoluble form of nutrients into a soluble form and make it available to the roots of the plant which easily take them up and utilize them. There are a variety of crops whose productivity can be increased by applying biofertilizers such as rice, oat, and other grain crops. In this review we go through the way of application of biofertilizers, and how they help the plants and in which they help.

Keywords: Sustainable agriculture, plant nutrients, Biofertilizer, PGPR, phosphate solubilization, plant growth, nitrogen fixation, soil fertility.

ICSBLCP-2021-S88

Review on the assessment of benefits of machine milking technology among livestock farmers in Pakistan

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ABSTRACT:

Since the last two decades, the share in value addition of crop sub-sector has declined from 65% in 1990-91 to 42% in 2010-11. While the livestock share has enhanced from 30 percent to 55 percent over the same time period. The importance of the livestock sector in Pakistan can be judged from the fact that 80 million families are engaged in raising livestock and earn 35 percent of their income from this sector. Pakistan is the 4th largest milk producing country. Average milk production in Pakistan is about 6 liters per animal per day while it is 22 liter per day per animal in UK and 20 liter per day per animal in Germany. Literature revealed that Mastitis is one the major reasons for low productivity. It has been ranked top in animals disease which decreases lactation period by 57 days on an average. Moreover, the disease damages the quality of milk and its products. Though the current loss against this disease is not available, however, in Punjab, the total losses occurred due to this disease has been estimated to Rs. 240 million per year. One of the causes of the disease is hand milking. Moreover, the hygienic milking is not possible with hand milking. This unhygienic milk causes diseases in children as well as in adults. The farmers use concentrate and injectable oxytocin for milk let down. The lingering use of oxytocin for milk letdown causes addiction and reduces milk yield. In Pakistan 60% farmers using injections which are injurious to animal health. It is unethical and against animal welfare. Hand milking is time consuming, costly due to labor shortage. Use of machine milking is one of the processionary measure for saving animals from mastitis, the most dangerous disease. It is time saving, friendly for animals, more hygienic as well as increases average yield. Machine milking has been shown to have the potential to increase milk production by up to 12%, reduce labor by up to 18%, and improve dairy cow welfare. Therefore, it is concluded that milking three times with machine can increase milk yields in cows.

Keywords: Value addition, Livestock, Mastitis, Productivity, Milking machine

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Effect of different herbals extract on growth performance, organ development, blood chemistry, immunity and intestinal of broilers

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ABSTRACT:

This study investigated the effects of herbal extracts on growth performance, organ development, diabetic potential, immunity parameters and intestinal microbial population of broilers. Total 840(one day old) broiler chicks were divided into 5 groups with 6 replicates having 28 chicks in each replicate. The control group (G1) fed with basal diet and antibiotic group (G2) was added with 15 mg/kg virginiamycin, while herbal extracts groups were given coneflower 20 ml/liter (G3), neem 15 ml/liter (G4) and thyme 20 ml/liter (G5), respectively, in drinking water. The results showed that compared with antibiotic group, G3 presented a significantly lower feed intake and body weight. The antibiotic group had significantly lower relative weight of small intestine than all other groups. Relative weight of bursa of fabricius in G3 showed a significant increase as compared with other groups. Regarding diabetic parameters, it was found that blood sugar and cholesterol were significantly decreased especially in G3 compared to antibiotic and control group suggesting the strong anti-diabetic potential of herbal extract. Similarly, blood parameters including red blood cell, white blood cell and hemoglobin were improved with the supplementation of herbal extract indicating the improvement in immune parameters compared to control and antibiotic groups. Group 5 decreased

the E.colicontents whileG4 increased the Lactobacillus contents. In conclusion, coneflower improved feed conversion ratio compared to virginiamycin in broilers while Neem and thyme were the most effective in the enhancement of immune parameters, and decreased the serum triglyceride level and E.coil contents. "

Keywords: Broiler; growth performance; herbal extract; immunity; intestinal microbe

ICSBLCP-2021-S90

Efficiency evaluation of dairy sector under multioutput agriculture production systems in Pakistan

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ABSTRACT:

Agriculture production systems in Pakistan are characterized by multi-output production mechanism. To explore the efficiency of dairy farmers under multi-output system we have conducted the research in Punjab region of Pakistan. Translog output distance function approach is employed to evaluate the efficiency of farmers by employing the cross sectional data collected from 323 farmers. The study has found significant complementary effects between labor and irrigation, labor and land which suggests as the farm size increases, farmers shift towards better irrigation practices and adopt mechanization. The efficiency of the farmers is evaluated based on credit, age, experience, extension services, and rented land. We have found the 79 percent of the farmers are technically efficient which implies that by reducing technical inefficiencies, output can be increased by 21 percent.

Keywords: Multi-output, Translog, Inefficiency, Dairy Farmers, Pakistan

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Economic benefits of climate-smart agriculture (CSA) gained by the farmers in Pakistan: A group-wise comparison of adopters and conventional farmers

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ABSTRACT:

Climate change, conventional agricultural management practices, and increasing water scarcity pose a major threat to agricultural production and biodiversity as well as environmental sustainability. Climate-smart agriculture (CSA) is recognized as an efficient, sustainable and feasible agricultural system that plays a vital role in addressing the potential impacts of climate change in Pakistan. First-hand information was collected from 450 farm households in 24 villages from Okara, Sahiwal and Khanewal irrigation divisions, having various wheat-based cropping systems of Pakistan. This includes rice-wheat (RW), maize-wheat (MW), and cotton-wheat (CW) cropping systems in the Lower Bari Doab Canal (LBDC) irrigation system. This study estimated and compared the sustainability and efficiency analysis of CSA and conventional agricultural practices. This study also estimated the impact of water-smart practices of the CSA, technical training, and groundwater quality on agricultural production by using production function and bootstrap truncated regression. The

findings of this study revealed that adopters of CSA of the wheat-based cropping systems have higher economic benefits and improved resource use efficiencies compared to the conventional farmers. The findings of the study also revealed the increased efficiency of CSA adopters over other two systems in CW cropping system. The water-smart practices of CSA, access to credit, technical training, use of groundwater of varying quality, and other inputs also showed variations in the agricultural production and resource use efficiency. It has been concluded that farmers can earn more profit, save inputs (such as water) and increase their production by adopting water-smart practices of CSA. Hence the government and other relevant institutions should devise and implement policies that adequately addressed the importance and enhance the use of water-smart practices of CSA in Punjab and beyond."

Keywords: water-smart practices; climate-smart agriculture; cropping systems; resource use efficiency; Pakistan

ICSBLCP-2021-S92

Sustainability challenges for Aquaculture Production

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ABSTRACT:

A great variety of species are cultured around the globe, based on local preferences and suitability of growing conditions. Aquaculture is conducted in many locations and environments. This includes the use of streams and raceways, groundwater, rivers, ponds fed by rain, and coastal areas where tidal movements provide food and water exchange. In addition, some organisms are raised in cages placed in lakes, bays, and increasingly in the open ocean itself. Aquaculture can be conducted on an intensive (high density and high inputs) or extensive (low density and low inputs) basis. With all its potential benefits, aquaculture can also carry risks. Aquaculture has been responsible for introducing exotic and invasive animals, plants, and diseases around the world, often inadvertently through development assistance. Ecosystems have been disrupted by these invasive species or diseases, leading to reduced productivity of natural systems, loss of local livelihoods, and threats to local or even national economies. With intensive farming and the addition of more feeds and inputs, as required with higher trophic level animals or high intensity culture, the potential for producing more effluents, disease, and pollution can rise considerably. The use of good management practices, along with strong policy, regulation, and oversight, can help minimize these and other risks.

Keywords: aquaculture, challenges, exotic species, ecosystems

ICSBLCP-2021-S93

C4 protein of Cotton leaf curl Multan Virus interacts with Double stranded RNA binding Protein 5 of Nicotiana benthamiana

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ABSTRACT:

Cotton leaf curl viral disease has implicated a huge impact on Cotton production in Asian subcontinent. This disease is caused by single stranded DNA begomoviruses. Begomovirus has several multifunctional genes that are involved in viral replication, encapsidation and movement.

Moreover, many of these proteins also play gene-silencing suppression by targeting plant gene silencing machinery active against the viruses. This research was also designed in similar context to find the interaction of C4 protein of Cotton leaf Curl virus with Double stranded RNA binding protein 5 (DRB5) of model plant Nicotiana benthamiana. Plant DRBs proteins are involved in mRNA cleavage during RNA silencing. DRB5 is known to be involved in different kinds of silencing mechanism hence important to study. Interaction was studied by Yeast two Hybrid (Y2H) approach. Positive interaction of both genes was investigated upon selection of transformed yeast strains on nutrient minimal medium. Protein-Protein interaction was further validated via bimolecular florescence complementation approach (BiFC). Again, cloning was performed and positive clones were shifted into binary YFP vectors. These clones were transformed into Agrobacterium tumefaciens strain C58. N. benthamiana plants were infiltrated by agro-constructs to check the transient expression of interacting proteins. Fluorescence was observed and images were analyzed by laser scanning confocal microscopy. Both proteins were found to be interacting in leaf cells. It was observed that both protein were localized in cytoplasmic periphery. This study will help to get more knowledge about viral proteins so we may able to create any resistance strategies against CLCuD in future.

Keywords: CLCuMV, C4 protein, Yeast two Hybrid, BiFC, Suppressors of gene silencing

ICSBLCP-2021-S94

Expression of Newcastle Disease Virus Epitope in Nicotiana benthamiana

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ABSTRACT:

Viral diseases have greatly affected human lives and civilizations from time immemorial. The Newcastle disease virus (NDV) is causing lethal and highly contagious diseases in birds especially chickens and having a negative impact worldwide on the poultry industry. Although this virus has been effectively vaccinated, it is still prevalent in Pakistan and disease-related outbreaks have led to serious losses regarding mortality and loss in meat and egg production for the poultry industry in the country. Different genes of this negative single-stranded RNA virus have been sequenced, cloned, and expressed in plasmid-vectors in various organisms. There are different strategies to produce vaccines of NDV and plant-based vaccine (PBV) is one of them. Fusion (F) gene has the most virulence impact among the all-other genes of NDV. In this study, the epitope gene of NDV was cloned into the plant expression vector. Agrobacterium-mediated transformation of F gene in Nicotiana benthamiana was performed through the leaf disc method. The epitope was checked by amplification using specific primers through polymerase chain reaction (PCR). Real-time polymerase chain reaction (RT-PCR) was carried out to analyze the expression of the transgene in transgenic N. benthamiana plants. Through this research, we might be able to fight any pandemic disease within few months instead of producing a vaccine in several years in the future.

Keywords: Poultry; Newcastle Disease Virus; Agrobacterium-Mediated Transformation; Plant-Based Vaccine

ICSBLCP-2021-S95

Impact of different potting media on growth and flowering of zinnia plant

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ABSTRACT:

Zinnia (Z. elegan) is popular summer season annual flower of diverse colorful flowers that respond to potting media. Biochar and peat moss are important components of potting media for water retention, nutrient balance, pH, support beneficial microbial development. This study was performed to evaluate the impact of potting media on vegetative growth and flowering of two zinnia varieties (Dreamland, Profusion). Different combinations of biochar and peat moss along with silt were used as potting media. Data of different morphological, physiological and reproductive parameters was collected to evaluate the efficiency of suitable potting media for growth of zinnia under condition of South Punjab. Low concentration of biochar and higher concentration of peat moss significantly increased fresh weight and dry weight of roots, flower number, fresh and dry weight of flower, gaseous exchange and relative water content. Thus, it is suggested that low concentration of biochar could be used in the potting media of annual flowers for increases the growth and flowering attributes. Moreover, biochar application in the growing media could be a replacement of commonly and costly used peat moss.

Keywords: Annual flowers, Biochar, Peat moss, Physiology

ICSBLCP-2021-S96

Enhancing economy through poultry by-products

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ABSTRACT:

Poultry sector is one of the most organized and vibrant sector of agriculture in Pakistan. It contributes a major portion towards national GDP (1.4%). Poultry industry fulfils protein requirements by providing 1,75,000 million table eggs and 1,322 million kilo grams chicken meat annually. It generates large amount of poultry by products like offal, manure, blood, and feathers, shell wastes which are often wasted and cause environmental pollution. Processing of these poultry by products generate blood meal, feather meal, fertilizer and further increase economic outcome from poultry industry. Feathers represent 3-7% weight of the live bird and constitute a large proportion of waste products produced by poultry. Similarly, poultry manure contain nutrients like nitrogen, phosphorous and potassium, which are essential for crops production. In addition to this, manure can be composted that provide sustained release of minerals and also enhances water holding capacity of soil. Poultry industry has a huge impact on economy not only by providing meat and eggs but it's by products are also used as a potential source to further progression of Pakistan's economy.

Keywords: Poultry by-products, manure

ICSBLCP-2021-S97

The ticks of large ruminants: Why and How do they matter?

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ABSTRACT:

Large ruminants (cattle, buffalo, camel) play a vital role in Pakistan's total milk production. From a commercial viewpoint, Pakistan is expanding its capacity for bovine-origin fresh milk, processed/packaged milk and related dairy products. In this competitive scenario, the livestock ectoparasites can significantly decrease the productive and reproductive capacity of the livestock. Owing to the nuisance, hide damage, injection of toxins and transmitting capability of a broad range of bacterial, viral, protozoan and rickettsial pathogens, the ticks stand pivotal focus for control. Important genera of large ruminants include: Hyalomma, Rhipicephalus, Boophilus, Argas, Haemaphysalis, etc. Needless to mention the hardy nature, diverse life cycle stages and high degree of adaptability towards changing climate make ticks successful invaders of animal and human health. Control options for ticks at local scenario are limited due to lack of farmer awareness, self-prescribed arthropod control at farm levels, scarcity of promising acaricidal or tick repellent candidates. Moreover, another fuel to the injury is the emerging acaricidal resistance-the tip of the iceberg. These considerations signpost the urgent need to consider, monitor and devise ways to counter the tick problem in large ruminants. Livestock bio-economy can potentially enhance the standard of rural life, support national development goals and improvise the food safety. Therefore, focus on the ways to curtail the tick related factors decreasing livestock productivity should be the academic, scientific and research priority.

Keywords: Large ruminants, Ticks, Sustainable, Production

ICSBLCP-2021-S98

Expression profiling of gossypol gland initiation in cotton: a way forward to improve nutritive value in seedcake for livestock

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ABSTRACT:

Cotton (Gossypium hirsutum L.) is an important fibre and oilseed crop that plays a significant role in the world's economy including Pakistan. Climate change has changed the frequency and intensity of both biotic and abiotic stresses. Whereas land plants adapted several natural defence mechanisms to better cope with these environmental challenges. Gossypol is a specific toxic secondary metabolite in cotton plant (Gossypium spp.) that play a significant role in protecting the plant against several biotic stresses. But the presence of gossypol toxicity in cottonseed limits its consumption in human nutrition and animal feed inspite of quality edible oil and proteins. Gossypol diet effects the reproductive organs of male and female ovaries. Therefore, cottonseeds cannot be used directly to human beings, monogastric animals and require several chemical treatments that affect the

oil and cotton meal quality. Thus, the best approach would be to develop cotton cultivars with gossypol free seed for human and ruminant consumption and maintain a normal level of gossypol in other parts of cotton plant to shield against pests/pathogens. The complex metabolic mechanisms make gossypol a very difficult trait to study. To utilize gossypol in breeding implements, the understanding of gossypol initiation biosynthesis genes in important at different stages of organ development i.e., in developing embryo (ovule) and developing boll shell. For this purpose, a study planned to dissect the genetic basis of gossypol biosynthesis genes. Cotton germplasm of 100 genotypes screened visually based on gossypol glandedness and a core set of 10 genotypes was developed. Further three genotypes FH-330 (high glanding), F-280 (low glanding) and IRMA-197 (glandless) were used for determining the transcript abundance of twelve gossypol biosynthesis genes. Our results identify CYP706B1-D and CDNC-D are the candidate genes that mediate gossypol biosynthesis. This will provide scientists a way to manipulate gossypol contents in cottonseed to maintain the integrity of quality proteins and oil. Moreover, with suitable breeding strategies by providing gossypol free seed varieties in organic farming promise a sustainable agriculture without exerting any negative impact on ecosystem." Gene expression profiling, Gossypium, gland formation

ICSBLCP-2021-S99

Insecticidal efficacy of biosynthesized Silver nanoparticles, B. thuringiensis and Triazophos against Pectinophora gossypiella (Saunders) (Lepidoptera: Gelechiidae)

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ABSTRACT:

Pink bollworm, Pectinophora gossypiella (Saunders) (Lepidoptera: Gelechiidae) is key pest of cotton worldwide. Traditional management measures used by farmers are proved worthless to effectively combat this notorious insect pest. This study was conducted on finding an effective alternate to conventional insecticides and to evaluate the efficacy of some non-conventional pest control agents i.e. silver nanoparticles (AgNPs), bio-formulation (Bacillus thurengiensis) and a commercial insecticide (Triazophos) under laboratory conditions. Biosynthesis of AgNPs was carried out through the chemical action of aqueous leaf extract of neem (Azadirachta indica). Synthesized AgNPs were characterized by UV-visible spectroscopy and Transmission Electron Microscopy (SEM) techniques. Single and combined efficacy of AgNPs, Bt and Triazophos was evaluated against 2nd instar larvae of PBW and mortality rate was recorded at different time intervals i.e., 24 hours,72 hours and 120 hours.Results indicate that combined application of AgNPs+Triazophos (50ppm + 100 ppm) exhibited > 90% larval mortality as compared to other treatments. It was evident from the results that nanoparticles are efficient larvicidal agents for PBW control.

Keywords: AgNP, PBW,

ICSBLCP-2021-S100

Impact of fleas on the animal health and livestock

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ABSTRACT:

Fleas are wingless, small, hematophagous and cosmopolitan ecto-parasites belongs to the order (Siphonaptera) found on birds and mammals. The most of the fleas' species are known for spreading diseases in all over the world such as rat flea, dog flea *Ctenocephalides canis* and cat flea *Ctenocephalides felis* have a great impact on the animal health as well as livestock. Fleas play an important role as a vector in certain diseases pathogens like *Bartonella sp. and R. felis* becoming popular day by day. They causes severe irritation and allergic reaction, discomfort and reduction in blood. Fleas transmitted contagious diseases such as plague caused by the bacterium *Yersinia pestis* and found in wild animals and rodents. Flea-borne typhus is mainly caused by *Rickettsia typhi* and it is transmitted by the rat flea and cat fleas. The adult stage are found on the host and is necessary for transmission of diseases from one host to another host. Dogs are essential for the transmission of flea borne pathogens and act as a vehicle for fleas between the animals and their natural reservoirs. Fleas have the direct impact on the infested animal's especially when they have inflammation on skin and allergic reaction because they transmit pathogen (*Bartonella sp*) that can cause the contagious diseases in cat and other pets and also causes loss in meat, eggs and milk production and indirect loses are associated with contagious agents transmitted by fleas. The management of fleas involved the application of sprays, insecticidal dust and shampoo to the animal fur. Dusts are safe because they don't affect the animal's skin and produce less odour as comapared to insecticides. The effective method Plastic flea collars and tablets of lufenuron are also used for fleas effective treatment in cats and dogs. The flea treatment with effective ecto-parasiticides aids to prevent direct consequences of flea infestation on the pet and decreases the danger of flea-borne diseases in dogs and cats.

Key words: Fleas, hematophagous, contagious, allergic reaction, *Bartonella sp.*

ICSBLCP-2021-S101

Microbial Worth in Food Industry

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ABSTRACT:

The variety of microorganisms has a crucial role in the food industry to improve food quality and shelf life. Cyanobacteria, yeast, and lactic acid bacteria have a major role in the food industry. Microbial enzymes also have a very beneficial impact on the food industry. Different type's food fermentations are carried in the food industry. Foods can be protected from any type of danger by using different food processing technologies. A specific microbial is found in cheese that is made of both prokaryotes and eukaryotes which are particularly yeast. Nanotechnology is a positive generation for food protection and has authorized the formation of packing. For meat packaging, a new artificial cloth with silver particles has been advanced. Nano drugs contain fish oil and this nanotechnology also extended the shelf life of tomatoes. The conventional fermentation methods include pasteurization and sterilization are currently used for inactivation microbes in food however the new technology is growing which has a minor effect on the dietary content.

Keywords: Microorganisms; Food fermentation; Microbial enzymes; Food industry; Food protection.

ICSBLCP-2021-S102

Impact of climate change on ventilation of poultry farming in Pakistan

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ABSTRACT:

The control environment in poultry house is an energy intensive process due to requirement ofcmaximum production from the poultry birds. During the cooling and heating for poultry house is expensive due to current increasing pricing of energy. Similar, the temperature is increasing due to climate change. Pakistan is affecting from climate change severe as compare to develop countries. This study focused on climate change impact on ventilation system of poultry house. For the study region, statistical downscaling used to take air temperature as major factor. The increase in temperature from climate change scenarios highlighted the demand of energy for cooling and reduces the energy demand for heating as compare to current decade. On the other hand, warmer climate also increase water withdraw for cooling pad. These findings also to demand to alternative technology innovation as compare to cooling pad for future. The energy demands will also increase in future for the ventilation of poultry house. To mitigate the negative impact of climate change, it demands to change the production schedule to minimize the energy and adding insulation.

Keywords: climate change, poultry house, ventilation, Pakistan

ICSBLCP-2021-S103

Mass production of insects as alternate food source for fisheries

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ABSTRACT:

Due to an increase in human demand, animal-origin food production is growing at a faster rate around the world, by 2050, animal products consumption is expected to increase by 60–70%. Fish provide important protein that are essential for humans. Fish accounts for 16% of total animal protein consumed by humans worldwide. Aquaculture sector is a major player in protein supply chain to the humans in term of volume but availability of feed to the fisheries is going to be the major challenge in the coming decades. Aquafeed mostly consist of components that originates from oilseed crops, cereals, and marine residues. Aquafeeds also face tough competition as a feedstuff from swine and poultry farming which necessitates the development of complementary components. Feed expenses, which account for 60 to 70% of production costs and include meat meal, fishmeal, and soybean meal, are a key barrier to further development. In this regard, using insects as a source of nourishment for aquatic creatures might be a viable option. Insects are high in protein, calories, and fats. Insects provide a highly potential future option for animal protein production. Their nutritious content, along with their high food conversion efficiency and low water requirements, makes them a more sustainable option for animal-based food production. The nutritional properties, ease of raising, and biomass output of the larvae of black soldier fly, grubs of mealworm and adults of Orthopteran like grasshopper, locust and crickets and pupae of silkworm have also been studied. Although they aren't as good as already use fish feed but still it is a better option to use them as a replacement of a portion of fish meal (25% to 30%). But using insects as a feed is cost efficient and environment friendly approach.

Key words: Food security, Fisheries, Animal nutrition, Alternate feedstuff, Insects

ICSBLCP-2021-S104

Antibacterial potential of iron oxide nanoparticles in uropathogens

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ABSTRACT:
The treatment of infectious diseases caused by bacteria has become problematic due to antibiotic resistance in bacteria. The major cause of antibiotic resistance is the irrational use of antibiotics. Antibiotic resistance is common in urinary tract bacteria. Therefore, the development of alternative approaches to combat antibiotic resistance is needed. Advancement in green nanotechnology offers a great opportunity to limit the antibiotic resistance in microbes. Different nanomaterial-based antimicrobial agents, like nano-emulsions, have been traditionally used for the treatment of microbial infections. Nanotechnology has important role in treatment of urinary tract infections (UTIs) and made significant advancement in the treatment of UTIs by the use of metallic nanoparticles. Due to the antimicrobial properties of metallic nanoparticles, they can limit the growth of bacteria, allowing to overcome the multidrug resistance (MDR) and reduction in formation of biofilms through targeted drug delivery to the sites of infection. This study was planned to demonstrate the incidence of antibiotic resistance in uropathogens, which were isolated from urine of UTIs patients. In this study, antibacterial potential of iron oxide nanoparticles against uropathogens (Escherichia coli, Klebsiella pneumoniae, Staphylococcus aureus, Pseudomonas aeruginosa) was assessed. Sapodilla leaves were used for green synthesis of iron oxide nanoparticles. Sapodilla leave extract could reduce iron to iron oxide. A total 40 urine samples were collected from urology ward of Nishtar Hospital Multan, Punjab for culturing purpose. The samples were analyzed by disc diffusion and well diffusion methods. The growth of bacterial strains which shows resistance against antibiotics were limited by using colloidal iron oxide NPs ug/mL (40-80uL). Results suggested that iron oxide nanoparticles have antibacterial potential.
Keywords: Infectious diseases; Antibiotic resistance; UTIs; Nanotechnology; Iron oxide nanoparticles

ICSBLCP-2021-S105

Molecular detection and phylogenetic analysis of *Trypanosoma theileri* in cross-breed cattle in Southern Punjab, Pakistan

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ABSTRACT:
Trypanosmes species, including *Trypanosome evansi* (*T. evansi*) and *Trypanosome theileri* (*T. theileri*) have been reported in a wide range of mammalian species worldwide. Owing to the paucity

of information, the current study was designed to investigate the prevalence and genomic characterization of *T. evansi* and *T. theileri* in the cattle population in Southern Punjab Pakistan. Both conventional (microscopic examination) and molecular identification [polymerase chain reaction (PCR)] methods were applied for the detection of these parasites in blood samples. Using a PCR assay, 48 (20.1%) and 9 (3.7%) blood samples were positive for *T. evansi* and *T. theileri*, respectively with an overall 23.9% prevalence. Congruent phylogeny inferred with partial 18s small subunit gene (SSU rRNA) sequences indicated monophyletic clustering of the under-studied *T. theileri* strains together with *T. theileri* strains reported from the cattle population rather than those reported from Buffaloes. Based on the first-ever prevalence and genomic analysis of *T. theileri*, the current study suggested that the evolutionary dynamics of *T. theileri* strains may be constrained by host diversity. However, a more comprehensive understanding of the genetic diversity of *T. theileri* strains, using a large number and complete sequences from a diverse host species, is a prerequisite.

Keywords: *T. evansi*, *T. theileri*, PCR, Phylogeney, cattle, Pakistan

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Analysis of Milk Value Chain: A Case of Small Milk Producers in Punjab, Pakistan

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ABSTRACT:

Milk provides relatively quick returns for small-scale milk producers particularly in the peri-urban areas of Punjab province in Pakistan. These returns may be enhanced by adding value to milk but there are many constraints in the existing milk supply chain. The current milk supply chain system in Punjab is mostly informal in nature. The farmers usually sale milk to milk collectors who onward supply to consumers or small dairies. Some farmers sell fresh milk to the surrounding areas. Now farmers have started participating in value chain system through local dairies. It is considered more profitable venture for them. A binary logistic regression model was estimated to delineate effect of major variables affecting small milk producer's decision to participate in the milk value chain activities in two districts (Faisalabad and Multan) of Punjab province. A representative sample of 80 milk producers (40 from each district) was selected using stratified random sampling technique. The major findings suggested that estimated model was correctly specified as value of - 2 LL was 10.58, value of Nagelkerke R Square was 0.89 whereas Hosmer and Lemeshow test yielded a $\chi 2$ of 1.380 ($p>0.05$). According to estimated model, business experience of milk producers, monthly income and distance from processing station were the significant variables affecting their decision to participate in value addition whereas the variables (age, education, and ownership of business) showed insignificant impact. There is need to establish more processing stations particularly in proximity of small milk producers to develop milk value addition culture in the country.

Keywords: Value Addition, Small Producers, Nagelkerke R2, Logistic Regression