Proceedings of the National Seminar
On
"Emerging Trends and Opportunities in Livestock Sector of Balochistan"

On sideline of

Balochistan Livestock Expo

19-November, 2019

Abstracts

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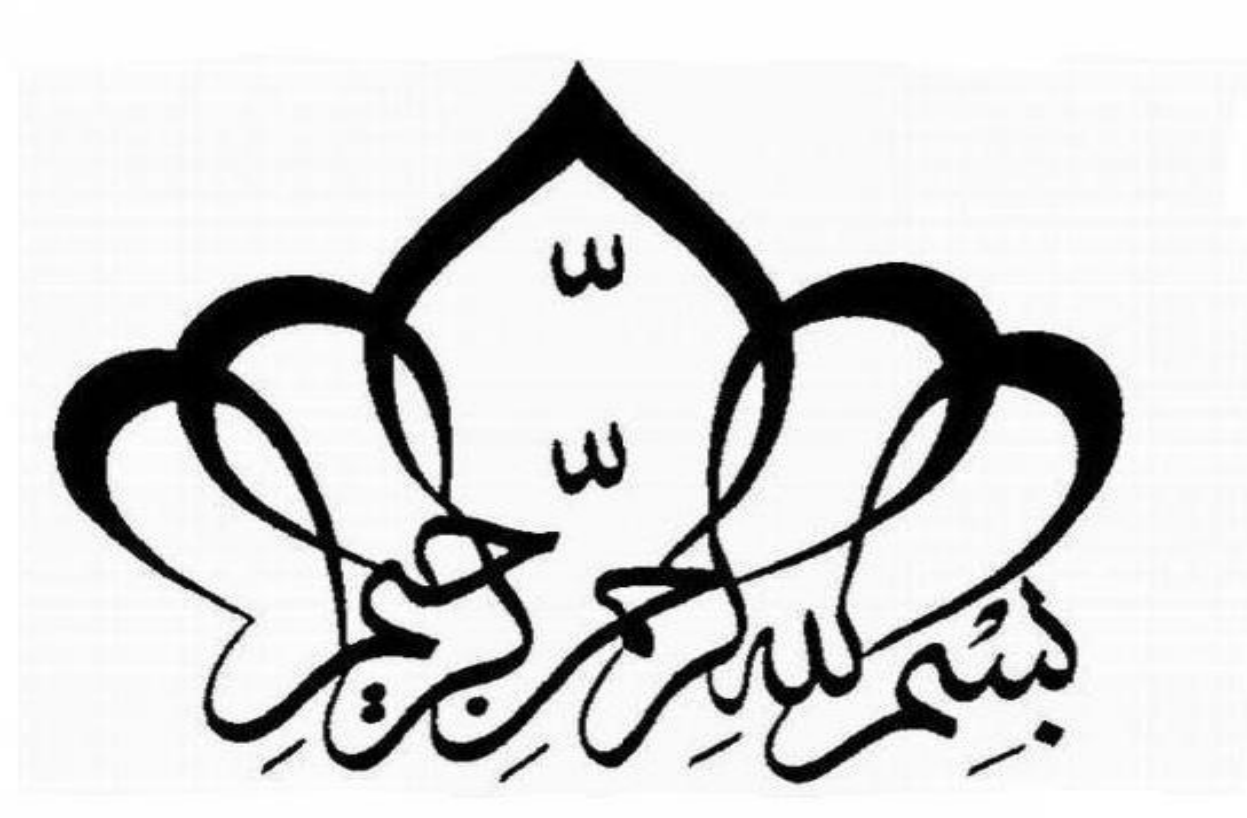
بسم الله الرحمن الرحيم

RATIONALE

Livestock sector is considered as one of the four economic pillars of Balochistan. Other three are mineral, agronomy, and coastal sectors. However, the sector has remained a primary product supply segment till now. Pakistan, recently, has witnessed economic benefits from investment in livestock value-addition and processing. Livestock sector was the only sector with positive growth in the GDP for the year 2018-19. Economic returns in livestock sector are much quicker than the other small and medium businesses, including agro-businesses. Balochistan is, primarily, livestock and rangeland economic entity of Pakistan. Its transformation from traditional to modern-commercial-industrial sector is need of the day. Above in view, Balochistan Government has prepared a 10-years' Livestock Policy (BLP 2020-30) which has focus to transform livestock sector into a commercial and industrial sector. Such a transformational policy and strategy requires attracting local and foreign investors from private sector.

National Conference on

"**Emerging Trends and Opportunities in Livestock Sector of Balochistan**"

Venue: Main Auditorium, University of Balochistan, Quetta

(19th November 2019)

SESSION I – INAUGURATION & OVERVIEW OF LIVESTOCK SECTOR

Registration of participants	8:30 am to 9:00 am
Welcoming of Guests and Participants	9:00 am to 9:15 am
Recitation of Holy Quran	9:15 am to 9:20 am
Opening Remarks about National Seminar Dr. Muhammad. Azam Kakar, Director, Planning & Development Livestock Department Balochistan, Quetta	9:20 am to 9:30am
New Initiatives of Government of Balochistan, in Livestock Sector Mr. Captain Fazal Asghar {Retd}, Chief Secretary Balochistan	9:300 am to 10:00 am
Guest Speaker from Iran	10:00 am to 10:15 am
Chief Guest: Jam Kamal Khan Chief Minister Balochistan	10:15 am to 10:45 am
Tea Break	10:45 am to 11:15am

SESSION II – ACADEMIA-INDUSTRY LINKAGES

Farmer, Academia-Industry Linkages for Livestock Sector Dr. NH Kholoro, DG PRI Karachi	11:30 am to 11:50 am
Business Opportunities of Livestock in Balochistan Mr. Dostain Khan Jamaldini, Secretary Livestock Department Balochistan	11:50 pm to 12:10 pm
A Success Story in Livestock Farming Mr. Mumtaz Khan Minhas Progressive Livestock Farmer and Ex-Minister Punjab	12:10 pm to 12:20 pm
Strategy for Eradication of FMD in Pakistan Dr. Muhammad Afzal, Food and Agriculture Organization Islamabad	12:20 pm to 12:40 pm
Transforming Livestock Resources into Exportable Surplus Prof. Dr. M Subhan Qureshi, President Dairy Science Park Pakistan, Ex-Dean FVAS, UA Peshawar	12:20 pm to 12:40 pm
Importance of Agriculture Technologies in Livestock Sector & Contribution of USAID PATTA project for their promotion through private sector Dr. Waqar Ahmed, USAID PATTA project	12:40 pm to 1:00 pm
Lunch and Prayer	1:00 pm to 2:00 pm

SESSION III – POLICY, REFORMS AND SUPPORT PACKAGES

Policy Reforms And Support Packages For Livestock Development Dr Ghulam Hussain Jaffar, Director General (E) Livestock Department Balochistan	2:00 pm to 2:20 pm
Panel Discussion: Suggestion and Remarks/Ideas from Participants	2:20 pm to 4:00 pm
Recommendations of the National Seminar Mr. Ejaz Sanjrani, Special Assistant to CM Balochistan	4:00 pm to 4:10 pm
Remarks and Vote of Thanks by Advisor to CM for Livestock Mr. Haji Mitha Khan Kakar	4:10 pm to 4:25
Conclusive Remarks from the Honorable Chief Guest Governor Balochistan Mr. Justice (Retd) Amanullah Khan Yasinzai	4:25 pm to 4:50pm
Vote of Thanks by Vice Chancellor University of Balochistan Quetta Prof. Dr. M. Anwar Panizai	4:50 pm to 5:00 pm

CONTRIBUTED PAPERS

AOH=Animal Health and One Health
APT= Animal Production and Technology
FRM= Fodder and Range Management
QCH= Quality Control and Halal Practices
BAH= Biotechnology and Animal Health
EDV= Entrepreneurship Development
PST= Poultry Sciences
FRMI= Farming Innovations

SR. NO.	CODE	TITLE/ AUTHOR	INSTITUTION
1.	AOH-01	Sequence diversity analysis of beta-casein gene, kappa-casein gene and interferon beta-1 gene in Pakistani camel breeds Masroor Ellahi Babar* Virtual University of Pakistan *masroor.ellahi@vu.edu.pk	Faculty of Science & Technology, Virtual University of Pakistan, Lahore
2.	AOH-02	Antiviral potential of Medicinal plants of Balochistan: studies based on the local investigations Fayaz Ahmed	Balochistan University of Information Technology, Engineering and Management Sciences, Quetta Pakistan
3.	AOH-03	Isolation of *Mycoplasma Mycoides* Subsp.*Mycoides* Small Colony in North And South Kordofan States, Sudan Eslah, A. D.O*, Neimat.M.E.E, Ahmed, S.I, Elgadal.A, Alhassan, G.E.M *eslahhabib@gmail.com	Ministry of Animal Resources. Animal Resources Research Corporation
4.	AOH-04	Recombinant Adenovirus Expressing Vesicular Stomatitis Virus G Proteins induce both humoral and cell-medicated immune responses in Mice and Goats Xiaojuan Xue, Yong Wang, Hongyan Jin, Lin Liang, Jiayang Li, Xiaolu Li, Zhaoyong Yu, Shangjin Cui, Gang Li* *gli358@gmail.com	Beijing Scientific Observation and Experiment Station for Veterinary Drugs and Diagnostic Technology, Ministry of Agriculture and Rural Affairs, Institute of Animal Sciences, CAS, Beijing China

5.	AOH-05	Emerging Public Health Concerns With MDR *S.Aureus* From Camel Milk In Distinct Agro Ecological Zones *Mahboob Ali *qaisbros@gmail.com	Livestock and Dairy Development Department Government of Balochistan, Quetta, Pakistan
6.	AOH-06	Prevalence of Bovine Babesiosis and Theileriosis in District Zhob, Balochistan Nasibullah Kakar, Mujeeb Ur Rehman* *mujeebnasar@yahoo.com	Civil Veterinary Hospital, Department of Livestock and Dairy Development Department, Zhob
7.	AOH-07	Phytomineral Supplementation for Better Animal Health and Cost Effective Control of Gastrointestinal Parasites Hafiz Muhammad Rizwan* dr.hmrizwan@yahoo.com	Section of Parasitology, Department of Pathobiology, College of Veterinary and Animal Sciences, Narowal Sub Campus UVAS, Lahore, Pakistan
8.	AOH-08	Evaluación of *in vitro* antiviral activities of the plants crude-extracts against Foot and Mouth Disease virus Faiza Ashraf* *dr.faizaash@gmail.com	Foot and Mouth Disease Research Center, Veterinary Research Institute, Peshawar, Khyber Pakhtunkhwa, Pakistan
9.	AOH-09	Characterization Of Corynebacterium Pseudo-Tuberculosis From Infected Sheep In Khartoum States, Sudan Almaani Omer *elmaani2015@hotmail.com	Central Veterinary Research Laboratory, Sudan.
10.	AOH-10	Control Of Congo Virus Infection In Pakistan Muhammad Tariq Javed *mtjaved@uaf.edu.pk	Department of Pathology, University of Agriculture Faisalabad
11.	AOH-11	Crimean Congo Hemorrhagic Fever (Cchf) In The Scenario Of Dsp-Bio-Risk Management In Pakistan Parkha Riaz Nasrullah, Azizullah, M.S. Qureshi and Mithat Direk	Department of Human Nutrition, University of Agriculture, Khyber Pakhtunkhwa, Pakistan
12.	AOH-12	Epidemiology And Control Of Gastrointestinal Nematodes Of Large Ruminants (Cattle) In District Quetta, Balochistan *Muhammad Ramzan *drmramadhan@yahoo.com	Department of Parasitology, University of Veterinary and Animal Sciences, Lahore, Pakistan

13.	AOH-13	Spatial Cluster Analysis Of Human Cases Of Crimean Congo Hemorrhagic Fever Reported In Pakistan Tariq Abbas *tariq.abbas@cuvas.edu.pk	Department of Epidemiology & Public Health, Cholistan University of Veterinary and Animal Sciences, Bahawalpur, Pakistan
14.	AOH-14	Emergence of pathogenic strains of *S. Aureus* in Goat milk, and their comparative response to antibiotics Iqra Muzammil, Amjad Islam Aqib* *amjadwaseer@gmail.com	Department of Medicine, Faculty of Veterinary Science, Cholistan University of Veterinary and Animal Sciences, Bahawalpur, Pakistan
15.	AOH-15	Optimization Of Procedure To Detect Foot And Mouth Disease Virus In Bovine Of Balochistan Asadullah[1,2], Jamil Ahmad[2], Ferhat Abbas[1] and Muhammad Azam Kakar[2]	Centre for Advanced Studies in Vaccinology and Biotechnology (CASVAB), University of the Balochistan, Quetta
16.	AOH-16	Screening Of Antibacterial Activity Of Five Medicinal Plants Of Balochistan-Pakistan Siraj Ahmed Kakar*, R.B.Tareen*, M. Azam Kakar**, Hameeda Jabeen*, Saeed-ur-Rehman Kakar*	University of Baluchistan, Quetta Pakistan.
17.	AOH-17	Ethno-Veterinary Practices in Camel and other Livestock in Balochistan, Pakistan Ihsanullah Kakar, M. A. Kakar, M. I. Memon	Department of Veterinary Medicine, Faculty of Veterinary Sciences, LUAWMS Uthal
18.	AOH-18	Epidemiological Studies On Arrested And Pasture Nematodes Larvae Infecting Sheep In Balochistan Hamdullah Kakar *hamdullahkakar@gmail.com	Livestock and Dairy Development Department, Quetta, Balochistan, Pakistan
19.	AOH-19	Risk Factors Assessment And Molecular Characterization Of Theileria In Sheep And Goat In Balochistan Mir Ahmad khan hanawal2005@gmail.com	Livestock and Dairy Development Department Quetta, Balochistan, Pakistan

20.	AOH-20	Indigenous Knowledge Of The Medicinal Plants Used For The Control Of Diseases In Small Ruminates In Balochistan, Pakistan Ihsanullah Kakar, Y. Musakhail, Mir A. Kakar and M. I. Memon	Department of Veterinary Medicine, Faculty of Veterinary Sciences, LUAWMS Uthal
21.	AOH-21	Prevalence and Chemotherapy of Ear Mite Infestation in Cat Tariq Khan, Asim Khalid Mahmood, Muhammad Sarwar Khan, Kamran Ashraf	Livestock and Dairy Development Department, Quetta, Balochistan, Pakistan
22.	AOH-22	Studies on Biology and Economic Importance of *Przhevalskianasilenus* in North-East Upland of Balochistan, Pakistan. Saadullah Jan saadcasvab@gmail.com	Centre for advanced studies in Vaccinology and Biotechnology (CASVAB) University of Balochistan, brewery road Quetta, Pakistan.
23.	AOH-23	Anthelmintic Activity Of Zinger Officinale Against Gastro -Intestinal Nematodes In Sheep In District Quetta, Balochistan Shah Mahmood Khan Kakar *skakar089@yahoo.com*	Livestock and Dairy Development Department, Quetta, Balochistan, Pakistan
24.	AOH-24	Seroprevalence And Hematological Study Of Enzootic Bovine Leukosis In Cattle Populations In And Around District Charsadda Umar Sadique	College of Veterinary Sciences, Faculty of Animal Husbandry and Veterinary Sciences, The University of Agriculture, Peshawar-Pakistan
25.	AOH-25	Ethno Veterinary Practices by Buffalo Farmers in Southern Punjab: An Observational and Questionnaire Study A.Faraz drasimfaraz@bzu.edu.pk	Department of Livestock and Poultry Production, Faculty of Veterinary Science, Bahauddin Zakariya University Multan, Pakistan

26.	AOH-26	Phytochemical Studies On *Catharanthus Roseus* Through Supercritical Carbon Dioxide Extraction Fouzia A. Sattar, Fayaz Ahmed, Khalija Awang, Samina A. Sattar, M. A. K. Malghani and Muhammad I. Choudhary	Balochistan University of Information Technology, Engineering and Management Sciences, Quetta Pakistan
27.	AOH-27	Review Article; Haemonchosis (Haemonchus Contortus) In Small Ruminants Din Muhammad	Arid Zone Small Ruminants Research Institute Kohat, KPK
28.	APT-28	Potential of Application of Modern Genomic Technologies to Enhance Productivity of Livestock in Balochistan Masroor Ellahi Babar*, Abdul Wajid and Tanveer Hussain *masroor.ellahi@vu.edu.pk	Faculty of Science & technology, Virtual University of Pakistan, Lahore
29.	APT-29	Evaluation Of Ambient Management Interventions On The Physiological And Behavioral Performance Of Lactating Sahiwal Cattle During Hot Humid Summer Mehtab Ahmad ***mehtabqais@gmail.com***	Livestock and Dairy Development Department, Quetta, Balochistan, Pakistan
30.	APT-30	Camel: A potential meat animal of the Future Muhammad Tariq*, Abdul Waheed, Bahar-e-Mustafa, Zia Ur Rehman and Muhammad Ashraf *tariqlm@uaf.edu.pk	University of Agriculture, Faisalabad Sub-Campus Toba Tek Singh
31.	APT-31	Buffalo a major Dairy Animal: Its Socio-Economic impact in poverty alleviation in rural areas of Pakistan Muhammad Tariq*, Muhammad Aslan Mirza, Muhammad Fahad Bhutta and Ri Mustafa *tariqlm@uaf.edu.pk	University of Agriculture, Faisalabad Sub-Campus Toba Tek Singh

32.	APT-32	Dairying: an effective tool for food security in Pakistan Muhammad Tariq* and Muhammad Aslam Mirza *tariqlm@uaf.edu.pk	Department of Livestock Management, University of Agriculture, Faisalabad
33.	APT-33	Balochistan Nari Master And Its Importance For The Future Beef Industry Of Pakistan Azizullah and Fayyaz Ahmed	Livestock and Dairy Development Department, Quetta, Balochistan, Pakistan
34.	APT-34	Dairy And Milk Processing And Its Future Prospects In Balochistan, Pakistan Masood ul Haq Kakar, Ehsanullah Kakar, Naseebullah Kakar	Faculty of Veterinary and Animal Sciences LUAWMS, Uthal, Pakistan
35.	APT-35	Nutrient Requirements For Buffaloes – A Short Communication A.Faraz drasimfaraz@bzu.edu.pk	Department of Livestock and Poultry Production, Faculty of Veterinary Science, Bahauddin Zakariya University Multan, Pakistan
36.	APT-36	Buffalo Production Profile In District Sahiwal, Punjab A. Faraz drasimfaraz@bzu.edu.pk	Department of Livestock and Poultry Production, Faculty of Veterinary Science, Bahauddin Zakariya University Multan, Pakistan
37.	APT-37	Hygienic Quality Of Milk Samples Collected From Different Production System In Khartoum State, Sudan L. M. Warsama areejwarsmaq3@gmail.com	Department of Dairy Production, Faculty of Animal Production, University of Khartoum, P. O. Box 321, Khartoum, Sudan
38.	APT-38	Performance Of Crossbred Cows In The Province Of Balochistan, Pakistan Muhammad Arif Kakar, Amjad Ali, Muhammad Azam Kakar, Ghulam Hussain Jaffar	Livestock and Dairy Development Department Balochistan, Quetta, Pakistan

39.	APT-39	Preservation Of Fresh Buffalo Milk By Activation Of Lactoperoxidase System Masood ul Haq Kakar, Muhammad Akbar Arain and Muhammad Khaskhaili	Faculty of Veterinary and Animal Sciences, LUAWMS, Uthal
40.	APT-40	Assessment Of Wool Characteristics Of Mengali Sheep Of Balochistan Muhammad Masood Tariq tariqkianiraja@hotmail.com	Center for Advanced Studies in Vaccinology and Biotechnology (CASVAB), University of Balochistan, Quetta, Pakistan
41.	APT-41	Study Of Non- Genetic Factors Affecting Milk Production In Beetal Goat Maria Mukhtar, Amjad Farooq, Abdul Waheed	Faculty of Veterinary Science, Bahauddin Zakariya University Multan, Pakistan
42.	APT-42	Organic Acid: A Potential Marination To Improve Saftey Of MeaT M.Zohaib Arshad zohaibzabi193@gmail.com	University of Agriculture Faisalabad Sub Campus Toba Tek Singh
43.	APT-43	Performance Profile Of Friesian Cows Kept In Balochistan, Pakistan Muhammad Bilal, Muhammad Azam Kakar and Ghulam Hussain Jaffar	Livestock and Dairy Development Department Quetta, Balochistan, Pakistan
44.	APT-44	Preservation Of Fresh Red Sindhi Cow Milk By Activation Of Lactoperoxidase System Masood ul Haq Kakar, Muhammad Akbar Arain and Muhammad Khaskhaili	Faculty of Veterinary and Animal Sciences, LUAWMS, Uthal
45.	APT-45	Production Profile And Reproductive Health Of Buffaloes In Response To Oxytocin Administration A. Faraz drasimfaraz@bzu.edu.pk	Department of Livestock and Poultry Production, Faculty of Veterinary Science, Bahauddin Zakariya University Multan, Pakistan
46.	APT-46	Some Morphological, Fertility And Growth Traits For Mengali sheep Of Balochistan, Pakistan Mohammad Masood Tariq	Center for Advanced Studies in Vaccinology and Biotechnology (CASVAB), University of Balochistan, Quetta, Pakistan

47.	APT-47	Effect Of Feeding Maize, Sorghum And Oat Silage On Growth Performance Of Nili-Ravi Buffalo Calves During Summer In The Sub-Tropical Region Of Pakistan Rafiuddin *rafi_kaka27@yahoo.com*	Livestock and Dairy Development Department Quetta, Balochistan, Pakistan
48.	APT-48	Study Of Relationships Among Different Body Dimensions In Sheep Sidra Fida*, Amjad Farooq, Abdul Waheed	Institute of Pure and Applied Biology, Bahauddin Zakariya University, Multan
49.	APT-49	Health Benefits Of Camel Milk – Food For Life A. Faraz drasimfaraz@bzu.edu.pk	Department of Livestock and Poultry Production, Faculty of Veterinary Science, Bahauddin Zakariya University Multan, Pakistan
50.	APT-50	Heritability Of Pre-Weaning Growth Performance Traits In Mengali Sheep In (Balochistan) Pakistan Muhammad Masood Tariq tariqkianiraja@hotmail.com	Center for Advanced Studies in Vaccinology and Biotechnology (CASVAB), University of Balochistan, Quetta, Pakistan
51.	FRM-51	The Afghan refugee role in cultivation of fodder for livestock in Balochistan Muhammad Aziz aziz1sh@hotmail.com	Institute of Biochemistry, University of Balochistan, Quetta, Pakistan
52.	FRM-52	Determination of seasonal nutritional composition of major range forage species of scrub rangelands Ahmad Hussain*, Mohammad Kabir, Sadaf Siddique, Hidayat Ullah and Kaleem Mehmood *ahmad.hussain@uoh.edu.pk	Department of Forestry & Wildlife Management, University of Haripur, KPK
53.	FRM-53	Effect Of Varying Levels Of Sugar Beet Pulp As An Alternate Fiber Source In Total Mixed Ration On Growth Performance, Blood Metabolites And Body Condition Score In Fattening Of Nili Ravi Buffalo Calves Saeed Ahmed saeed.ahmed@uvas.edu.pk	Department of Animal Nutrition, Faculty of Animal Production and Technology, University of Veterinary and Animal Sciences, Lahore

54.	FRM-54	Mycotoxins In Dairy Animal Feed And Their Health Effects; Diagnostic Aids And Treatment, A Big Animal Health Challenge Habib-Ur-Rehman hur_2085qta@yahoo.com	Department of Microbiology, University of Balochistan, Quetta, Pakistan
55.	FRM-55	Qualitative and Quantitative Analysis of Nitrate Contents in Livestock Fodder Ghazunfar Rashid ***ghazanfarrasheed@yahoo.com***	Livestock and Dairy Development Department Quetta, Balochistan, Pakistan
56.	FRM-56	Dairy Animal Feeding And Food Safety Systems In Pakistan With Special Reference To World Trade Organization Muhammad Abbass Shah	Livestock and Dairy Development Department Quetta, Balochistan, Pakistan
57.	QCH-57	Meat Industry In Balochistan With Special Reference To Halal Meat Iqra Ayub iqrakool@yahoo.com	Center for Advanced Studies in Vaccinology and Biotechnology (CASVAB), University of Balochistan, Quetta, Pakistan
58.	BAH-58	Artificial Gene Analyzer (Aga): A Bioinformatics Tool For Analyzing Inserted Gene Naveed Iqbal, M.A Kakar, A. Wali and Nazeer Ahmed	Balochistan University of Information Technology Engineering & Management Sciences (BUITEMS), Quetta, Pakistan
59.	BAH-59	Whole Genome Sequencing Of Cattle Breeds From Pakistan And Their Use In Genomic Selection For Enhancing Milk And Meat Production Shahid Mansoor	National Institute for Biotechnology and Genetic Engineering (NIBGE), P O Box 577, Jhang Road, Faisalabad, Pakistan
60.	BAH-60	Role Of Biotechnology In The Prosperity And Food Security Through Sustainable Livestock In The Developing World Muhammad Azam Kakar and Fayyaz Ahmed	Livestock and Dairy Development Department Quetta, Balochistan, Pakistan

61.	BAH-61	Analysis Of Genetic Characteristics Of Indigenous Harnai Sheep Native To Northern Balochistan, Pakistan Under Conservation By Microsatellite Markers Muhammad Ali Khan drkhanpishin@yahoo.com	Center for Advanced Studies in Vaccinology and Biotechnology (CASVAB), University of Balochistan, Quetta, Pakistan
62.	EPD-62	Role Of Women In Livestock And Dairy Development In Balochistan, Pakistan Shahana Tabassum	Balochistan Rural Support Program (BRSP) Quetta
63.	EPD-63	Challenges And Future Scope Of SME Sector: Specially Access To Finance In Balochistan Shakoor Ahmed	Provincial Chief, SMEDA Balochistan Quetta
64.	EPD-64	Camel Milk In Balochistan; An Unearthed Product Needs Collaborative Strategy To Alleviate Poverty Of Camel Farmers Illahi Bakhsh Marghazani marghazani76@yahoo.com	Lasbela University of Agriculture, Water and Marine Sciences, Uthal, Balochistan
65.	EPD-65	Government Supportive and Small Ruminants-Holders' Partnership Business Model Through Financial Inclusion and Marketing Strategy in Balochistan-Pakistan *Muhammad Shafiq forshaf@gmail.com	Department of Commerce, University of Balochistan, Quetta
66.	EPD-66	Export Possibility Of Baluchistan's Halal Red Meat; Potentials And Optimization *Muhammad Shafiq forshaf@gmail.com	Department of Commerce, University of Balochistan, Quetta
67.	PS-67	Comparative evaluation of hatchability traits & fertility of Rhode Island Red (RIR) & Black Australorp (BA) under local conditions of Hazara division Zia Ur Rehman, Din Muhammad*, *drdinmuhammad2009@gmail.com	Poultry Research Institute Jabba Mansehra, KPK

68.	PS-68	Evaluation of Two Vaccination Regimes for Newcastle Disease Vaccination in Broiler Yasir Amin, Zia Ur Rehman, Din Muhammad*, Ishtiaq Ahmed, Zubair Ali and M Ayaz *drdinmuhammad2009@gmail.com	Poultry Research Institute Jabba Mansehra
69.	PS-69	Antimicrobial Evaluation of Plant Extracts against Common Poultry Pathogens Sadaf Raana, Muhammad Ovais Omer*, Muhammad Adil Rasheed, Aftab Ahmad Anjum, *ovomer@gmail.com	Department of Pharmacology and Toxicology, University of Veterinary and Animal Sciences, Lahore, Pakistan
70.	PS-70	Effect of liquorice (*glycyrrhiza glabra*) root extract as immunostimulant hypocholesterolaemic hepatoprotective anticoccidial and growth promotant in broiler chicks Muhammad Usman Ghani *drdinmuhammad2009@gmail.com	Livestock and Dairy Development Department Quetta, Balochistan, Pakistan
71.	PS-71	Fruit Orchards Can Augment Farmers' Income Through Production Of Organic Chicken Eggs Sar Zamin Khan, Rafiullah Khan and Naseer Ahmad	Department of Poultry Science, University of Agriculture Peshawar, Pakistan
72.	PS-72	Role Of A Locally Prepared Bivalent Inactivated IBV Vaccine To Control IB Disease In Layer Chickens *Salman O. G.A ***sherein.abdelgayed@vet.cu.edu.eg***	Newcastle Disease Department, Veterinary Serum and Vaccine Research Institute, Abbasia, Cairo, Egypt. Pathology department, Faculty of Vet.Med., Cairo Univ., Egypt.
73.	PS-73	Production Of Zn Bacitracin By *Bacillus Licheniformis* Using Molasses As Fermentation Media Muhammad Idrees Achakzai, Zia Ud Din, Dawood Bazai, Syed Nasrullah Agha and Ashraf Khan Barech	Livestock and Dairy Development Department Quetta, Balochistan, Pakistan

74.	PS-74	*In-Vitro* Antimicrobial Activity And Minimum Inhibition Concentration Of Selected Culinary And Medicinal Herbs Majed Rafeeq majid_casvab@yahoo.com	Center for Advanced Studies in Vaccinology and Biotechnology (CASVAB), University of Balochistan, Quetta, Pakistan
75.	PS-75	Effect Of Herbal Feed Additive On The Growth Performance Of Broiler Chicks Alternative To Antibiotic Majed Rafeeq majid_casvab@yahoo.com	Center for Advanced Studies in Vaccinology and Biotechnology (CASVAB), University of Balochistan, Quetta, Pakistan
76.	PS-76	Effect Of Herbal Feed Additives On The Performance Of Broiler Chicken Majed Rafeeq majid_casvab@yahoo.com	Center for Advanced Studies in Vaccinology and Biotechnology (CASVAB), University of Balochistan, Quetta, Pakistan
77.	PS-77	Effect Of Herbal Aqueous Infusion On The Performance Of Broiler Chicken Majed Rafeeq majid_casvab@yahoo.com	Center for Advanced Studies in Vaccinology and Biotechnology (CASVAB), University of Balochistan, Quetta, Pakistan
78.	PS-78	Comparative Efficacy Of Salinomycin Sodium, Diclazuril And Steroidal Sapogenin For The Prophylaxis Of Coccidiosis In Broiler Chicks Muhammad Essa Kakar drmuhammadessa_kakar@yahoo.com	Livestock and Dairy Development Department Quetta, Balochistan, Pakistan
79.	PS-79	Yeast As Alternative To Plant And Animal Protein Source In Poultry Irfan Hashmi irhashmiees@gmail.com	Feed Tech Division, Ghazi Brothers, Lahore, Pakistan.
80.	FRMI-80	Normality Tests Of Morphological Measurements Of Sheep, A Study From Pakistan Ansar Abbas, AmanUllah, Abdul Waheed	

81.	FRMI-81	Development Of Prediction Models For Estimating Live Weight In Sheep Aroona Saif[*1], Amjad Farooq[1], Abdul Waheed[2], Asim Faraz[2], MM Tariq[3]	Institute of pure and Applied Biology, BZU Multan
82.	FRMI-82	Computational Model In Livestock Muhammad Aziz	Institute of Biochemistry, University of Balochistan, Quetta, Pakistan
83.	FRMI-83	Usability Of Bootstrap Aggregating (Bagging) Mars Algorithm For An Animal Data Set As A Hybrid Approach Ecevit EYDURAN	Iğdır University, Faculty of Economics and Administrative Sciences, Department of Business Administration, Quantitative Methods, Iğdır, Turkey

IS-01

TRANSFORMING LIVESTOCK RESOURCES OF BALOCHISTAN INTO EXPORTABLE SURPLUSES

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ABSTRACT

Livestock resources

Balochistan is the largest province of Pakistan contributing 44% of national territory. The province has got a huge livestock resource-based sharing 42% of national sheep, 41% camel, 22% goats populations. The Livestock Department has been providing services to the farmers and BRSP has been supporting livestock farmers through a network in 25 districts. However, the commercial aspect of this resource-base is still unexplored and poverty level in the province is high (52%) according to a report of Sustainable Development Policy Institute (SDPI).

The Development approach

The GoB and FAO have joined hands for developing livestock resources of the province through coordinated efforts. Dairy Science Park (DSP) consulted various stakeholders in the province comprising local universities, SMEDA and Chamber of Commerce and Industries for utilization of the indigenous resources under Livestock Techno park Quetta (LTQ), an autonomous body with full legislative, financial am thankful to the Food and Agricultural Organization of the United Nations at Islamabad, Pakistan for giving me this opportunity to serve the people of the war-hit region of Khyber Pakhtunkhwa. Of course, this was an exciting task for me, as I have interacted with various stakeholders across the livestock-based value chain during my 36-years regular career as a civil officer with the provincial government and as a professor/dean at the University of Agriculture Peshawar. I got a productive interaction with the private sector, policy makers and international players through academia-industries-government linkages.

The challenges

In Baluchistan and Khyber Pakhtunkhwa the dairy, mutton, poultry and fish farmers are usually landless people, living a life with little access to quality foods and education. Their income is usually very little in spite of having a huge resource-base and the food they are producing for the consumers in the form of milk, meat and eggs, is neither assured for quality parameters, nor monitored under some traceability system. They are subjected to penalty by the district administration when they sale meat and milk of pure quality at somewhat higher prices. Hence the livestock and poultry farmers are facing unbearable financial burden and most of these valuable assets are on way to total collapse. Ten public and private sector organizations are mandated for serving the Livestock Sector covering extension, research, fisheries, education, livestock markets, slaughter houses price regulation, food safety, trade and farmers' welfare. However, lack of coordination and their apathy towards the farmers and processors, has left the burning issues unattended.

The DSP approach

DSP has worked with the stakeholders across the livestock value chain, in the public and private sectors and proposed establishment of livestock techno parks as good governance models. These techno parks would work as under the regulatory framework of Academia-Industry-Government-Society Nexus as autonomous bodies. LTQ has been suggested to be established, initially as a Task Force through an executive order and later on through an Act of the Legislative Assembly/Ordinance of Governor; with full regulatory, administrative, financial and legislative powers to protect all the stakeholders of the livestock industry, and engage all relevant private and public sector organizations with shared authority and responsibility.

The Good Governance Model

Governance was described as more than ever a driving concern in FAO's work and was considered critical to achieving FAO's Strategic Objectives (FAO 2019). At the global level, FAO works to build institutions and mechanisms that provide international norms, standards and data, promote international cooperation, and support an enabling environment for effective collective action to solve problems that cannot be addressed, or as effectively addressed, working at national level alone. FAO works at the global, regional and national levels providing coherence on governance issues.

At country level, the governance lens looks beyond purely technical issues to highlight how people, institutions and authority interact to influence political decision-making. Using political economy and stakeholder analyses, FAO helps governments identify their most important governance challenges related to food and agriculture, and improve the inclusiveness of their policies and programs to address them more effectively.

DSP has been involved with the provincial and federal governments, the academia and private sector for a long period of 36 years. DSP governance model has been developed through extensive interaction with the stakeholders during this period (DSP 2019). A consultancy was completed for FAO-KP with the report titled, "Transforming Livestock Resources into a Beacon of Hope through a Good Governance Model", as an attempt to transform the current system of governance, concentrating the powers within a single stakeholder, into a new model with shared authority and responsibilities for all the four stakeholders, namely, LDD Ext, LDD Res, UAP and the private sector, under the umbrella of Livestock Techno park Peshawar.

The development programs of provincial and federal government utilize funds for various projects, but with negligible impact on the medium sized commercial poultry and livestock farmers. As a result, the farming resource base is facing socio economic pressure, compelling farmers to change the business. Especially the young educated family members look at the miserable conditions of their parents and try to avoid joining farming business.

Livestock Techno parks

The Governance Model proposed by DSP reflects their initiative for establishing Livestock Techno parks (LTs), founded on the six SDGs; initiated through on-campus development of entrepreneurship models; supported by Extension and Research wings and industry/civil society

for building the entrepreneurship network; leading to Halal food export. LTs would be used as an interactive platforms for achieving the Sustainable Development Goals #2, covering production of milk, meat and milk for local consumption; SDG #3 covering food safety for protection of public health; SDG 5, engaging women in the livestock sector transformation process; SDG 7, providing biogas and solar energy for farm operations and processing factories; SDG 8, ensuring generation of decent employment for the youth through business incubation and entrepreneurship development and; SDG 16, ensuring end of conflict among stakeholders in the private and public sectors. Livestock Techno park Quetta (LTQ) would be established as the leading provincial body for transformation of the livestock resources into a network of entrepreneurship for generating decent employment and exportable surpluses.

Business Incubation

Business Incubation is the only remedy for entrepreneurship development on modern lines and to make it compatible with the market demands, consumers' preference and acceptability of the community and cultures. University of Agriculture Peshawar, has tried its best to develop such models through university industry interaction as business incubation models, under deanship of the author for two tenures. Postgraduate thesis research was redesigned to meet expectations of the industry and civil society and train the postgraduate scholar as a scientist as well a potential entrepreneur.

The present farming system comprises of small scale subsistence activities in the rural areas, or opportunity cost-based traditional family farming, mostly inherited from forefathers, in the peri-urban areas. The farmers are mostly illiterate with no awareness about their own health, animal health or impact of their farm products on public health. Dairy buffaloes are usually kept under the peri urban dairy farming system, with few crossbred dairy cows.

Quails have been introduced in the region through various non-government organizations in cooperation with the University of Agriculture Peshawar. Master and PhD thesis were produced on various issues of quails' fertility, hatchability, growth and stress management (DSP 2016). Through the reshaped postgraduate research, the Poultry Science Department of the University successfully came up with several entrepreneurship models under a revolving fund. Various poultry birds were studied including quails. Several studies were conducted under a revolving fund, to investigate the feed conversion ratio, supplementation of antioxidants, growth pattern, breeding efficiency and effects of aflatoxins on economic parameters and other aspects. It was concluded that AFB1 is capable of inducing clinico-biochemical reactions and alterations in different organs when fed to quails in different concentrations.

A study on effect of organic acids on the performance of Japanese quails found that net return was significantly higher by the supplementation. Two studies were conducted to investigate efficiency of artificial insemination and identification of a suitable extender and their effect on quail eggs fertility. AI showed good results in Japanese quails in term of least fertility related problem as compared to natural mating. Proctodeal gland foam extender was found to be very effective for fertility, hatchability, sperm motility and count and as well as economical, in terms of cost per chick. Analysis of the data generated on quails at the Department showed that a

rolling fund of Rs. 400,000 generated Rs. 42,000 per month which is an excellent entrepreneurship model for the region.

Nutrition is mostly imbalanced, not meeting the protein, energy and mineral requirement in dairy buffaloes (Qureshi et al, 2002). The low yielding buffaloes usually get higher protein intake in the form of cottonseed cakes. The excess protein has to be got rid through conversion of ammonia in the rumen and urea in the liver, which is an energy consuming process. As such the farm expenditures go up; milk yield and fertility of animals comes down and immunity of the animal is compromised.

Rebreeding is usually avoided due to fear of decline in milk yield. It has been found (Khan et al, 2009) that this fear is baseless and appropriate feeding management may maintain higher milk yield and fertility in a sustainable manner. Artificial insemination has failed to find a place in breeding of the buffaloes.

Market Oriented Production Strategy

The traditional peri-urban farms keep running through loans from the livestock or feed dealers, with meagre net profit having no plan for horizontal expansion or quality improvement. The per head milk yield is low (about 10 liters) and cost per unit productivity is higher (Rs.90). These farms lack the resources for living a graceful life in the society, in spite of huge investment, e.g. Rs.5-10 million on establishing the Unit. New generation of the farmers and certain educated young persons have adopted dairy farming using the crossbred dairy cows.

Such farmers are adopting new technologies for managing feeding, breeding and health of animals. They are getting higher per head milk yield (about 30 liters) and have got linked with the marketing system, sometime after processing and packaging their products. However, some issues of animals' health, productivity, fertility, feed quality, price capping and taxation faced by these farmers, needs to be addressed and have been covered under theLTs and Livestock Business Facilitation Centers.

The remotely located sheep and goats' farms are also run without adopting improved management and feeding practices or concepts of profitability. Sheep and goats are located in the arid, hilly or mountainous terrains. The fodders and water availability is usually difficult and the farming system is sedentary, transhumant, nomadic or migratory. About 60% of the goats' population is kept in units of more than 30 animals. Sheep population of about 40% is kept in flocks of 50 to 350 animals. Under such a situation, these production activities are not considered graceful, profitable or sustainable.

The products quality coming out of unhygienic facilities would not be considered safe for human consumption and hence, face hurdles in local, national and international marketing. They have no say in the matters like price fixation, quality control, policy formulation or projects implementation. The LT, however, improving the governing system and practices at these farms, would enhance the profitability and sustainability of the units.

The essential assets are available with the farmers in the form of sheep, goats, cattle, buffaloes, camels, poultry, quails and even ostrich. The farmers have got the basic skills in farming and

management of health, breeding and feeding of animals. There is a need to convert these valuable assets into viable entrepreneurship models. The proposed LTs would facilitate Academia-Industry interactions to develop feasible entrepreneurship models through introducing good production practices in the production system, improving the health and immunity of animals, decreasing the per head productivity costs, ensuring traceability of animals and products, providing disease diagnostic, therapeutic, quality control and laboratory services through public and private partners, availability of high quality animals and farm inputs, sale of surplus animals and farm products, insurance in case of farm losses and addressing other associated issues. The efforts of the Park would be supplemented by LBFCs and other regional bodies.

Establishing Entrepreneurship Network

Balochistan and Khyber Pakhtunkhwa provinces, although rich in natural resources, face issues like unemployment, terrorism and lack of access to quality foods. DSP's DSP Good Governance Model for livestock techno parks, is founded on the six SDGs; initiated through on campus development of entrepreneurship models; supported by extension and research wings and industry/civil society for building the entrepreneurship network; leading to Halal food export.

Mr. Kamran Khan, an animal husbandry graduate, may be presented as a successful entrepreneur. He adopted his professional knowledge as a source of livelihood for his family. He is a source of relief for the farming community, a Beacon of Hope for the young generation and a sign of relief for the quality conscious food consumers in the city.

Presently the livestock and poultry farmers face difficulty in connecting with service providers, especially the fair marketing dealers. Health issues are usually chronic and the low quality of medicine, under-dosing of antibiotics, therapeutic approach of the veterinary practitioner instead of preventive, poor housing/ventilation and lack of hygienic practices affect the farm profit, adversely. The dairy, fattening, poultry and fish farmers are usually afraid of animal health issues. Very few veterinary practitioners find popularity among the farmers' community, based on their performance and contribution in combating animal health issues and raising farm profitability and sustainability. The farmers usually consult veterinary practitioners in case of severe disease outbreaks and mortality of animals. This is called fire brigade treatment and is a source of income for the veterinary practitioners and input suppliers. The farmers fail to realize the hidden losses at their farms due to under and overfeeding, toxic feeds, parasitic infections, infertility and other issues of economic importance.

LTs will engage and train the DVM unemployed graduates as well as in service veterinarians to visit the registered farmers on monthly basis for observing the animals' health and productivity cases with special emphasis on the hidden losses due to bad hygiene, parasitic infestation or toxic feeds. The veterinary practitioner will act as animal healers, public health protectors as well as economy boosters. All the three aspects would help the farmers to get maximum benefits out of minimum investment, producing milk, meat and eggs with the qualities of accepted standards, through our registered labs. Engineering, medical, business and other graduates in natural and social sciences would be motivated to establish services in their respective areas.

LDD Ext Department would be engaged in developing special training modules for entrepreneurship development. The hospitals would be utilized for shifting their therapeutic approach in disease control towards preventive and business advisory one. The outdoor cases would be encouraged and institutional based practice would be allowed on the analogy of medical doctors provided under Khyber Pakhtunkhwa Medical Teaching Institutions Reforms Act, 2015. The veterinary doctor would utilize his skills as animal healer, public health protector and economy booster. LDD Ext would help in farming innovation and commercialization, providing an enabling environment for entrepreneurship development. New breeding innervations would be developed and introduced for enhancing growth rate, fertility and fecundity of animals.

CASVAB would work on applied research to control diseases, vaccine improvement and commercial production and advanced research in collaboration with the universities. They would help in Bio risk management research and development in collaboration with medical and veterinary faculties in the Universities.

Local Government Department would appoint a Focal Point LT to support improvement in livestock markets and slaughter houses and in implementation of the joint ventures with private Slaughter Houses. Fisheries Department would host Livestock Business Support Center (LBSC) and would implement the fisheries components of the functions of LT.

The Universities ORIC Offices

ORIC Offices of various universities in the province would utilize the human resource base available in the form of highly qualified faculty members and enthusiastic postgraduate students for responding to the emerging industrial issues and developing entrepreneurship models. The Livestock Business Support Center at universities would be utilized extensively through international linkages, especially under an MoU with the Konya Techno park, Turkey and other organizations developed under Dairy Science Park.

University of Balochistan, BUITMES, Lasbela University of Water and Marine Sciences, SBK Women University, Quetta, Balochistan University of Engg.& Technology, Khuzdar, Bolan University of Medical and Health Sciences, Quetta, University of Loralai and University of Turbat would contribute in the business incubation of livestock, poultry and fisheries disciplines.

LBSCs or specialized centers like meat/dairy technology centers would be established at appropriate sites under the universities. These centers will support applied research connected with industrial issues and entrepreneurship development for generating decent employment and exportable surpluses. The Center would ensure an active and visible interaction among the academia, industries, government and the civil society, to provide feasible solutions to the emerging issues faced by producers, processors, service providers, marketing partners and consumers. Farming innovations would be introduced like introduction of biotechnologies, solar technologies, food technologies and bio-waste management across the livestock based food value chain.

Entrepreneurship models would be developed in livestock. Poultry, fish and fodders production, processing, quality control, diagnostics, veterinary clinical, processing, marketing and legislative services, as source of decent employment and exportable surpluses. Some examples may be establishing milk, meat and eggs shops; fodder production facilities; fodder seeds shop; silage plants; mini-slaughter houses, livestock/poultry/fisheries/other farming, also including fancy birds, pets, rabbits, ostrich, or others; processing, packaging milk, meat and eggs; marketing at district, provincial or international levels. Veterinary clinics, diagnostic laboratories or biotechnological products processing or any other related facilities would be encouraged. Graduate interns and postgraduate scholars would be engaged in these activities under an incentive package.

Livestock Business Support Centers

Livestock Business Support Centers (LBSCs) would be established at various locations by the line department through development grants/Endowment Funds. LBSCs would be managed by a Management Committees each comprising two members from the respective host organization; two members from other relevant public sector organizations; two members from the industry; and one member from district/tehsil council. Chairman of the committee would be elected by the members for a period of two years.

LBSCs would be satellite remote components of Livestock Techno park Quetta and will support the farmers in improving their farm productivity, products quality, business viability and forward/backward linkages of the entrepreneurship models. The farmers and other stakeholders would get registered with the relevant public and civil society organizations and LBSCs. Each LBSC will also host an Advocacy Forum comprising stakeholders' representatives to accommodate concerns of all, like price fixation, food quality, business viability and replication, etc. It is appreciated that livestock value chain is generating many business models like farming, animal trade, milk processing and trade, meat processing and trade, service delivery, etc. Such businesses are at their primitive stage and need to be exempted from all type of taxes for the next 10 years. Endowment Fund and Development Grant would be allocated for each LBSC.

Regulatory and technical support by LTQ

Livestock and poultry farmers are provided feeds, semen, medicine and other farm inputs by commercial companies. Most of the times these inputs are not quality tested, nor cost-effective. The feed companies supply feeds and their salesmen convince the illiterate farmers to feed the animals more and more. And as mentioned already in this document, this leads to excess intake of proteins, leading to ammonia and urea toxicity and losses in milk productivity, fertility and profitability of the farms.

Managing Board LTQ will test the farm inputs through various partner laboratories and the per unit productivity cost would be determined. Cost effective farm inputs would be made available at the Livestock Business Support Centers and other associated facilities. Feeds would be tested for nutrients availability and toxins presence through laboratory analysis and through growth, fertility and productivity trials, Semen would be tested for fertility and genetic potential through field trials at registered and experimental farms, engaging postgraduate students.

Marketing linkages are most of the times hostile to the farmers, be it livestock or poultry farmers. Animals are purchased from contractors or feed/milk dealers on loans to be paid in installments. The mark up rate usually goes beyond 100% per annum. And the lenders sometime take back animals or even families of the farmers, if he is unable to pay back the installments. In case of peri urban buffaloes dairy farming, the freshly parturated buffalo is purchased at about Rs. 200,000 and after getting milk for six months, the animals are sold back at Rs. 70,000. Weekly cattle markets are held at various popular locations of public gatherings. The LTQ would devise a marketing mechanism for keeping dry animals at remote areas with little running cost, as salvage farming and newly pregnant animals would be kept at such stations for supply back to the peri urban dairy farms.

Peshawar Meat was established as an entrepreneurship model for providing Hygienic and Halal tested beef and mutton to Peshawar. It could not survive due to price capping form meat by government, lack of animals supplies to the factory and lack of sale points. The specially prepared beef through rearing calves, has to compete with culled old buffaloes at the end of lactation, or diseased and injured animals. The production cost of such animals is far lower while the production of prime beef would cost at least double this amount. However, the prices of beef and mutton are fixed at flat rates, irrespective of qualitative grading. Such a practice discourages growth and survival of young entrepreneurs, struggling for finding a graceful living in the society, while the shops with unhygienic and low quality products goes on working in an uninterrupted manner.

Establishing a network of entrepreneurship would solve the issue. A farming entrepreneur would be producing cost effective quality products to the factories, he will get inputs from the quality tested, registered suppliers, registered vets, analytical labs and other service providers; and he will supply his products to the registered factories and products marketing dealers. There would be a win-win situation for everyone.

New graduates would find it easy to enter the chain at any point of the entrepreneurship network. Buffaloes are brought to major cities of the provinces from Punjab and sent to slaughter house after getting milk for few months. It drains the genetic potential of buffaloes towards trash and puts financial burden on local farmers, purchasing a fresh buffalo on higher rates. Establishment of salvage farms for rearing and caring of dry animal in remote areas of the province would prevent the animals from slaughtering and maintain the genetic pool of best breeds of livestock population.

Establishment of model dairy farms for the purpose of extension, research and business demonstration at regional level under partnership with the private sector, would popularize the innovative farming models in the province, for further replication. Establishment of modern slaughter houses with advance facilities through joint venture will ensure the production of quality meat to the consumers and to be used for research purposes targeted at meat industry expansion and provision of Halal Meat to the entire Muslim community.

The impact

At the end of the year 2021 LTQ would be able to generate direct decent employment models to the tune of 18,000, each one earning about Rs. 50,000 per month and employing five more persons each. Hygienic, Halal and Organic food would be produced per annum valuing Rs. 5,098 billion. A fraction of 10% may be injected into Halal Meat and Biotech Export Market. Motivated young graduates in veterinary, engineering, medical, business and social sciences would be joining LTQ for their career development and transformation of ideas into actions to serve the society. Quality conscious consumers would be having access to traceable food products in the towns. Public and private sector organizations would have access to sufficient operational funds for motivating their staff and serving people. And this would be a Beacon of Hope committed by DSP for utilization of indigenous resources for local market and export.

IS-02

PROGRESSING TOWARDS CONTROL OF FOOT AND MOUTH DISEASE IN PAKISTAN

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ABSTRACT:

Foot and Mouth Disease (FMD) is the most prevalent and economically the most important infectious disease of livestock in Pakistan. The disease is endemic in the country and occurs around the year. Currently FMD virus serotypes O, A and Asia-1 are prevalent. Prevalence of FMD in the country not only restricts export of Halal meat to high-end markets but is also a major impediment for the development of dairy industry in the country. Significant progress has been made during last 7 years in the control of FMD and Pakistan has progressed from stage 0 on the FMD-Progressive Control Pathway (PCP) in 2008 to Stage 1 in 2009 and Stage 2 in 2015. This was achieved through training of veterinary field staff and farmers, improving disease diagnosis and surveillance, availability of free emergency vaccination to control outbreaks and availability of country specific good quality vaccine under various FAO executed projects. Pakistan needs to progress towards achieving Stage 3 on FMD-PCP and get its National FMD Control Program endorsed by OIE (World Animal Health Organization) for having access to additional meat markets in the world. To have an access to the high-end meat markets, there is need to establish a FMD free zone in the country.

FMD control is also essential for the development for dairy industry. FMD results in huge economic losses to the dairy farmers. Studies indicate that milk losses alone due to FMD range from Rs. 18,000 to 26,000 per animal in rural settings and Rs. 55,000 to 64,500 in peri-urban dairying. Preventive vaccination with good quality vaccine has cost benefit ratio ranging from1:5.7 to 1:38.3. Effectiveness of good quality vaccine for FMD control has been effectively demonstrated in all production systems in Pakistan. FMD control is considered as an international and national public good and requires sustainability and continuity of the national program with sufficient resources to succeed.

Key words: FMD, Halal meat, Progressive Control pathway, vaccine

IS-03

IMPORTANCE OF AGRICULTURE TECHNOLOGIES IN LIVESTOCK SECTOR & CONTRIBUTION OF USAID PATTA PROJECT FOR THEIR PROMOTION THROUGH PRIVATE SECTOR

Waqar Ahmad

Pakistan agricultural technology transfer activity (PATTA)

ABSTRACT

Outdated and ineffective agricultural technologies are among the leading causes for Pakistan's agricultural productivity falling short of its potential. Scaling up the production, marketing, distribution, and adoption of agricultural technologies in Pakistan is made challenging by lack of information, difficulty in accessing credit, as well as wide dispersion of small holders, and the diversity of challenges facing different subsets of small holder farmers, including women and other marginalized groups. Despite small landholding and less income level, precision technologies can make a significant difference in the livelihoods of equipment manufacturers, operators and farmers. Purpose of 4-year (2017-21) USAID funded PATTA project is to identify, support and bring to scale private sector solutions to improve agricultural productivity in Pakistan, through a four -year activity. PATTA will partner with agricultural technologies companies to commercialize product and services that can increase the productivity and competitiveness of small holder farmers and mobilize private sector investment in agricultural technology, to increase productivity, build resilience to climate change and reduce postharvest losses. a) Increase smallholder farmers' access to affordable appropriate and effective agricultural technologies. b) Enable agricultural technology related businesses to expand and adapt their products and services to meet small holders' needs. c) Scale up the adoption and use of agricultural technologies. PATTA is expected to leverage at least $4.8M for PATTA in private sector capital investment and create at least 3,400 jobs over the life of the project. The Contractor shall job target must include a minimum of 2,500 jobs generated when smallholders transition to commercial production from subsistence livelihoods, The Contractor shall also target the commercialization of at least 500 tools, technologies, and practices, as at least this number shall be featured in effective marketing campaigns, demonstration activities, dissemination plans over the life of the project. PATTA will collaborate with farmers associations, Agricultural Technology manufacturers, Private Micro finance institutions, autonomous and semi-autonomous training and research institutions and small holder farmers and service providers.

IS-04

POLICY REFORMS AND SUPPORT PACKAGES FOR LIVESTOCK DEVELOPMENT

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ABSTRACT

Livestock plays a pivotal role in agriculture economy of every country by producing meat, milk, hide, skin, wool, egg and every draught is most of the developing countries of this world. An Pakistan this is only sector which is growing significantly whereas the Balochistan province the usual household represents around 80% and 3/4th of population is dependent on livestock sector for this livelihood. After 18th constitutional amendment, livestock became a provincial subject and for its development a proper policy is required to transform the livestock sector to meet this need of consumers

The policy provides the roadmap to stimulate rapid growth in the sector and deliver prosperity and well-being to these families through livestock values chain, which is 32 million sheep's & goat with total population of 39 million in this province. Such a large population reared mostly on poor range land do not have significant production potential, effecting climate change, contributing paramount degrading of range land ecosystem, resulting toward increasing incident of draught. On the same time it possess potential to improve the livelihood of harder families by improving livestock productivity and restoring biodiversity and environmental services generated by range-land ecosystems. The efforts to introduce practices that can substantially improve flock and animal productivity and capitalize on growing demand for meat and dairy product while at the same time reducing uncontrolled and unsustainable grazing practices and resulting degradation of rangelands. He policy will ensure rapid growth in prosperity and wellbeing of farmers, businesses related to this sector through value chain and advance technologies. The value chain of dairy, poultry and small ruminants, which covers about 80 % of livestock in Balochistan, provides significant opportunity for women and men to improve their livelihood with sustainable growth.

Through adaptation of livestock policy, sustainable rangelands productivity its conservation can be achieved adoption of production and marketing innovation in livestock sector can batterly be beneficial, motivated and supported to invest in profitable input services & processing infrastructure through business investment, opportunities by providing diversified markets access to livestock businesses, an opportunity to access credit and insurance for livestock products relevant to their needs, through enabling environment and reforms in existing departmental reforms of Govt: services for livestock production, marketing and investments.

AOH-01

SEQUENCE DIVERSITY ANALYSIS OF BETA-CASEIN GENE, KAPPA-CASEIN GENE AND INTERFERON BETA-1 GENE IN PAKISTANI CAMEL BREEDS

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ABSTRACT:

Pakistan is enriched with a variety of livestock resources, and camel is one of the most significant livestock assets in the arid and hot regions of the country. Camel has unique physical characteristic of fatty deposition and it is known as the "Ship of the Desert". Economically and historically, it is of enormous value as it provides essential products like wool, skin, meat and milk. Current study was conducted for the molecular characterization of IFNβ1, kappa and beta-casein genes. Dromedary, Kachhi, Mareecha and non-descript camel breeds of Pakistan were selected for this purpose. Genes were amplified through PCR followed by sequencing. These sequences were further aligned with reference sequences from NCBI for analysis. Phylogenetic tree construction was carried out with the help of MEGA 6 software using the Neighbor Joining method with a bootstrap value of 1000. Sequence data showed five single nucleotide substitutions at position c.1-1999G>A, c.1-1580G>T, c.1-1450A>G, c.1-1160C>G and c.1-1157C>T in beta-casein gene and when these were compared with the reference sequence, cysteine nucleotide deletion at c.1-1398, c.1-1391, c.1-1371, c.1-1330, c.1-1200 and two bases insertion (Adenine and Thymine) at position c.1-1156 was identified. Similarly, deletion of A bases at c.1-1075 and heterozygosity (CT) at the c1-1046 were observed in kappa-casein gene along with some other important SNPs as well as, heterozygous conditions at positions c.36 (A/C), c.87 and c.225 (Y, T/C) of IFNβ1 were found. Phylogenetic tree constructed with the corresponding genetic sequences of other species available on NCBI, reconfirmed the classical biological classification of Pakistani camel breed in comparison to other mammals. These polymorphic sites will not only promote practicability for a quick directional selection as well as will also pave the path for further studies to explore the camel's genetic worth.

Key words: camel, phylogenetic tree, genetics, beta casein gene

AOH-02

ANTIVIRAL POTENTIAL OF MEDICINAL PLANTS OF BALOCHISTAN: STUDIES BASED ON THE LOCAL INVESTIGATIONS

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ABSTRACT

The study of natural products or "Nature's Combinatorial Library" has a long history as a source of drugs, since they have proved to be a rich source of therapeutic agents. It is estimated that 61% of all the new drugs introduced worldwide during 1981-2002 can be traced to or were inspired by natural products and approximately 60% of the world's population relies almost entirely on plants for medication. Pakistan is a developing country of South Asia, spreading over an area of 87.98 million hectares. Pakistan obtains more than 80 % of its medicaments from plants. In the field of preventive and primary health care, it is notable that most of the Plant based medicines do not produce harmful side effects in contrast to some chemical or synthetic drugs. A wide range of medicinal plants of Balochistan origin have shown promise to treat a number of viral infections, and some of them possess broad-spectrum antiviral activity, A viral infection is any type of illness or disease caused by a virus. Depending on the virus and the person's state of health, various viruses can infect almost any type of body tissue, from the brain to the skin. The present studies describe the screening of potential of Balochistan plants possessing broad-spectrum antiviral effects against emerging viral infections.

Key words: Balochistan, medicinal plants, local informants, antiviral agents, ethno botanical study.

AOH-03

ISOLATION OF MYCOPLASMA MYCOIDES SUBSP MYCOIDES SMALL COLONY IN NORTH AND SOUTH KORDOFAN STATES, SUDAN

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ABSTRACT

This study was carried out to isolate and to characterize the *Corynebacterium pseudotuberculosis* from infected sheep of Caseous Lymphadenitis(CLA) in slaughtered sheep, In order to select candidate strain to produce a vaccine and control the disease.Samples were collected from sheep carcasses routinely inspected for lesions in 2016/2017 in slaughterhouses at Khartoum state.*Corynebacterium pseudotuberculosis* was isolated from 50/88 (56.8%) of the samples. Lesions in lymph nodes of the slaughtered sheep were distributed as follows: prescapular 62(70.5%), parotid 5(5.7%), popliteal 4(4.5%), mediastinal 3(3.4%), mandibular 2(2.3%) and prefemoral 1(1.1%) lymph nodes. All isolates were subjected to conventional biochemical tests and were found positive for catalase, urease and glucose and negative for oxidase, lactose, trehalose and starch and did not reduce nitrates to nitrites. The multiplex PCR examination of the 50 isolates using primers targeting the 16srRNA, rpoB, and pld *C. pseudotuberculosis* genes, confirmed that all 50 isolates were *Corynebacteriumpseudotuberculosis*, to confirm the mPCR results, one chosen isolate was submitted for further confirmation using singleplex PCR assay with specific primer pairs. It was found to contain the three *C. pseudotuberculosis*16SrRNA, rpoB, and pld genes. The sequences were compared with previously published gene sequences of *C. pseudotuberculosis* strain PA08in the NCBI database. High percentage identify was found for the submitted C. *pseudotuberculosis* chromosome.

Key words: Caseous lymphadenitis; Corynebacterium pseudotuberculosis; biochemical tests; molecular technique; sheep

AOH-04

RECOMBINANT ADENOVIRUS EXPRESSING VESICULAR STOMATITIS VIRUS G PROTEINS INDUCE BOTH HUMORAL AND CELL-MEDICATED IMMUNE RESPONSES IN MICE AND GOATS

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ABSTRACT

With a human type 5 replication-defective adenovirus expression vector, three recombinant adenovirus (rAd) and expressed Vesicular Stomatitis Virus (VSV) Indiana serotype glycoprotein (VSV-IN-G), VSV New Jersey serotype glycoprotein (VSV-NJ-G) and the G fusion proteins [two serotypes G (VSV-IN-G-NJ-G)] were constructed. Three rAds were named rAd-IN, rAd-NJ, and rAd-IN-NJ. The three rAds were inoculated into AAV-293 cells, and the AAV-293 cells were serially propagated to 20 generations till the virus titers were stablem which were determined by the TCID50. Indirect immunofluorescence and western blot detection method were used for detecting the expression of the target proteins; lymphocyte proliferation test was used for immune cell numbers. The results showed that G proteins could be expressed with good reactogenicity. The rAds were used to subcutaneously inoculate mice three times at 2-week intervals, and goats two times at 3-week intervals, respectively. On 0, 2, 4, and 6 weeks of post inoculation for the mice and 0, 3, 6, 9, and 12 weeks for the goats, their sera were collected and the NT antibodies were detected. The results showed that the rAds could induce the production of VSV antibodies in the mice, and VSV NT antibodies in the goats. The antibody levels were 1:16 to 1: 32 in mice, and 1:32 to 1: 64 in the goats. The rAds could cause a strong immune lymphocyte proliferation in mice and goats, and were significantly higher than that of the negative control groups. It could be concluded that the three rAds expressed VSV-G proteins very well, and induced a certain degree of humoral and cellular immune responses in both mice and goats.

Key words: VSV, G Protein, Recombinant adenovirus, Mice, Goats

AOH-05

EMERGING PUBLIC HEALTH CONCERNS WITH MDR *S.AUREUS* FROM CAMEL MILK IN DISTINCT AGRO ECOLOGICAL ZONES

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ABSTRACT

Staphylococcus aureus (*S.aureus*) is emerging as multiple drug resistant (MDR) pathogen in camel milk with characteristically zoonotic potential. This study was carried out to investigate the clinico-epidemiology of *S.aureus.* Two distinct agro-ecological zones, Cholistan desert area (n=185) and Sulaiman mountain range (n=177) having major population of camels were screened for subclinical mastitis using California Mastitis Test (CMT). *S.aureus* was isolated by performing biochemical tests. *In-vitro* drug susceptibility was performed against Penicillin, Glycopeptide and Cephalosporin classes of antibiotics for confirmation of MDR *S.aureus* using disk diffusion method. MDR isolates were then tested against different antibiotics to check the sensitivity. Nonparametric tests at 5% probability were applied to check the significance of the results. The study revealed 33.98% prevalence of *S.aureus* from subclinical mastitis samples while 64.06% isolates were confirmed MDR *S.aureus.* Non-significantly ($p>0.05$) higher prevalence of MDR *S.aureus* was noted in Cholistan desert area (38.38%) than to Sulaiman mountain range (29.98%) on subclinical basis. Cefoxitin, Oxacillin and Ampicillin faced 100% resistance while Cefixime, Cefotaxime and Vancomycin had > 78% of resistance from MDR *S.aureus* isolates in both study zones; while Ciprofloxacin and Trimethoprim (> 90%), Streptomicin (73.07%), Oxytetracycline (71.15%), Chloramphenicol (69%), Gentamicin (67.3%) and Amikacin (51.92%) effective against MDR *S.aureus*. The study concluded higher prevalence of MDR *S.aureus* in camel milk and some antibiotics presented higher scope of treatment.

Key words: Camel milk, MDR *S.aureus*, antibiotics, Cholistan desert area, Sulaiman mountain range

AOH-06

PREVALENCE OF BOVINE BABESIOSIS AND THEILERIOSIS IN DISTRICT ZHOB, BALOCHISTAN

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ABSTRACT

Babesiosis and Theileriosis are febrile, tick-borne haemoprotozoan diseases of cattle, caused by Babesia spp. and Theileria spp. respectively and wide spread in tropical and sub-tropical regions of the world. The present study was conducted to determine the occurrence of babesiosis and theileriosis in cattle population of district Zhob, Balochistan. For this purpose, 5 ml blood samples were collected from the jugular vein of 116 clinically suspected animals inEDTA containing vacutainers and transported in ice boxes to Disease Investigation Lab, Zhob, during October and November, 2019. The clinical history and physical examination of each animal was recorded on prescribed proforma. The samples were examined via Giemsa stained blood smear technique. Overall the prevalence of bovine babesiosis and theileriosis in district Zhob was 6.9% and 4.3%, respectively. The highest prevalence of babesiosis and theileriosis was reported in the older animals (>3 years of age). In addition, the occurrence of babesiosis was noticed to be higher in female as compared to male animals. However, there was no statistical association between the occurrence of disease and sex, age, or breed. The present findings highlight the evidence of babesiosis and theileriosis in district Zhob. Therefore, further molecular analysis studies are required to determine the magnitude of infection in bovines and take necessary preventive measures to stop the spread of infection and heavy economic loss caused by these diseases.

Key words: Babesiosis, Cattle, Giemsa stain, Theileriosis, Zhob

AOH-07

PHYTOMINERAL SUPPLEMENTATION FOR BETTER ANIMAL HEALTH AND COST EFFECTIVE CONTROL OF GASTROINTESTINAL PARASITES

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ABSTRACT

It is well known that trace minerals are required for the normal functioning of basically all biochemical processes in the body. They are part of numerous enzymes and coordinate a great number of biological processes, and consequently they are essential to maintain animal health and productivity. In many developing countries, natural pastures are the main source of minerals for livestock. Mineral in forages (phytomineral) are dependent upon the interaction of a number of factors including soil, plant species, stage of maturity, yield, pasture management and climate. Minerals derived from feedstuffs are sometimes insufficient to meet animal requirements, these later exhibiting subclinical symptoms as a result. Suboptimal mineral deficiency that affects growth and production is more serious than the manifested mineral deficiency showing clinical signs that can be corrected. The improved serum trace elements level and protein status of the livestock may directly or indirectly lead to improved immunity against gastrointestinal (GI) parasites and/or reduced parasite intensity. Our recent studies revealed that *Prosopis cineraria*, *Asparagus densiflorus* and *Cenchrus alarius* forages contain high level of Zn, Cu and Mn concentration respectively. However, mean concentration of Cu, Zn and Mn in serum is found inversely proportional to the mean EPG. The trace element-rich forages are advisable supplemental remedies to improve the trace element profile in grazing animals. This mitigation strategy may ultimately improve the resilience against GI parasitic infections especially in the resource-poor countries.

Key words: Trace elements, Gastrointestinal parasites, Immunity, Forages, Animal health

AOH-08

EVALUATION OF *IN VITRO* ANTIVIRAL ACTIVITY OF THE PLANTS CRUDE-EXTRACTS AGAINST FOOT AND MOUTH DISEASE VIRUS

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ABSTRACT

Foot and Mouth Disease (FMD) is a highly contagious viral disease of cloven-hooved animals that have devastating outcomes. Apart from vaccination, there is no antiviral therapy available to treat on-going FMD infections. This study was intended to explore the antiviral effect of the two herbal plants i.e. *Withania somnifera* (*W. somnifera*) and *Curcuma longa* (*C. longa*) traditionally used against FMD. The ethanol and ethylacetate crude-extracts of both plants were used to determine in-vitro antiviral activity against the FMDV serotype-O. The Maximum Non-Toxic Dose (MNTD) of plants extracts in ethanol and ethyl acetate of *W. somnifera andC. longa*were recorded as 0.62 mg/ml, 0.31 mg/ml, 5 mg/ml and 0.62 mg/ml, respectively. For antiviral activity test, 10TCID50 of FMDV type-O was incubated with MNTD of each of the plant extracts for 1hr before inoculation on cells. The preliminary antiviral extracts were tested for3 days and the cytopathic effects were assessed by MTT dye uptake assay. The percentage protection of BHK-21 cells against FMDV by using MNTD of both plants extracts i.e. *W. somnifera*and *C. longa* in ethanol and ethyl acetate were found 77.4%, 76.3%, 55.4%, and 67.1%, respectively. Our results indicated that the extract of *W. somnifera*possesses more antiviral activity as compared to the extract of *C. longa.* However, the ethanolic extract of *W. somnifera*possesses highest antiviral activity as compare to the ethylacetate extract of *W. somnifera*. Further research studies may be carried out in the field, so that their antiviral effects may be assessed.

Key words: FMDV, *Withania somnifera,Curcuma longa*, Maximum Non-Toxic Dose, TCID-50

AOH-09

CHARACTERIZATION OF CORYNEBACTERIUM PSEUDO-TUBERCULOSIS FROM INFECTED SHEEP IN KHARTOUM STATES, SUDAN

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ABSTRACT

This study was carried out to isolation and to characterize *Corynebacterium pseudo-tuberculosis* from infected sheep of CLA in slaughtered sheep in Khartoum State, which is considered to be one of the important in box or center of states of production and consumption areas of slaughtered sheep meat inthe Sudan. In order to select candidate strain to produce a vaccine and control the disease. In this study, we described the performance principal characteristics of *C. pseudo-tuberculosis*, including morphology, biochemical reaction and to improve *C. pseudo-tuberculosis* detection by PCR, the more recently developed multiplex PCR (mPCR) technique was adopted for diagnosis and it proved its accuracy and rapidity. This multiplex PCR enabled specific identification of *C. pseudo-tuberculosis* isolates in culture and direct detection in pus samples from CLA affected animals obtained from different sources (Pacheco *et al*., 2007).Samples were collected from sheep carcasses routinely inspected for lesions during the period from October to March2016/2017 in Alsalam, Al kadaro and Karary slaughterhouses at Khartoum state. A total of 88grossly enlarged lymph nodes were collected from different animals.Samples were collected from lesions in 88 slaughtered sheep in Al salam, Al kadaro and Karary slaughterhouses in Khartoum state.*Corynebacterium pseudo-tuberculosis* was isolated from 50/88 (56.8%) of the samples. Lesions in lymph nodes of the slaughtered sheep were distributed as follows: pre-scapular 62(70.5%), parotid 5(5.7%), popliteal 4(4.5%), mediastinal 3(3.4%), mandibular 2(2.3%) and pre-femoral 1(1.1%) lymph nodes. Abscesses were also noted in livers 5(5.7%), lungs 3(3.4%) and subcutaneous tissues, kidneys and spleens as 1(1.1%) each. Isolates were identified as *Corynebacteriumpseudo-tuberculosis* according to their morphology, staining reaction, cultural characteristics, biochemical reactions and molecular techniques.All isolates were subjected to conventional biochemical tests and were found positive for catalase, urease and glucose and negative for oxidase, lactose, trehalose and starch and did not reduce nitrates to nitrites.The multiplex PCR examination of the 50 isolates using primers targeting the 16srRNA, rpoB, and pld *C. pseudo-tuberculosis* genes, confirmed that all 50 isolates were *Corynebacteriumpseudo-tuberculosis* when compared with reference strain DSM20689. In order to confirm the mPCR results, one chosen isolate was submitted for further confirmation using singleplex PCR assay with specific primer pairs. It was found to contain the three *C. pseudotuberculosis*16SrRNA, rpoB, and pld genes. The sequences were compared with previously published gene sequences of *C. pseudo-tuberculosis* strain PA08in the NCBI database. High percentage identify (100%) was found for the submitted *Corynebacterium pseudo-tuberculosis* chromosome.

Key words: Caseous lymphadenitis, Sheep, *Corynebacterium pseudo-tuberculosis ,molecular* characterization.

AOH-10

CONTROL OF CONGO VIRUS INFECTION IN PAKISTAN

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ABSTRACT

Crimean Congo Hemorrhagic fever was first identified by Russian scientists in 1944 in humans. The virus was identified to be present in larvae and adult stage of the tick of *Hyalomma marginatum* specie. Congo virus was first isolated from patients in Zaire in Africa resulting in fever. Later on, it was proved that Crimean Congo Hemorrhagic virus and Congo-virus were serologically similar. The virus was classified as Nairovirus of the genus Bunya-virus (ss-RNA virus). Congo virus was also identified in ticks from Hazara Pakistan which was similar to Nairobi sheep disease virus. The ticks which can be infected by the virus include *Hyalomma, Amblyomma variegatum,Boophilus decoloratus* and *Rhipicephalus sp.*The Congo virus is sensitive to Ribavirin (anti-viral) drug, susceptible to disinfectants including 1% hypochlorite and 2% glutaraldehyde, and can be killed at 56 ºC for 30 minutes but can survive outside host in blood for 10 days at 40 ºC. A very high up to 66% prevalence in cattle has been reported from West Africa with regional prevalence from varying from 10 to 95%. In year 2016, 20 patients died of Congo in Pakistan mainly from Sindh province. Disease in human is serious with case fatality rate varying between 10-60%, while in animal disease is not very serious. No vaccine is available for humans and animals to control this infection. Because ofthe zoonotic importance of Congo virus infection with high case fatality rate in humans,it demands strong preventive strategies to control the spread of Congo virus from animals to humans. Furthermore, there is a need to have a stringent surveillance program in animals, controlled movement of animals from one place to another, killing/getting rid of ticks and all precautionary/preventive measures from livestock farm to slaughter house to kitchen with respect to infected tick/animal/animal product contact and to prevent the horizontal spread of virus in humans including nosocomial spread.

Key words: Crimean Congo Hemorrhagic fever, Congo virus, prevalence, control, Pakistan

AOH-11

CRIMEAN CONGO HEMORRHAGIC FEVER (CCHF) IN THE SCENARIO OF DSP-BIO-RISK MANAGEMENT IN PAKISTAN

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ABSTRACT

The present condition of Crimean-Congo hemorrhagic fever is deteriorating in Pakistan. The tick-borne *Nairovirus* causing Crimean Congo Hemorrhagic Fever (CCHF) has taken a greater death toll on human as well as cattle, compared to last year. To bring to light, the disease,first time activated during the 1944 in Crimea killing 200 army officers of the Soviet Union, has now a vast geographical dispersal becoming endemic in 30 countries across the globe which includes Africa, Middle East, Asia and the Balkans. Ticks from the *Bunyaviridae* family especially the genus *Hyalomma* known to be primarily involved in its spread and an active carrier of the virus, cause it among animals and humans by a single bite, while the infected animals through skin contact, slaughter houses, veterinarians and other agricultural workers, expose the incidence of the disease to other animals and humans. Similarly, human-to-human transmissions can occur by blood contact, exchange of bodily fluids and secretions of the infected person, less precautionary hospital environment with CCHF patients, and mishandling and re-use of needles or other medical appliances. Though, the symptoms are not immediately visible by human-to-human blood contact (5 to 6 days), the tick-bite within a day or few (1 to 7 days) causes fever, joint pain, headache, vomiting, dizziness, diarrhea, red spots on the upper mouth palate and sore throat. Treatment includes supportive care of symptoms and eliminating secondary infections. In the year 2016, cases tested using ELISA kits to be CHF positive were 86 out of 483 admitted patients in hospitals across Pakistan, later, out of these, 38 patients died (CFR: 44%). Maximum cases: 38, belonged to Balochistan, 35 of them died, followed by cases in KPK and Sindh (17% each) with death rate of 20% and 23%, Punjab 13% cases with 20% deaths, while, Pakistan-administered Kashmir had 8% infected people with 9% deaths. The rudimentary cause behind the highest prevalence of CCHF in Balochistan is their not only their local cattle, but also, poor quarantine laws and health investigation on the borders with Iran and Afghanistan which are the top possible route of virus dispersal across border lines. 58% of CCHF positive patients of Balochistan have prospectively reported to have been to remote areas of Afghanistan, in parallel, 13 animals out of 21 randomly selected animals from Afghanistan and Iran's neighboring areas after ELISA tests revealed to be CCHF positive.Precautionary measures including medicinal care of cattle only last about a week or two which is worth than having no cure at all, on the other hand, human infections can be prevented by following the DSP Bio-risk Management safety measures to avoid exposure to the disease and raising responsiveness on district and provincial level and acknowledge the population about this global concern before it becomes an epidemic.

Key words: CCHF, DSP, Bio-risk Management, Zoonotic Diseases, Pakistan

AOH-12

EPIDEMIOLOGY AND CONTROL OF GASTROINTESTINAL NEMATODES OF LARGE RUMINANTS (CATTLE) IN DISTRICT QUETTA, BALOCHISTAN

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ABSTRACT

Background: The climate of the certain area of Balochistan province is quite difference from many tropical, subtropical and temperate regions of the world and arid areas of Pakistan. Information on the epidemiology of gastrointestinal nematodes of cattle from this region was not available. Keeping in view the scarcity of information and the importance of gastrointestinal nematodes in domestic ruminants, the present study was accomplished for a better understanding of gastrointestinal nematode infections under local climate and management system of Balochistan.

Methods: A study was conducted to access the epidemiological and control aspects of gastrointestinal nematodes of cattle at Quetta, Balochistan, from March 2012 To February 2013.A total no of 900 fecal samplefrom cattle (75 samples per month) were examined during the study period.

Results: Fecal analysis of these cattle showed overall higher (26.99%).nematodes prevalence. Nematodes infection was recorded with higher prevalence of *Ostertagia* followed by *Haemonchus*. The cattle of ≤1 year of age presented higher nematodes prevalence than 1-2 years and >2 years. The female cattle were infected with nematodes prevalence higher than male animals. The nematodes were prevalent almost throughout the year, however a peak infection were recorded during August/September in cattle. The therapeutic studies result showed higher reduction of EPG in cattle calves treated with Ivermectin followed by Levamisole and Oxfendazole.

Conclusion: The gastrointestinal nematodes are prevalent in all age groups and either Sex of cattle with peak during summer. The FECRT based diagnosis is more accurate. The Ivermectin products are more effective against cattle nematodes followed by Levamisole and Oxfendazole.

AOH-13

SPATIAL CLUSTER ANALYSIS OF HUMAN CASES OF CRIMEAN CONGO HEMORRHAGIC FEVER REPORTED IN PAKISTAN

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ABSTRACT

Justification: Crimean Congo hemorrhagic fever (CCHF) is a tick-borne viral zoonotic disease that has been reported in almost all geographic regions in Pakistan. The aim of this study was to identify spatial clusters of human cases of CCHF reported in country.

Methodology: Kulldorff's spatial scan statisitc, Anselin's Local Moran's I and Getis Ord Gi* tests were applied on data (i.e. number of laboratory confirmed cases reported from each district during year 2013).

Results: The analyses revealed a large multi-district cluster of high CCHF incidence in the uplands of Balochistan province near it border with Afghanistan. The cluster comprised the following districts: Qilla Abdullah; Qilla Saifullah; Loralai, Quetta, Sibi, Chagai, and Mastung. Another cluster was detected in Punjab and included Rawalpindi district and a part of Islamabad.

Conclusion: We provide empirical evidence of spatial clustering of human CCHF cases in the country. The districts in the clusters should be given priority in surveillance, control programs, and further research.

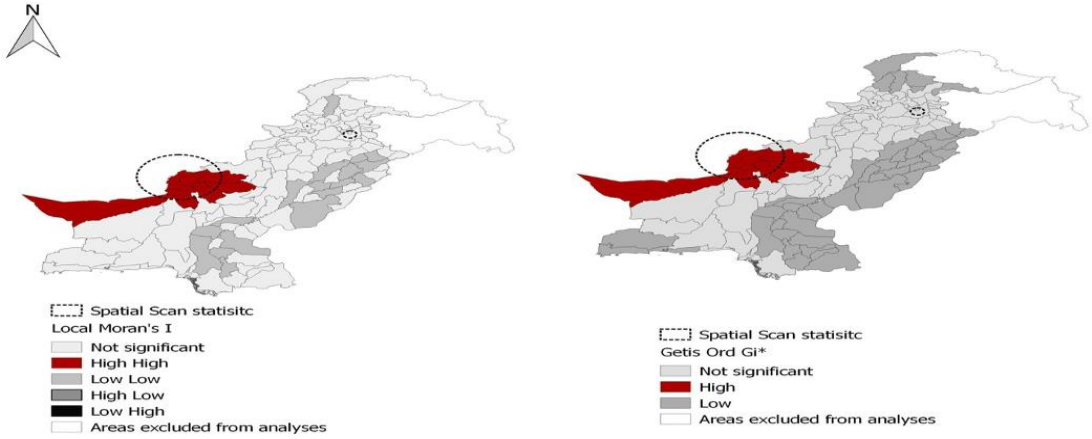

Figure: Map of Pakistan displaying output of spatial scan statistic, Local Moran's I and Getis- Ord Gi* tests. Local Moran's I identified high - high (red) and low-low (medium gray) clusters. However, not even a single high-low (dark gray) or low-high (black) type spatial outlier could be found. Getis- Ord Gi* detected hot spots (red) and cold spots (gray) of the disease cases across the country. The map also illustrates location of two most likely cluster clusters detected through spatial scan statistic (doted circles).

Citation: Abbas, T., M. Younus and S. A. Muhammad, 2015: Spatial cluster analysis of human cases of Crimean Congo hemorrhagic fever reported in Pakistan. *Infectious diseases of poverty*, **4,** 9.

AOH-14

EMERGENCE OF PATHOGENIC STRAINS OF *S. AUREUS*IN GOAT MILK, AND THEIR COMPARATIVE RESPONSE TO ANTIBIOTICS

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ABSTRACT

The nutraceutical milk of goat in agro based countries is at risk of pathogenic strains of *S. aureus*. Current study was designed to investigate the prevalence of methicillin resistant *Staphylococcus aureus* (MRSA), biofilm producing *S. aureus* (bpSA), and hemolytic *S. aureus*, along with their antibiogram and risk factor analysis for mastitis. The samples (n=200) were collected from different regions of Faisalabad and processed for isolation of *S. aureus* and antibiotic susceptibility was performed using disk diffusion against all *S. aureus* strains. Current study presented 42% (84/200, CI=35.37-48.93) prevalence of subclinical mastitis, 38.1% *S. aureus* (32/84, CI=28.45-48.79), 5.95% MRSA (5/84, CI=2.57-13.19), 46.9% hemolytic *S. aureus* (15/32, CI=30.87-63.56) and 34.4 % bpSA (11/32, CI=20.41-51.69). Among risk factors, type of feeding system (p=0.00), drainage system (p=0.00), vaccinated animals (p=0.00) and teat injury (p=0.00) were significantly associated with acquisition of *S.aureus*. Antibiotic susceptibility testing against *S.aureus* showed 100% sensitivity to Gentamicin, Oxytetracycline, and Trimethoprim + Sulphamethoxazole with > 50% in case of Cefoxitin, Amoxicillin, Oxacillin while least in case of vancomycin (16.67%). However, *in-vitro* drug trial against bpSA and nbpSA showed less sensitivity against bpsa in comparison to nbpSA by vancomycin, Amoxy-clavulanate, Linezolid, Amoxicillin while equal efficacy was noted against gentamicin and Oxytetracycline. The study concluded the higher prevalence of subclinical mastitis with increased percentage of *S. aureus* strains. Some of the assumed risk factors mentioned above showed the positive association with disease spread while Gentamicin, Oxytetracycline and Trimethoprim + Sulphamethoxazole showed highest efficacy against all strains of *S. aureus* to combat this pathogen.

Key words: Goat mastitis, *S. aureus*, MRSA, biofilm, risk factors, antibiotic sensitivity

AOH-15

OPTIMIZATION OF PROCEDURE TO DETECT FOOT AND MOUTH DISEASE VIRUS IN BOVINE OF BALOCHISTAN

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ABSTRACT

Foot and Mouth Disease Virus cause great economic losses in terms of lowered productivity, weight loss, decreased production and mortality in young animals due to myocarditis. Even after vaccination we are not getting desirable results and there are number of outbreaks of the disease. This is because, FMD virus has seven serotypes O, A, C, SAT 1, SAT 2, SAT 3 and Asia 1. All these types have further sub types/ topotypes. Vaccination against one serotype does not provide protection against other serotype, that's why disease outbreaks occur even after vaccination. Animal once infected with one serotype is equally susceptible to other serotype of the virus. Typical cases of FMD are characterized by a vesicular condition of feet, buccal mucosa and in females, the mammary glands. Clinical signs can vary from mild to severe, and fatalities may occur especially in young animals. FMD viruses may occur in all the secretions and excretions of acutely infected animals. Including expired air. Transmission is generally effected by direct contact between infected and susceptible animals or, more rarely, indirect exposure of susceptible animals to the excretions and secretions of acutely infected animals or uncooked meat products. Following recovery from the acute stage of infection virus disappears with the exception of low levels that may persist in the oropharyngeal fluid. Animals in which the virus persists in the oropharynx for more than 28 days after infection are referred to as carrier animals. Mastitis is a common sequel of FMD in dairy cattle. Therefore, it is the matter of urgency to screen out the serotype of FMDV present in Balochistan which has dense cattle population. So that vaccination should be done with specific serotype present in the particular area. This will help controlling the disease and economic losses occurring due to FMD in Balochistan. Epithelial tissue and vesicular fluid samples from mouth lesions of diseased animals were collected from the cattle population Balochistan. Epithelial samples were placed in a transport medium composed of equal amounts of glycerol and phosphate-buffered saline (PBS) with a pH between 7.2 – 7.6 and added antibiotics at 4 C and were stored at -20 C until tested. RNA of Foot and mouth Disease Virus was extracted from the epithelial tissue and vesicular fluid collected from the diseased animals during disease outbreaks. Standard procedures for the RNA extraction with little modification according to the requirement were being adopted later cDNA were synthesized from RNA extracted from FMDV samples using standard procedures described by as per manufacturer's instructions of the kit used for cDNA synthesis.

AOH-16

SCREENING OF ANTIBACTERIAL ACTIVITY OF FIVE MEDICINAL PLANTS OF BALOCHISTAN-PAKISTAN

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ABSTRACT

The Balochistan province is rich in medicinal plants, but has not been evaluated scientifically. In the province different plants or its parts are generally used for different ailments of animals as well as human being. In the present study Crude Methanol Extracts (CME) of five plants of Balochistan (*Berberis baluchistanica, Seriphidium quettense, Iphiona aucheri, Ferula costata, F. baluchistanica*) have been tested against three gram positive bacteria (*Staphylococcus aureus, Streptococcus pneumoniae, Streptococcus pyogenes*) and four gram negative bacteria (*Escherichia coli, Salmonella typhimurium, Klebsiella pneumoniae, Pseudomonas aeruginosa*). Zones of inhibition of CMEs were determined by disc diffusion method and MIC was tested by agar dilution method and agar well diffusion method. All the plant extracts were found to be effective against all the tested bacteria. *Berberis baluchistanica* was the most effective one showing higher zones of inhibition and lowest MIC values while both the species of *Ferula* (*F. costata* and *F. baluchistan*) showed comparatively least activity. *Salmonella typhimurium* and *Klebsiella pneumoniae* showed the most resistance. These and other medicinal plants of the province have got great unexploited potential in the future.

Keywords: Balochistan, medicinal plants, antibacterial activity, CME, MIC.

AOH-17

ETHNO-VETERINARY PRACTICES IN CAMEL AND OTHER LIVESTOCK IN BALOCHISTAN, PAKISTAN

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ABSTRACT

Camel is an important animal in the lives of farmers of Balochistan. In this province the ethno-veterinary medicine as dealing with the folk beliefs, knowledge, skills, methods and practices pertaining to the health care of animals. The present study investigates and documents the indigenous veterinary practices for the control of infectious and non-infectious diseases prevail in the province of Balochistan, Pakistan. Four districts of the Balochistan province were selected on the basis of livestock population, practices for treatment of animals, existence of various medicinal plants (ecological zones), cultural differences and different migratory routes. A total of 42 settled, 41 nomads, and 21 transhuments farmers were interviewed. All farmers were grazing their animals in the rangeland freely and adopting the open grazing system. Majority of the respondent were performing inbreeding in their animals (87%) and cross breeding (13%). Aged people know more about the use of indigenous knowledge as compared with the youth. Overall the indigenous plants used for lungs worm 91, mange 88, pleuro pneumonia 77, sheep/goat pox 75, liver fluke 66, anthrax 64 enterotoxaemia 53, foot and mouth 53, and others (bloat, wound, mastitis) 50 reported in the present study. Many rural people most of the time rely on the use of herbal medicine when their animals are sick. About the use of medicinal plants in the study area 12 different kinds of medicinal plants were used as single or mixed one or more plants in combination. Some of the use of these plants were: *Peganum Harmala L (spanda):* root is being used for liver fluke, leaves are used as laxative and for heat stroke; *Daphne Mucronata Royle.(Peepal):* used for mange, liver fluke and nasal bots; *Berberis balochistanica Ahrendt (Zaralg):* for coughing, infection; *S. cbulica Bth.(Karpola):* for coughing and fever; *Sophora mollis (Royle) Baker (Ghoreza):* for liver fluke, constipation, heat stroke, coughing; *Withania coagulans (Khamazorj):* indigestion, constipation, heat stroke; *Ephedra intermedia Schhrenk & Meyer (Oman):* anti diarrhea, coughing; *Hertia intermedia (Bioss) (Gonga):* retained placenta, mange; *Acroptilon repens (L) DC (Kuragh):* mange, lungs worm, and intestinal worm; *Artemisia maritima (A.quettensis) (Tarkha):* coughing, fever, indigestion; *Juniprus excellsa M. Bieb (Obashta):* coughing, lungs worm and *Citrilus colocynthis (L) Schard (Maraghoni):* heat stroke, constipation. Methods of use or application of these plants were different, such as boiling in water, soaking in water and oil, fumigation, and application on body coat. Livestock owners also have a good understanding of the plant parts and quantities needed, and the methods used in harvesting, processing, storing, preserving and utilizing medicinal plants to ensure good drug efficacy and to enhance the survival of plant germplasm. Thus there can be no doubt about the acceptability and efficacy of herbal remedy within rural society. In conclusion, there is need to conserve the medicinal resources of the area through local participation, better awareness and sustainable harvest.

AOH-18

EPIDEMIOLOGICAL STUDIES ON ARRESTED AND PASTURE NEMATODES LARVAE INFECTING SHEEP IN BALOCHISTAN

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ABSTRACT

The present study was conducted with the objective to investigate the prevalence of arrested and pasture nematodes larvae infecting sheep at two agro–ecological zones (district Quetta and Pishin) of Baluchistan. The infective stage (L3) of three different species of gastrointestinal nematodes viz., *Haemonchus contortus, Ostertagia circumcincta* and *Trichostrongylus axei* were identified from 960 gastrointestinal tracts of sheep slaughtered at Quetta abattoir. Statistically there was significant difference at $P < 0.05$ among species. The prevalence of *Haemonchus contortus* was highest (48.38%) followed by *Ostertagia circumcincta* (31.33%) and *Trichostrongylus axei* (20.27%). The highest prevalence of arrested development larvae (L3) of gastrointestinal nematodes was observed in February (23.75%) followed by January (17.5%), December (12.5%) and March (3.75%), but no larvae were found during the rest of months in the study period. Similarly four different species of infective larvae (L3) viz., *Haemonchus contortus, Trichostrongylus colubriformis, Ostertagia circumcincta, and Trichostrongylus axei* were identified from 48 pasture samples collected from Pishin and Quetta districts of Baluchistan. *Haemonchus contortus* infective larvae (L3) were highest in prevalence (50.48% and 48.69%) at two districts followed by *Trichostrongylus colubriformis* (33.71% and 34.17%), *Ostertagia circumcincta* (10.48% and 9.73%) and *Trichostrongylus axei* (5.31% and 5.36%), respectively. However, *Trichostrongylus colubriformis* and *Trichostrongylus axei* were higher in prevalence at Quetta district while *Haemonchus contortus* and *Ostertagia circumcincta* were higher in Pishin district. Pasture samples from Pishin areas showed higher prevalence larval infectivity (62.5%) as compared to Quetta (54.16%).

Key words: Sheep, Arrested larvae, Pasture larval count, Nematodes, Baluchistan, Pakistan.

AOH-19

RISK FACTORS ASSESSMENT AND MOLECULAR CHARACTERIZATION OF THEILERIA IN SHEEP AND GOAT IN BALOCHISTAN

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ABSTRACT

In Pakistan, theileriosis is an important disease of small ruminants due to favourable climatic conditions for ticks. The northern highlands of Balochistan were never been previously explored for theileriosis, so the present one year study (June 2012-May 2013) was designed to determine epidemiology and molecular characterization of theileria in domestic small ruminants in two regions (Northern Highlands and Suleiman Mountain) of Balochistan, Pakistan. The domestic small ruminant flocks (n= 2200 sheep; n=670 goats) were visited for data collection and blood sampling. The samples were examined microscopically for the presence of theileria in RBCs. The association of various risk factors with the disease were tested through Chi square test. The Prevalence of Theileriosis was higher in sheep than goats (20.81% vs 9.70%; $p<0.05$). We did not find any significant difference in the prevalence of disease in Northern Highlands and Suleiman Mountain Region of Balochistan ($p>0.05$). A clear trend of seasonal pattern ($p<0.05$) came to record with highest in summer season (30.30%) followed by autumn (19.07%), spring (14.52%) and winter (7.61%). The disease was significantly higher ($p<0.05$) in above two years age group (22.17%) followed by between 1-2years (15.85%) and lowest in less than one year (7.99%). Gender was not a significant risk factors for theileriosis (18.92% male vs 17.92% female; $p>0.05$). The molecular characterization of positive samples through 18S ribosomal RNA revealed the presence of *Theileria lestoquardi* and *Theileria ovis*in the infected animals. *T. lestoquardi* was dominated in both sheep (73.80%) and goats (69.23%) while *T. Ovis*accounted for only 26.19% of sheep infection and 30.76% in goats.The observed prevalence can be explained by the farming system of the rural livestock of Balochistan, lack of awareness of community, absence of diagnostic facilities, expensive acaricidal drugs and poor economic condition of farmers.

Key words: Theileriosis, *T. lestoquardi*, *T. ovis*, Balochistan, Small ruminants

AOH-20

INDIGENOUS KNOWLEDGE OF THE MEDICINAL PLANTS USED FOR THE CONTROL OF DISEASES IN SMALL RUMINATES IN BALOCHISTAN, PAKISTAN

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ABSTRACT

Boosting investment in developing world agriculture is necessary not only to reduce current levels of world hunger but to safeguard future world food supplies against the impacts of climate change and epidemic diseases. The present study investigates and documents the indigenous knowledge of medicinal plants for veterinary practices. A total of 104 farmers i.e., 42 settled, 41 nomads, and 21 transhumant farmers were interviewed. Overall six hundred and seventeen traditional practices are reported in this study, which included the traditional practices used for lungs worm 91, mange 88, pleuro pneumonia 77, sheep/goat pox 75, liver fluke 66, anthrax 64 enterotoxaemia 53, foot and mouth 53, and others (bloat, wound, mastitis). Twenty-one different kinds of medicinal plants were used either alone or in combination with other plants. Some of the use of these plants (local name) were: *Peganum Harmala L (spanda):* root is being used for liver fluke, leaves are used as laxative and for heat stroke; *Daphne Mucronata Royle.(Peepal):* used for mange, liver fluke and nasal bots; *Berberis balochistanica Ahrendt (Zaralg):* for cough, infection; *S. cbulica Bth.(Karpola):* for cough and fever; *Sophora mollis (Royle) Baker (Ghoreza):* for liver fluke, constipation, heat stroke, cough; *Withania coagulans (Khamazorj):* indigestion, constipation, heat stroke; *Ephedra intermedia Schhrenk & Meyer (Oman):* anti diarrhea, cough; *Hertia intermedia (Bioss) (Gonga):* retained placenta and mange; *Acroptilon repens (L) DC (Kuragh):* mange, lungs worm, and intestinal worm; *Artemisia maritima (A.quettensis) (Tarkha):* cough, fever, indigestion; *Juniprus excellsa M. Bieb (Obashta):* cough, lungs worm and *Citrilus colocynthis (L) Schard (Maraghoni):* heat stroke, constipation; *Rhiza stricta (*Ezhwarg) leaves were used for liver fluke and mange; *Pinus gerediana (Zarna)* wood oil was used for mange, heat stroke, helminthiasis and as a tonic; *Saliaxa cinophylla* (Walla) branches' wood was used for bloat and indigestion; *Iris songerica* (Cook) leaves were used for pre-slaughter feeding of older animals and was supposed to counter the deleterious effects of mutton on the consumer; *Crambe cordifoliai* leaves and roots were used for cough and fever. *Prangos paboleria* leaves were used for cough and helminthiasis; *Ferulla* roots were used for endoparasites; *Lawsonia inermais* leaves powders were used for cough; *Prunus eburnea* gum was used for stomatitis and external wounds. Food security through the use of indigenous knowledge of local plants can, and should, be addressed together, by transforming agriculture and adopting practices that are "climate-smart" to eradicate hunger from the country.

Key words: Balochistan, medicinal plants, small ruminants, indigenous knowledge

AOH-21

PREVALENCE AND CHEMOTHERAPY OF EAR MITE INFESTATION IN CAT

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ABSTRACT

The present study was designed to determine the prevalence and chemotherapy of ear mite infestation in cat. For the experiment a total of 312 cats were enrolled, out of these 96 were positive for ear mite infestation. Then these 96 cats are divide in to four groups, 24 in each group (A, B, C, D). Group A was treated with Iveremectin, B with Fipronil, and C with Cypermethrin while D were control positive. The data obtained was statistically analysed under analysis of variance technique. Results showed that prevalence of ear mite infestation in domestic cats was 30.76%. The breed wise prevalence was 45.34%, 6.17 % and 25.71 % in Persian, Siamese and Local breeds of the cats respectively. Age wise prevalence i.e, birth to 12 months, 1-5 years and 5 plus age group was 40.38%, 27.97% and17.5%, respectively. Insecticides used in study i.e, Iveremectin (A) and Fipronil (B) showed 100% efficacy while, Cypermethrin (C) was 75% in its performance.

Key word: Cat, ear mite, prevalence, Iveremectin, Fipronil, Cypermethrin.

AOH-22

STUDIES ON BIOLOGY AND ECONOMIC IMPORTANCE OF *PRZHEVALSKIANASILENUS* IN NORTH-EAST UPLAND OF BALOCHISTAN, PAKISTAN.

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ABSTRACT

Studies were conducted on biology and economic importance of goat grubs, *Przhevalskianasilenus,* in upland of north-east region of Balochistan, Pakistan, during April 2011 to March 2012 with the objectives to observe different stages of the life cycle and to estimate the economic importance of hypodermosis in goats for better control strategies. All the observations regarding the adult fly activity season, oviposition, first, second and third instars larval and pupation period were recorded in naturally infested goats in the study areas. Depending on the geo-climatic conditions of the areas under study, there were variations of not more than a few weeks regarding completion of the life cycle in a complete one year period of study. First instars larvae (L1) were observed from mid of May to mid of July, second instars larvae (L2, 12 mm) from mid of July to November, third instars larvae (L3, immature 16.1 mm, mature 18 mm), as well developed warbles on the back and flank region of the goats, were palpated in the field and collected from both the slaughter houses and fields from December until the end of February. The pupal period was observed in early spring in the months from March to mid of April. The adult flies were not seen in the field due to their very short life period. However, the adult fly activity season (Oviposition period) was observed in early summer from mid of April to mid of May. This information was collected from the animal's owners and shepherds that animals run suddenly (gadding), become restless and do not graze and feed properly. The larvae at different stages of their life cycle were isolated, preserved, processed and identified. The overall losses due to warble fly infestation in the study areas were calculated as Pak. Rupees 7578625.49 (Pak. Rs 7.57 million = US$ 77530.69, US$ 1= 97.75) annually. It is concluded that the best time for treatment of goat warble fly infestation in northern mountainous region of Balochistan, Pakistan, is in the months of June and July when first larval instars are still in migratory stage and have not yet caused damage to the skin.

Keywords: *Biology, Economic losses, Przhevalskianasilenus, Goat, Balochistan.*

AOH-23

ANTHELMINTIC ACTIVITY OF ZINGER OFFICINALE AGAINST GASTRO - INTESTINAL NEMATODES IN SHEEP IN DISTRICT QUETTA, BALOCHISTAN

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ABSTRACT

Evaluation of anthelmintic activity of Zinger officinale was studied against GIT nematodes of sheep in district Baluchistan. Sheep of the district were screen out for the presence of GIT nematodes. Animal positive for GIT nematodes and having 150+ Egg per Gram (EPG) of feces was included in the drug trial. Animals were treated with crude powder of locally available herbal plant (*Z.officinale*) and Albendazole. Sixty animals were randomly divided in to six groups (10 animals in each group) i.e. A, B1, B2, B3, B4 and C. Animals in group A served as control treated group given Albendazole at the standard dose at the rate of 7.5 mg/ kg body weight. Animals in groups B1, B2, B3 and B4 were treated with crude powder of *Zingerberofficinale* at the dose rate of 1, 2, 3 and 4 g/kg body weight respectively And Animals In group C served as control untreated. The collected data were analyzed by using SPSS softwareversion 20.0; comparative analysis was done by applying ANOVA. P value <0.05 was taken as significant. Efficacy of Albendazole tested for 14days in-vivo sheep was up to 88%. The efficacy of Albendazole was significantly higher (P<0.05) than all forms and dosages of medicinal plant. Animals in group B1, B2, B3 andB4 showed anthelmintic efficacy of 26.2%, 45.4%, 62.2 %, 71.5% and from day 0 to day 14th post-treatment. Gastrointestinal nematodes of sheep have produced anthelmintic resistance against Albendazole at the dose rate of 7.5mg/kg. In previous studies Albendazole had showed efficacy of 92 to 96%.

AOH-24

SEROPREVALENCE AND HEMATOLOGICAL STUDY OF ENZOOTIC BOVINE LEUKOSIS IN CATTLE POPULATIONS IN AND AROUND DISTRICT CHARSADDA

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ABSTRACT

Enzootic bovine leukosis (EBL) is one of the most important emerging diseases in Pakistan and causes huge economic losses in the cattle population. The causative agent of EBL is *bovine leukemia virus* (*BLV*). The present study was conducted for the first time in District Charsadda of Khyber Pakhtunkhwa province of Pakistan. An investigative study was carried out to determine the seroprevalence of enzootic bovine leukosis and its effect on the hematological and biochemical profile of the infected cattle. A total of 600 blood samples were collected from the four breeds of cattle including Holstein Frisian, Jersey, Crossbred and Achai in three Tehsils (Tangi, Shabqadar & Charsadda) of District Charsadda. Equal numbers of samples from three Tehsils and four breeds were collected. The samples were subjected to isolation of serum in the Provincial Disease Investigation Laboratory KPK. The serum was subjected to indirect ELISA by using Leukosis Serum X2 Kit. Blood samples of positive cattle (OD values > 0.9999, SP% ≥ 40.00) were subjected to hematological profile and serum biochemistry. Results of the present study showed that a total of 20% positive seroprevalence was recorded in district Charsadda. Tehsil wise seroprevalence was 39% in Tehsil Tangi, 17% in Tehsil Shabqadar and 6% in Tehsil Charsadda. The breed wise distribution was 42% in Friesian, 28% in Jersey and 11% in crossbredacross all the three tehsils of district Charsadda, whereas no animal in Achai breed was found seropositive in either of the tehsils of district Charsadda. The sex wise distribution was 4% males and 17% females were *BLV* seropositive in overall sampled cattle (n=600) of district Charsadda. There was a highly significant difference in tehsils and breeds ($P<0.001$) whereas there was no significant difference between male and female ($P>0.05$). The hematological finding showed that total leukocyte count (TLC), lymphocytes and monocytes counts were significantly high ($P<0.005$) in infected cattle as compared with non-infected cattle; whereas neutrophils percentage was significantly low ($P<0.005$) in infected animals as compared with non-infected animals. Interestingly in our local indigenous breed Achai present 0% Seroprevalence and shown resistance to this disease. The pure exotic breeds (Holstein Friesian and Jersey) and Crossbred showed high prevalence suggestive high producing animals are highly susceptible to the disease. Consumption of raw milk from *BLV* infected animals poses a high risk to the human population.

Key words: Enzootic bovine leukosis, ELISA, *Bovine Leukemia Virus,* Pakistan.

AOH-25

ETHNO VETERINARY PRACTICES BY BUFFALO FARMERS IN SOUTHERN PUNJAB: AN OBSERVATIONAL AND QUESTIONNAIRE STUDY

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ABSTRACT

Three main districts Multan, Khanewal & Sahiwal of southern Punjab were surveyed and a total of 300 buffalo farmers were interviewed and participant observations were taken to gain information about different diseases and related ethno veterinary practices. The farmers classified the diseases in major and minor categories based on their clinical signs and economic importance. Mastitis (Sarro) followed by Foot and Mouth Disease (Munh Khur),Hemorrhagic Septicemia (Gal Ghotu), Milk Fever (Sotak), Tick Fever/Red Water (Rut Motra), Asiatic Nerve Paralysis (Saran Wa),Tuberculosis (Wada Taap) and Facioliasis/Liver disorders (Suk Tuc)were found to be the most prevalent diseases causing great economic losses. These diseases are contagious, environmental/seasonal and for their cure variety of treatments were performed like usage of medicinal plants, pesticides, larvicides, fly repellents/odorants, cauterization, supportive therapy (*cold drinks, hot food, hot drinks, yogurt, oil and desi ghee*). The documentation and validation of indigenous agriculture knowledge is of paramount need as the knowledge about ethno veterinary practices is rapidly going to disappear so represents a cultural heritage, valuable resource of food security and sovereignty.

Keywords: *Ethno veterinary, buffalo farmers, south Punjab, survey*

AOH-26

PHYTOCHEMICAL STUDIES ON *CATHARANTHUS ROSEUS* THROUGH SUPERCRITICAL CARBON DIOXIDE EXTRACTION

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ABSTRACT

Catharanthus roseus formerly known as *Vinca rosea* belong to apocynaceae family. It is shrubby plant with oblong leaves and pink or white flowers. It occurs mostly in tropical and subtropical regions. *Catharanthus roseus* contains a variety of indole alkaloids and some are used as antitumor agent; vinblastine and vincristine. In this research study, super critical fluid extraction (SFE) of *C. roseus* was performed applying various temperature, pressure and flow rates. The crude extracts obtained were qualitatively compared by TLC, GC and GC-MS. There profiles were also developed.

Key words: *Catharanthus roseus,* SFE, GC, GC-MS, HPLC.

AOH-27

REVIEW ARTICLE; HAEMONCHOSIS (HAEMONCHUS CONTORTUS) IN SMALL RUMINANTS

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ABSTRACT

Small ruminants, such as sheep and goats, are extremely susceptible to internal parasites, especially gastrointestinal Nematodes. The species of nematodes that affect sheep the most belong to the Super family Trichostrongyloidea and includes Haemonchus, Trichostrongylus, Cooperia & Ostertagia (Bowman et al., 2003). Haemonchus Contortus is ranked as the most important worm of sheep and goats on global basis; Haemonchus Contortus probably causes more losses than any other species of nematodes in ruminants (Marquardt and Demaree, 1985). *Haemonchus Contortus* popularly known as barber pole worm or red worm, is a blood sucking nematode that causes haemonchosis , an infection characterized by anemia ,bottle jaw --the swelling of the lower jaw as a result of anemia, digestive disturbances and death (Machen *et al.*, 1998). Adult worms colonize the abomasal mucosa of the sheep and feed on their blood. The eggs they produce are secreted in the feces, hatch and are ingested by the sheep through the consumption of grasses. Haemonchosis is the most economically important and deteriorating parasitic problem of sheep and goats in Pakistan that is caused by *H. placei* and *H. contortus* (Qamar *et al*., 2011). *H. contortus* is an important, voracious blood sucking parasite of small ruminants found in abomasums , causes anemia, diarrhea , loss of weight, oedema , recumbency , severe debility and ultimately death (Nabi *et al*., 2014).Each worm of *H. contortus* sucks about 0.05 ml of blood per day by ingestion or liberation from lesions (Qamar and Maqbool, 2012). Haemonchus contortus causes blood loss resulting in decrease in erythrocytes, lymphocytes, hemoglobin, packed cell volume, body weight and wool growth (Hayat et al., 1996). A decrease in profitability up to 15% and weight loss up to 50% due to gastrointestinal parasites have been reported by Hussain (1985). Economic losses amounting to Rs. 19.7 million per year have been estimated by Iqbal et al. (1993). Javed et al. (1992) found that losses associated with lowered meat and wool production in sheep and goats in Faisalabad was amounting to 31.4 million per year. Control depends on continual application of antihelmintics particularly Closantel. levamisole, niclosamide, albendazole and oxfendazole and oxfendazole/ levamisole mixture and better managemental strategy.

APT-28

POTENTIAL OF APPLICATION OF MODERN GENOMIC TECHNOLOGIES TO ENHANCE PRODUCTIVITY OF LIVESTOCK IN BALOCHISTAN

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ABSTRACT

The human population is growing and will approach 10 billion people by the year 2050, yet an estimated one in nine (approx. 820 million people) don't have access to enough food to lead a normal life. There will be a profound increase in the demand for animal products. Globally, developing countries are increasing their investments in agriculture research to enhance their ability to contribute to world agriculture markets. Pakistan must increase its investments in creating more advance strategies for animal production that meet the increasing demands for the overgrowing population. In this context, modern technologies must be implemented that increase the proficiencies of livestock production systems. Accelerating animal breeding and improving animal productivity with higher growth, enhanced resistance to disease, improved fertility will require a better understanding of the structure and function of animal genomes. Until recently, much of the genomics research focused on sequencing animal genomes, detecting and tagging sequence variants from individual animals, and then using that genetic marker to select for predicted genetic differences in traits of economic importance. Recently, with the advent of modern technologies, researchers globally can amazingly successful at generating a large amount of genotypic and phenotypic data from large numbers of animals. Advances in genotyping, sequencing technologies (SNP-chip, GBS, RNA-seq and ddRAD seq) and development of gene-editing techniques (CRISPR) generate exciting opportunities to accelerate animal genetic improvement and advance the field through integration of genomic information in livestock important species. Baluchistan has great potential in livestock sector and contributing approximately 40% of Pakistan's total livestock population. Livestock in the province is an integral constituent of rural livelihoods and plays a central asset and safety-net for the poor people. However, lack of education, economic resources, deficiencies in veterinary-service network, poor infrastructure and lack of awareness among local farmers are major hindrances to livestock development. A great opportunity is available here to explore animal genome through recent modern technologies and train researchers/geneticists and veterinary professionals in animal breeding and genetics and bioinformatics analysis.

Key words: Livestock, advanced genomic technologies, production enhancement, Balochistan

APT-29

EVALUATION OF AMBIENT MANAGEMENT INTERVENTIONS ON THE PHYSIOLOGICAL AND BEHAVIORAL PERFORMANCE OF LACTATING SAHIWAL CATTLE DURING HOT HUMID SUMMER

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ABSTRACT

The study was carried out on lactating Sahiwal cow with the objective to study the relationship between physiological and behavioral performances during hot humid summer and to investigate the strategies to provide comfortable ambient environment to get optimum production during hot summer of tropical region. Fifteen lactating multiparous Sahiwal cows (approximately similar age, weight and same parity) were randomly divided into three groups, 5 cows in each group under completely randomized design (CRD) with 90 days treatment period. Treatments includes; 1) provision of roof shade only (S), 2) provision of shade along with fans (SF), and 3) provision of shade, fans and sprinklers (SFS). Similar feeding was provided to all experimental animals throughout the trial period. Ambient temperature and relative humidity were recorded at 12:00pm and 6:00 pm daily. Significantly ($p \leq 0.05$) decreased respiration rate (breaths/min) was observed (27.03±0.10, 33.43±0.61, 38.85±0.67) in cows under SFS, SF, and S treatment, respectively**.** Similarly, mean daily rectal temperature wasobserved significantly ($p \leq 0.05$) lowered (100.99±0.08, 101.51±0.02, 101.69±0.03) in SFS, SFand S, respectively. Behavioral parameters (min/24 h) significantly ($p \leq 0.05$) differsin total time spent in feed intake, ruminating, lying and locomotion between treatments. It is concluded from the present study that the physiological and behavioral performance of lactating Sahiwal cattle can be improved by providing the fan-assisted ventilation facility during the hot humid summer in the subtropical region.

Key words: Sahiwal cow, behavioral performances, ambient environment

APT-30

CAMEL: A POTENTIAL MEAT ANIMAL OF THE FUTURE

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ABSTRACT

Unlike other livestock species camel is unique in its characteristics. At present, more camels are being slaughtered for meat in those areas where there is less output from other livestock to ensure the fulfillment of dietary protein intake. Dromedary camel is present all over Pakistan and its population is highest in Baluchistan (41%). There are 21 documented breeds of camel in the country. The main two types are riverine and mountainous. In Pakistan, as well, there are areas with extremely arid pastures in which the only livestock that can produce milk, meat, wool and skins is the camel. This animal has a unique ability to convert the scanty plant resources of the desert into valuable animal proteins due to unique physiological characteristics like their great tolerance to the extremes of temperatures, drought, water scarcity, dessert conditions and poor vegetation.

In literature the documented average birth weight of camels is about 35 kg, but it varies widely between regions, breeds and even within the same breed. The modest growth rate (500 g/day) is a great limitation in meat producing ability of camels. But when we review the production systems of camel it is evident that camels are mostly produced under traditional extensive systems on ranges with poor levels of nutrition and are mostly slaughtered at older ages producing low quality carcasses. Camels have dressing-out percentage values from 55% to 70%. When we review the composition of camel meat, lean contains about 78% water, 19% protein, 3% fat, and 1.2% ash with a small amount of intramuscular fat, which renders it a healthy food for humans.

The characteristic color of camel meat is raspberry red to dark brown and the fat of the camel meat is white. The camel meat resembles coarse beef in taste and texture. The camel meat differs from beef in its amino acid and mineral contents. Future research efforts are needed to focus on exploiting the potential of this unique animal as a source of meat through multidimensional research resulting in efficient production systems, and improved meat processing and marketing.

Key words: Camel Meat, Desert, Dromedary, Carcass, Arid Zone

APT-31

BUFFALO A MAJOR DAIRY ANIMAL: ITS SOCIO-ECONOMIC IMPACT IN POVERTY ALLEVIATION IN RURAL AREAS OF PAKISTAN

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ABSTRACT

Dairy animals especially buffaloes are persistently having a substantial role in poverty alleviation as majority of the poor in developing world live in the rural areas and that food prices are a major determinant of the real income of both rural and urban poor. Buffalo plays a pivotal role in rural livelihood, household income generation, employment and poverty relief. In Pakistan, livestock sector has seen a growth of around 5-6% during the last decade. However, growth slowed down to 2.6% in 2003-04 and 2.3% in 2004-05 but it has risen again to 8% during the year 2005-06. Livestock has its share in value-addition of agricultural economy and has increased from 29 (1990-91) to 50 (2005-06) % as compared to the share of crop sector that had declined from 65 to 47% in the same period. About 30-35 million rural population of the country is deriving their livelihood from this potential sector and derives 30-40% of their income from livestock raising especially buffalo and cattle.

Our rural masses in Pakistan have inherited traditions of rearing buffaloes as major animal in irrigated Punjab and it has remained a complementary activity to crop production. The dairy farming in Pakistan has failed to attract its due importance from the policy makers. Buffalo and cattle farming is having important complimentary role with food grain production for small farmers. Animal dung is the main source of fuel for cooking and an excellent manure to maintain soil fertility, while crop residues, otherwise mostly going waste are saleable at remunerative prices to dairy farms for feeding buffaloes a good converter of raw material into valuable milk, and thus enhance economic return for crop production thus both crop and livestock sectors are complementing each other.

Despite the importance of buffalo among livestock production in the economy of Pakistan, especially for the livelihoods of resource-poor farmers and landless laborers, technical policy toward this valuable animal has suffered from the lack of a clear policy and strong thrust and targeted focus. To a great extent national policy makers and development groups have not recognized or realized the potential contribution of this excellent dairy animal in poverty reduction, despite the large share of the poor depending on dairy animals as indispensable part of their livelihood and the increasing demand for dairy products for food security in developing countries like Pakistan.

This Working Paper concludes with recommendations for improvement and efficient use of buffalo as a major dairy animal as an effective tool for food security and poverty alleviation in the country.

Key words: Poverty, Dairying, Hunger, Socioeconomic, Food Security

APT-32

DAIRYING: AN EFFECTIVE TOOL FOR FOOD SECURITY IN PAKISTAN

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ABSTRACT

Pakistan stands at fourth in the ranking of the largest milk producing countries in the world behind India, China and the United States with an annual production of 36.2 million tons from eight million farming households. Annual milk production across the country is worth as much as 1.8 US billion dollars and is easily the largest product in the entire agriculture produce and overall contribution of dairying to the national economy worth 5.40 US billion dollars. At the present the total estimated demand at household level in terms of liquid milk is 43.2 million tons in Pakistan and the demand is computed on the basis of monthly consumption parameters in household expenditure survey as reported by Federal Ministry of Livestock and Dairy Development in Pakistan. The sector has registered a constant growth of around five percent. The existing dairy production systems in Pakistan include: Rural subsistence small-scale production system, Rural, market-oriented small-scale production system, Rural commercial production system and Peri-urban commercial dairy production system. The issue of food security for Pakistan's next generation can be dealt with by seeking excellence in dairy farming, aiming for high-intensity, high-sustainability agribusiness by modernizing and expanding its agricultural sector. There is dire need of a package approach to develop a comprehensive policy that should be based upon integration of research, extension and development activities in the existing dairy production systems in Pakistan. The importance of milk is evident within long historical traditions of both urban and rural milk consumption, largely influenced by cultural factors, such as those in Pakistan and India. These traditions have encouraged the continued existence of strong informal rural milk marketing systems, thus supporting growing trends in per capita consumption in those countries. This rising regional demand for milk and dairy products has translated into opportunities for local producers/entrepreneur, the majority of whom maintain between two and five cows and supply more than 80 percent of milk in the region. The adoption of best practices in the dairy sector would have two fold effects: on one side it would help to increase the milk supply and on the other side would also help in entering the export market.

Key words: Dairying, Food Security, National Economy, entrepreneurship, Sustainability

APT-33

BALOCHISTAN NARI MASTER AND ITS IMPORTANCE FOR THE FUTURE BEEF INDUSTRY OF PAKISTAN

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ABSTRACT

The Bhagnari cattle of Balochistan, Pakistan are Zebu type and are well adapted to local conditions and over time have been selected for draught. The Bhagnari cattle, strong heavy breed, are well suited to slow but heavy agricultural work by tilling the hardest soils and pulling heavy loads. The breed accounts for about 28 percent (380,000 heads) of cattle population. The farmers of the area earn a greater part of their livelihood through cattle production of Bhagnari and non-descript breeds. Primarily these cattle have been used for draught purpose. There has however been no typical breed of cattle for meat production except the old and worn out cattle, no longer required for milk or draught purpose. In view of growing population and high cost mutton, the consumption trend to be shifting to beef eating. Similarly due to income elasticity, increasing trend of fast food and eating in hotels, demand for tender beef was seen to be on the high side. At Beef Production Research Center, Sibi, first Pakistani beef breed named as, "BALOCHISTAN NARI MASTER" has been evolved in late nineties. This new breed has a combination of improved and good characteristics like better birth weight, weaning weight, better fertility rate, weight gain in feed lot, better carcass quality, dressing percentage, feed conversion ratio besides resistance to hot weather and parasitic infestation as compared to indigenous Bhagnari. Achievement of the objectives towards evolution of "Balochistan Nari Master" as a unique breed having the beefy characteristics through successive cross breeding has successively been obtained and now the breed needs further propagation in the area. The department has been able to achieve a base population of about 500 heads of "BALOCHISTAN NARIMASTER" by now and intends to utilize/propagate it further in private sector for beef production.

APT-34

DAIRY AND MILK PROCESSING AND ITS FUTURE PROSPECTS IN BALOCHISTAN, PAKISTAN

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ABSTRACT

Livestock sector in Balochistan is generally characterized by low per animal productivity. The average productivity of ruminants is far below than its potentially achievable levels. Dairy animals though are in low numbers but are somehow meeting the basic requirements of people of the province. The buffalos are confined mostly in canal-irrigated districts of the province which are badly affected by the recent flood. Indigenous cattle have low potential both in terms of milk and meat but well suited to the local conditions. Balochistan has a success story in the acclimatization of pure breed Friesian and establishment of Friesian crossbred animals all over the province by employing the artificial insemination techniques. Though improved feed, control of parasites, and most importantly through better breeding strategies and introduction of modern biotechnologies productivity gap can be narrowed. However, so far no serious attempts have been made to take the new knowledge of dairy technology on the farmers' level nor have these new research findings been adequately disseminated to those concerned in the province. The main constraints in transforming the traditional dairy farming into commercial enterprise includes nomadic way of life, small herd size, scarcity of water and poor range lands. Conventionally, many efforts have been launched to transfer knowledge and skills to dairy farming community but those could not sustain due to their faulty design. They use practices which are not conducive to enhanced dairy production since no system exists for their training in modern dairy and husbandry practices. The public sector infrastructure and institutional base needs to be strengthened and reorganized to meet the emerging needs of the growing animal population in the province. So far, emphasis has been mainly on the animal health side, on prevention of livestock diseases and their control measures. Time has now come to devote equal attention towards the dairy production and management through modern biotechnologies and their application. But we are still away from the starting line of advancement especially in animal production. The current situation especially after the post-flood scenario, the dairy and milk processing in Balochistan demands a review of the whole system and could be a blessing in disguise to correct the situation for future dairy development in the province.

Key words: Milk, cow, buffalo, dairy production, artificial insemination, Balochistan

APT-35

NUTRIENT REQUIREMENTS FOR BUFFALOES – A SHORT COMMUNICATION

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ABSTRACT

Nutrient is a substance that provides nourishment essential for the maintenance of life and for growth. Water is a basic nutrient that should be given 5-7 times in summer and 3-4 times in winter per day. Total need of water per buffalo is about 130-150 liter per day. Inadequate or poor quality water can limit milk production and growth and may cause even health problems. DMI is normally calculated as 3-4 % of body weight. Energy is quantitatively the major nutrient required by dairy buffalo after water. Mostly the energy is supplied to the buffalo from carbohydrates being the most economical. Protein is also a good source of energy but it is usually 5 to 10 times higher in price as compared to carbohydrates and therefore its use is less as energy source. Fat is very good sourcing of energy and supply 2.25 times more energy as compared to carbohydrates and protein. It is mainly included in the rations of young calves but may also be added to the rations of lactating dairy buffaloes. Grains, hay, silage and pasture are also good source of energy. Protein is required in animal rations to provide the supply of amino acids needed for tissue repair and synthesis, hormone synthesis, milk synthesis and many other physiological functions. Amino acids are supplied by the digestion of microbial protein, and by feed protein that escapes microbial breakdown in the rumen. Soybean meal is most common protein supplement for buffaloes. Other sources are sunflower meal, cottonseed meal, peanut meal, fish meal and urea (NPN) is also used as a cheaper source of protein.Minerals are inorganic substances and are essential dietary constituents and required in relatively small quantities. Different minerals have been classified as nutritionally essential in buffalo diet. They include sodium, chloride, calcium, phosphorus, magnesium, potassium, sulphur, iron, zinc, copper, iodine etc. Vitamin A, D, E, and K are essential vitamins for buffalo diet. Fiber is also very important in buffalo diet as more fiber contents in feed increase rumination and saliva.

Key words: *Buffalo, crude protein, energy, nutritional requirements*

APT-36

BUFFALO PRODUCTION PROFILE IN DISTRICT SAHIWAL, PUNJAB

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ABSTRACT

A study was executed to evaluate the production profile of buffaloes maintained in district Sahiwal, region of the Punjab. Different husbandry practices, milk production, calf rearing and the constraints faced by the farmers affecting the buffalo production and management were studied through a pre tested questionnaire. A total of 100 farmers were interviewed by using a single-visit-multiple-subject diagnostic survey. Most of the farmers were keeping buffalos which play an indispensible role in the socioeconomic importance of the farmers of this area. According to the farmer's responses, the living status of farmers has improved and the major source of income is the sale of milk, meat, animals and crop cultivation. Many of the farmers kept their buffaloes in semi-open housing system in tie condition and feed them fodder by cut-and-carry system along with stall-feeding of concentrates and crop residues. In concentrates the farmers use different vandas, feeds and indigenous raw materials. Some farmers use agro industrial by products and kitchen wastes to feed their buffaloes. Many farmers use silage for feeding of their animals. The range of daily milk yield was found to be 8-12 kg in most of the buffaloes with some 14-16 kg in very few specimens.Birth weight of male and female calves ranged between37-42 and 32-39 kg, respectively. Calf mortality, traditional way of husbandry practices, poor extension services, lack of attractive market and value chain services were the major constraints affecting buffalo production. Survey indicated that buffalo farmers are more inclined towards ethno-veterinary practices than approaching the nearby veterinarians. Mostly practicing personals are nontechnical staff, technicians and village veterinary workers. Based on survey and constraints collected, some remedial measures have also been suggested.

Key words: *Buffalo, production, management, survey*

APT-37

HYGIENIC QUALITY OF MILK SAMPLES COLLECTED FROM DIFFERENT PRODUCTION SYSTEM IN KHARTOUM STATE, SUDAN

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ABSTRACT

This study was conducted to evaluate the quality of milk supplied to consumers from three different production system in Khartoum state, Sudan during winter and summer seasons. Fifty raw milk samples were collected from large , medium and small farms, then evaluated for the bacteriological examination(total bacterial count, coliform count and psychrotrophic bacterial count), in addition to phisiochemical analyses (fat ,solid not fat ,protein, density and acidity). Also antibiotic residues test was perform using three different methods. Total bacterial count (TBC) log 7.78±0.16 and coliform count log5.58±0.16were highly significant (P≤0. 01)differences in the milk samples that collected from small scale farms compared to those from medium and large farms. The herd size and farm management practice influence the somatic cell and bacterial count in bulk tank milk. TBC of milk samples collected from the three different production systems were highly significant (P≤0. 01) differences during the summer season compared to those collected during the winter season, this due to the unhygienic milking procedures or equipment as well as poorer milk storage condition. All the milk samples collected from different production system were free from antibiotic residues tests. High significant differences revealed in the fat content (log 5.11±0.2) and solid not fat (log 11.2±0.2) from the samples collected from large and medium farms compared to the small ones. These farms with larger herds have better management practices that differ significantly from those with smaller herds. The study concluded that extension services among dairy farmers, labors and Milker's, performing of sanitary practices and cleaning program are needed to prevent diseases.

Key words: Milk, chemical composition, TBC, coliform, antibiotic residues

APT-38

PERFORMANCE OF CROSSBRED COWS IN THE PROVINCE OF BALOCHISTAN, PAKISTAN

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ABSTRACT

Balochistan province is rich in cattle varieties; its climate also favors the imported breed especially in the cold region. Since the imported breed of the cattle Holstein Friesian came in the province many of the dairy farmers took advantage and crossed their existing cattle in order to improve the milk production. Since the farmer is quite unfamiliar whether this cross breeding have an impact over the reproductive performance of their animals keeping the environmental, nutritional and other factors. Therefore this study was designed to evaluate the present status of artificial insemination and its reproductive performance in crossbred cows in the province of Balochistan. Conventional economic evaluations of crossbreeding programmes have overestimated their benefits by ignoring subsidies, the increased costs of management such as veterinary support services, and the higher levels of risk and socio-environmental costs associated with the loss of the indigenous genotypes. The data from the all over the province has been collected. The sample was so collected randomly from different dairy farms where mostly crossbred animal were used for dairying purposes. The data was statistically analyzed. The parameter was fixed by obtaining the sample from the already existing data of the livestock department. This data was used as inferential to that which was collected randomly to testify the hypothesis. Results suggest that crossbreeding has had a positive impact on Balochistan society's welfare, although taking into account important social cost components substantially lowers the net benefits. Farm-level performance is, however, little improved under certain production systems by replacing the indigenous zebu with exotic breeds.

Key words: artificial insemination, crossbred, diseases, cows, Balochistan, Pakistan

APR-39

PRESERVATION OF FRESH BUFFALO MILK BY ACTIVATION OF LACTOPEROXIDASE SYSTEM

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ABSTRACT

The aim of this study was to study the preservation of buffalo raw milk by the activation of their natural lactoperoxidase system to extend its shelf life at different temperatures. Milk samples treated with equal concentration of sodium thiocyanate ions and hydrogen peroxide ranging from 10, 20 and 30 ppm and stored at 35, 40 and 45 ^{0}C. A total of 30 fresh raw milk samples from buffalo were used for the present study. For each treatment group, 10 raw milk samples at different temperatures were used for acidity, pH, clot on boiling test, alcohol test, methylene blue reduction and thiocyanate values. Each test was performed from 0 to 9 hours with an interval of three hours except thiocyanate values, which was recorded initially and at curdling. Acidity percentage was analyzed at 35^{0}C for 0h, 3h, 6h and 9h. At 6h and 9h, all the combinations were significantly ($P<0.01$ and $P<0.001$) different, except 0ppm versus 10ppm at 9 h. At 40^{0}C for 0h, 3h, 6h and 9h, all the combinations were significantly different at 0h and 3h except 20ppm versus 30ppm. The remaining combinations were significantly ($P<0.01$ and $P<0.001$) different. pH, were significantly ($P<0.05$) different at 0h between 0ppm versus 30ppm, 10ppm versus 20ppm; at 3h, 20ppm versus 30ppm; at 6h and 9h all the combinations. The remaining combinations were highly significant ($P<0.01$ and $P<0.001$) from each other. Thiocyanate at 35^{0}C, 4^{0}0C and 45^{0}C there was significant difference ($P<0.01$, $P<0.001$) at all the stages except at 10ppm and 30ppm at 35^{0}C. Clot on boiling test at 35^{0}C and 40^{0}C, 10ppm and 30ppm at 3rd h, and 20ppm COB started positive at 4th h. Alcohol test of the samples were positive for control and 10ppm at 6h and for 20ppm at 7h respectively. At 40^{0}C, for 10ppm, 20ppm and control the positive reaction started at 3rd h. At 45^{0}C, the reaction were positive at 1st h for control, at 3rd h for 10ppm and at 6th h for 20ppm and at 8th h for 30ppm. Methylene blue reduction test of the control samples were positive at 3rd h. At 35^{0}C, for 10ppm, 20ppm and 30ppm positive reaction started at 5th h, 7th h and 7th h respectively. At 40^{0}C, for 10ppm, 20ppm and 30ppm positive reaction started at 1st h, 2nd h and 2nd h respectively. And at 45^{0}C, for 10ppm, 20ppm and 30ppm positive reaction started at 2nd h, 5th h and 6th h respectively. Milk samples stabilized with 30 ppm were acceptable up to nine hours as compared to control which curdled within seven hours post milking. In Pakistan preservation of buffalo raw milk can be carried out by its lactoperoxidase enzyme system, which helps in collection of milk of high quality from widely scattered remote areas.

Key words: Milk, buffalo, dairy production, lactoperoxidase system, preservation

APT-40

ASSESSMENT OF WOOL CHARACTERISTICS OF MENGALI SHEEP OF BALOCHISTAN

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ABSTRACT

The study was carried out to establish the environmental factors' influence on the wool production as well as analyzed the wool quality parameters of Mengali sheep. The wool production data on 3150 offspring sired by 38 rams in fourflocks at three locations over a period of 5 years (Jan. 2005 to Dec. 2009) were included in the analysis. Data thus collected was subjected to statistical analysis by standard methods of analysis of variance. The average autumn fleece weight (AFW), spring fleece weight (SFW) and combined fleece weight (CFW) were 1.35±0.82, 1.17±0.75 and2.50±0.64kg, respectively. Animal model was fitted with shearing season and location of flocks as fixed and animal as random effects. The heritability estimates for AFW, SFW, and CFW were 0.19±0.03, 0.22±0.06 and 0.18±0.04, respectively. Wool traits of sheep (n=90) were found as: coarse wool with diameter 41.62±4.57µ; black (85%) and white(15%) in color, true fiber 65.07±5.06%, modulated fiber 11.2±3.2%, Kemp 10.1±2.79%, hetero type 21.0±1.06% and staple length 6.25±1.12cm. Season of shearing and location of flocks had significant effects ($P<0.05$) on fleece weight indifferent years. Sex and type of birth of animal were not statistically different ($P>0.05$) for fleece traits. Mengali wool characteristics are best suited for carpet manufacturing but color would be a limitation. These findings suggested that Mengali sheep wool production and quality can be improved through selection, management, and favorable environment.

Key words: Wool traits, environmental factors, genetic parameters, Mengali sheep

APT-41

STUDY OF NON- GENETIC FACTORS AFFECTING MILK PRODUCTION IN BEETAL GOAT

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ABSTRACT

Beetal goats were found mostly in irrigated areas of Punjab and was estimated that in 2017 there were 72.2 million goats and total goat milk production 891 thousand tones. This study was conducted to analyze the effect of several non-genetic factors including flock, parity, sex, age on milk production of Beetal goats. The objective was to study the milk production in goats and to study effect of non-genetic factors on milk production of goats in southern Punjab Pakistan. The study was conducted on Beetal breeds of goats (n=220) at Institute of Pure and Applied Biology in Bahauddin Zakariya University Multan. Milk production was recorded just two weeks after kidding on weekly basis and continued until when the animal dried off. Effects of non-genetic factors in Beetal goats to study their effect on milk production. Flock shown significant effect on milk production while other factors did not had any significant effect.

Key words: Beetal goats, Non-genetic factors, Flock effect

APT-42

ORGANIC ACID: A POTENTIAL MARINATION TO IMPROVE SAFTEY OF MEAT

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ABSTRACT

The target areas of biotechnological research in the field of livestock products can be envisaged as production of high yielding food animal, improvement in quality of their products, enhanced production of natural food grade preservatives, efficient by-product utilization and so forth. Many of the biotechnological techniques can be explored in the area of quality assurance programs, which would be of great help to produce livestock products of assured quality and public health safety. Meat quality refers to intrinsic attributes critical for the suitability of meat for eating, processing and storage. The main attributes of interest regarding meat are safety, nutritional value, consistency, oxidative stability and lipid composition. The margination is used to improve safety and functional properties of meat. The most commonly used marinades include salt and sodium tripolyphosphate. Now a days the meat processing facility are using more acidic sodium lactate, sodium citrate and sodium diacetate to decrease the bacterial growth such as *Listeria monocytogenes*. The efficiency using acids would be due to the non-dissociated fraction rather than to proton toxicity. The inhibitory effect of these acids can be related with the dissociation constant and with the greater permeability of the cell membrane to weak acids in their un dissociated form. This implies that increase in anti *Listeria* activity can be expected if the pH of the acetate or lactate containing system is decreased even to a small extent such that it was clear to the pKa of the acid.

APT-43

PERFORMANCE PROFILE OF FRIESIAN COWS KEPT IN BALOCHISTAN, PAKISTAN

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ABSTRACT

Holstein-Friesian heifers were imported from Denmark in 1977 by Balochistan Govt. to meet the milk demand of the province. The study was planned to see their potentials in productive [age at first calving, birth weight, lactation length or milk yield, milk yield per lactation, culling and mortality etc] and reproductive performance [service period, age at first service, gestation period and calving interval etc.]. Profiles of these animals kept under the local conditions of Balochistan. Overall average values for AFS were 660.42±12.42d, GP 280.62±0.25d, AFC 944.08±12.71d, BWT 30.12±0.15kg, MY 3731.26±40.52 liters, DIM were 313.56±3.83d, SP 240±9.61d, DP averaged as 59.15±20.61 d while CI 451.10±5.55d. The effect of year, season, age and location were studied and the results revealed that the year affected the AFS, AFC, BWT, Middle and SP ($P<0.01$); GP ($P<0.05$) but not DIM and CI ($P>0.05$). No effect of season on AFS, AFC, DIM, MY, SP and CI ($P>0.05$) was observed except GP and BWT ($P<0.05$). The age affected the GP and SP ($P<0.05$) but not on BWT, DIM, MY and CI ($P>0.05$). No effect of sex of the calves, type of birth and calving number on GP ($P>0.05$) was seen. Location of the farm did exert effect on AFS, AFC, BWT and MY ($P<0.01$), CI ($P<0.05$) but on GP, DIM and SP ($P>0.05$). Based on the results of the study, efficient and proper management demands that we take care all the productive and reproductive parameters of these animals for improved production.

Key words: Friesian, Holstein, cow, performance, sex ratio, Balochistan, Pakistan

APT-44

PRESERVATION OF FRESH RED SINDHI COW MILK BY ACTIVATION OF LACTOPEROXIDASE SYSTEM

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ABSTRACT

The aim of this study was to study the preservation of Red Sindhi Cow raw milk by the activation of their natural lactoperoxidase system to extend its shelf life at different temperatures. Milk samples treated with equal concentration of sodium thiocyanate ions and hydrogen peroxide ranging from 10, 20 and 30 ppm and stored at 35, 40 and 45 ^{0}C. A total of 30 raw milk samples of cow were used for the present study. For each treatment group, 10 raw milk samples at different temperatures were used for acidity, pH, clot on boiling test, alcohol test, methylene blue reduction and thiocyanate values. Each test was performed from 0 to 9 hours with an interval of three hours except thiocyanate values, which was recorded initially and at curdling. Cows' raw milk samples for acidity percentage at 35^{0}C, there were significant ($P<0.01$ and $P<0.001$) differences in the all the combinations except 10ppm versus 20ppm at 6h and 9h. At 40^{0}C again all the combinations were significantly ($P<0.01$ and $P<0.001$) different except 10ppm versus 30ppm at 0h, 10ppm versus 20ppm and 20ppm versus 30ppm at 3h. Moreover, when analyzed at 45^{0}C, there were highly significant ($P<0.001$) differences at 3h, 6h and 9h except 20ppm versus 30ppm at 3h and 0ppm versus 10ppm, 20ppm and 30ppm at 0h. Cows' raw milk samples for pH were checked at 0h, 3h, 6h and 9h, all the combinations were highly significant ($P<0.05$, $P<0.01$ and $P<0.001$) except 10ppm versus 20ppm at 3h and 20ppm versus 30ppm at 6h. In addition at 45^{0}C, a highly significant ($P<0.05$, $P<0.01$ and $P<0.001$) differences were revealed for all the combinations. In cows' milk, significant ($P<0.01$, $P<0.001$) differences were observed at 35^{0}C for 10ppm; at 40^{0}C for 0ppm, 20ppm and 30ppm; and 45^{0}C for 10ppm. Clot on boiling test of the control samples were positive for temperatures tested at 2h and 3h respectively. At 35^{0}C, for 10ppm, 20ppm and 30ppm positive reaction started at 5th h, 6th h and 7th h respectively. At 40^{0}C, for 10ppm, 20ppm and 30ppm positive reaction started at 6th h, 8th h and 9th h respectively. And at 45^{0}C, for 10ppm, 20ppm and 30ppm positive reaction started at 6th h, 7th h and no reaction respectively. Methylene blue reduction test of the control samples were positive at 1st h, 1st h and 2nd h respectively. At 35^{0}C, for 10ppm, 20ppm and 30ppm positive reaction started at 1st h, 1st h and 2nd h respectively. At 40^{0}C, for 10ppm, 20ppm and 30ppm positive reaction started at 5th, 7th h and 8th h respectively. And at 45^{0}C, for 10ppm, 20ppm and 30ppm positive reaction started at 5th h, 6th h and 6th h respectively. Milk samples stabilized with 30 ppm were acceptable up to nine hours as compared to control which curdled with in seven hours post milking. In Pakistan preservation of cow raw milk can be carried out by its lactoperoxidase enzyme system, which helps in collection of milk of high quality from widely scattered remote areas. This will be real help and support for small dairy holders in the far-flung country areas.

Key words: Milk, cow, lactoperoxidase system, preservation, dairy production

APT-45

PRODUCTION PROFILE AND REPRODUCTIVE HEALTH OF BUFFALOES IN RESPONSE TO OXYTOCIN ADMINISTRATION

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ABSTRACT

Oxytocin (OT) is released by posterior pituitary that causes contraction of myoepithelial cells surrounding the alveoli and smaller ducts of mammary glands. It is being widely used in buffaloes in Pakistan. OT increases milk yield by increased gland output of milk, which is not due to the removal of residual milk.The milking process allowed to be managed by an exogenous OT due to its vital role in neuro hormonal milk ejection process. OT also improves the persistency of lactation so its use in dairy buffaloes is very common in our country. OT injections causes' increased OT blood levels which results in the prolonged myoepithelial and alveolar contractions that ultimately increase milk yield. Milk composition especially protein, fat, lactose and mineral concentration influenced by exogenous OT concentrations. It affects the cell maintenance and mammary metabolism along with its proven physiological role in milk ejection reflex. Different reproductive anomalies in buffaloes like anestrous, corpusluteum cyst, delayed age at puberty, follicular ovarian cyst, repeated estrus cycles, dystocia, abortions, dead fetus and retention of the fetal membranes are commonly observed due to its abundant usage. In conclusion, OT has remarkable effects on milk quality, composition and reproductive health of buffaloes so its usage in the dairy industry should be discouraged.

Key words: Hormone, buffalo, dairy, production, reproduction

APT-46

SOME MORPHOLOGICAL, FERTILITY AND GROWTH TRAITS FOR MENGALISHEEP OF BALOCHISTAN, PAKISTAN

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ABSTRACT

The present study was conducted to establish the characteristics regarding the habitat, status, norms and performance parameters of Mengali sheep breed of Balochistan. For the present study, 15 households of 7villages were visited in 7 districts. Information on management, feeding, breeding, health practices, and utility patterns, productive and reproductive performance was collected by questionnaire and personal observations. Body weight and measurements were recorded for total 386 and 83 animals of extensive Farmers Flock (FF) and semi intensive production system, Experimental Station CASVAB (ESC), Quetta, respectively. The data were analyzed using unpaired t- test. In both production systems, sex had a significant effect on growth performance ($P<0.05$).Average adult body weights for ESC and FF were 49.0±0.51 and 40.4±0.35 for male, and 41.2±0.37 and 36.0±0.21kg for female, respectively ($P<0.05$). Male had higher height at withers height, chest girth and body length compared to female ($P<0.05$), whereas no significant difference was found in ear and tail length. No difference was observed in yearly greasy fleece weights. Averages of the twinning percentage for ESC and FF were 5.25 and 3.55%respectively. A ewe on an average delivers 6-9 lambs in lifetime. The variation in growth performance of sheep raised in different rearing systems could give remarkable clues in order to set genetic improvement plan by selection for a long term. The results suggested that the performance of the sheep was improved under semi-intensive managemental system, which indicates shortage of nutrients in the range, whereas in the semi-intensive conditions the feeding cost increased quite significantly.

Key words: Mengali sheep, Balochistan, Fertility, Morphological characteristics

APT-47

EFFECT OF FEEDING MAIZE, SORGHUM AND OAT SILAGE ON GROWTH PERFORMANCE OF NILI-RAVI BUFFALO CALVES DURING SUMMER IN THE SUB-TROPICAL REGION OF PAKISTAN

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ABSTRACT

Twenty four young male calves of Nili-Ravi buffalo with an average age of 7.0±1 months (mean ± SD) and weight 110±08kg were raised during summer of 2013 (14 May to 12 August), at Buffalo Research Institute, Pattoki, District Kasur, Pakistan. All the calves were divided into four groups according to completely randomized design, with six calves in each group. The groups and treatments are as, A = Maize fodder, B= Maize silage C = Sorghum silage and D = Oats silage. The results showed that dry mater intake (DMI) was significantly ($P< 0.05$) higher in calves of group A, similar between B and C but lower in group D, stand as 3.38±0.04, 2.44±0.03, 2.43±0.02and 2.24±0.02kg/day respectively. While, crude protein (CP) intake was also higher in group A, followed by B, C and D. Similarly, NDF and ADF intake were also significantly ($P<0.05$) higher in group A, but nonsignificant between groups B, C and D. Numerically weight gain was different however surprisingly non-significant ($P > 0.05$) among the groups. While dry matter digestibility (DMD) revealed non-significant ($P > 0.05$) result between the groups. Numerically low digestibility of control diet might be due to poor quality summer fodder as well as warm environmental condition. However same pattern existed for CP and NDF digestibility among the groups. Higher feed efficiency was observed in calves fed MS diet (0.167) to convert into gain followed by SS (0.160), OS (0.157) and MF (0.110). The calves consumed more feed on MF diet to gain one kg of body weight, while on MS followed by SS and OS diet performed best and were highly efficient to gain in weight. It is concluded from the results of current study that cereal silages could replace the summer grown maize fodder in the diet of growing buffalo calves without any negative effect on growth and digestibility.

APT-48

STUDY OF RELATIONSHIPS AMONG DIFFERENT BODY DIMENSIONS IN SHEEP

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ABSTRACT

The present research work was conducted in order to explore relationship among various body measurements of local sheep present in Southern Punjab, Pakistan. For this purpose data on various linear body measurements of sheep will be recorded along with identity of the animal. The various body measurements included in the study will be (1) Withers height (2) Body length (3) Head length (4) Head width (5) Ear length (6) Ear width (7) Neck length (8) Neck width (9) Heart girth (10) Rump length (11) Rump width and tail length was recorded. After collecting data it edited and tested for normal distribution. It was used to determine a relationship among them using Pearson's correlation coefficient. From this study we can understand relationships among various body measurements.

Key words: Linear body measurements, sheep, Pearson correlation

APT-49

HEALTH BENEFITS OF CAMEL MILK – FOOD FOR LIFE

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ABSTRACT

Camel milk is not only considered as a food with high nutritive values but also a food with therapeutic values that could be used to assist the patients with some of the diseases. These include the presence of peculiar antibodies that can penetrate into the cancerous tissues and the presence of insulin like molecules that could be used to treat diabetes, bioactive peptides that are produced from camel milk protein having antioxidant, antimicrobial and anti-hypertensive activity. Bovine's milk allergy is by far the most prevalent food allergy especially in children because of the presence of β-lactoglobulins. Camel milk lacks this protein and is enriched with α-lactalbuminsuch as human milk. Camel milk is very rich source of protein along with potential anti-microbial and protective activity while the fat present in the camel milk doesn't forms a layer so it is evenly distributed throughout the milk in the form of small micelles when kept undisturbed which make its digestion easier. It contains higher concentration of long chain fatty acids (C_{14}-C_{18}) than the short chain fatty acids, so it is healthier. Camel milk has unique property to inhibit the growth of certain microorganisms because it contains protective proteins and enzymes with special antibacterial and antiviral properties such as lactoferin, peptidoglycan protein (PGRP) and lacto-peroxidase. It contains insulin so used to treat the *Diabetes mellitus*. The amount of insulin (42μU/ml) is not so much higher than in cow's milk but this insulin is protective that is not destroyed in the stomach and passes to the intestine causing reduction in the blood sugar level. Camel immunoglobulins have no short chains and small so are active against antigens. The camel's immunoglobulins pass into the milk and so are available for combating autoimmune diseases. Camel milk can protect gastric mucosa against ulcers. It can be used in the treatment of tuberculosis as well. It has a reasonable percentage of protein, having fat with very fine fat globules that are emulsified in the milk and not form a clear fat layer over milk. It has a handsome amount of lactose percentage which is tolerant to the human beings so don't cause lactose allergy in the people. Camel milk is considered very special in this regard having SNF and Total Solids almost very near to cattle milk but considered healthier than cattle milk.

Keywords: Camel, milk, diseases, immunoglobulin, characteristics, composition

APT-50

HERITABILITY OF PRE-WEANING GROWTH PERFORMANCE TRAITS IN MENGALI SHEEP IN (BALOCHISTAN) PAKISTAN

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ABSTRACT

Genetic parameters were estimated for weights at birth (BW), 30 days (MW), 120 days weaning weight (WW), and pre-weaning average daily gain (PRADG) of four flocks of Mengali sheep maintained at the Experimental Station CASVAB, Quetta, (ESC), Mastung, Noshki and Quetta over a period a 5 years from2 005 to 2009. Records on 2750 lambs descended from 581 ewes and 56 rams were included in the analysis. Variance components were estimated fitting animal model using restricted maximum likelihood (REML) procedure. Genetic parameters were computed by pos-processing of the variance components. The heritability estimates for BW, MW, WW, and PRADG were 0.39 ± 0.06; 0.125 ± 0.02; 0.177 ± 0.03 and0.23 ± 0.05, respectively. BW was highly heritable while other growth traits were found moderately heritable, showing larger proportional of environmental variances. In general, heritability estimates were moderate in early growth traits of Mengali sheep. Hence it was suggested that improvement can be achieved by mass selection.

Key words: Genetic parameters, Mengali sheep, heritability estimates.

FRM-51

THE AFGHAN REFUGEE ROLE IN CULTIVATION OF FODDER FOR LIVESTOCK IN BALUCHISTAN

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ABSTRACT

The aim of current study was to understand the role of Afghan diaspora in agriculture during their stay in Baluchistan, before authorized agencies explicitly shut down the camps, after more than three decades. The secondary goal is to know which type of agrology skills they have learned during their stay. For this purpose, Chagai District was selected as a case study. To support the current study, two union councils were reported. Nomadic Afghan refugees have been putting their efforts to transform the rocks and desert into the green farms for a better environment. Their efforts in cultivation of local vegetables have drastically lowered the possibility of alarming drought in upcoming days. After obtaining fruits, the remaining parts of plants are used as fodder for animals. The easy access to animal food fulfills the needs of domestic livestock for the area. The study of livestock and fodder has a long history in social anthropology and the environmental espouse policy rely on this type of chronological evaluation.

Key words: Forage, Rakhshan division, Alleviation.

FRM-52

DETERMINATION OF SEASONAL NUTRITIONAL COMPOSITION OF MAJOR RANGE FORAGE SPECIES OF SCRUB RANGELANDS

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ABSTRACT

A detailed research study was conducted in subtropical sub humid rangelands with main objectives to assess seasonal nutritional composition of four major range forage species preferred by livestock in three representative rangelands. Grass samples were collected at three phonological stages of growth (vegetative, bloom and maturity) from Nurpur Reserved Forest, Mari Dharnal RF and Ara RF of Chakwal. Analysis was carried out in the Pir Mehr Ali Shah Arid Agriculture University Rawalpindi laboratory for the determination of major nutritional parameters like dry matter (DM), crude protein (CP), neutral detergent fibre (NDF) and acid detergent fibre (ADF). Minimum DM% among grasses was observed in winter 2014 while maximum DM% in summer 2015. The mean values of CP percent varied from 3.8 to 9.6. However, the amplitude of variation was different among grasses at three phonological stages of growth (i.e., vegetative, bloom and maturity). NDF mean values in percent varied from 24.80 to 44.47. Generally, the NDF% was greater at maturity (in winter season) followed by vegetative stage (in spring) and flowering stage in summer seasons. The overall effect of three growth stages i.e., vegetative, flowering and maturity on ADF content was highly significant. In Pakistan, more emphasis should have to be laid on the description of the important forage species, as well as on the DM yield, the chemical analyses, their nutritive value, ecology and production and wise utilization in rangelands, particularly in Balochistan.

Key words: Nutritional composition, Forage species, Crude Protein, Dry Matter.

FRM-53

EFFECT OF VARYING LEVELS OF SUGAR BEET PULP AS AN ALTERNATE FIBER SOURCE IN TOTAL MIXED RATION ON GROWTH PERFORMANCE, BLOOD METABOLITES AND BODY CONDITION SCORE IN FATTENING OF NILI RAVI BUFFALO CALVES

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ABSTRACT

The study was carried out to explore the effects of varying levels of sugar beet pulp as an alternate source of fiber in total mixed ration (TMR) on the growth performance, blood metabolites and body condition score in Nili Ravi buffalo male calves.Three TMRs were formulated with 0% (TMR1), 15% (TMR2) and, 30% (TMR3) sugar beet pulp. All TMRs were iso-caloric and iso-nitrogenous. Calves were offered ad libitum TMR based ration at rate of3% of BW per day on dry matter basis. The experimental TMRs were randomly assigned to three groups of male calves (n = 6) according to completely randomized design and the experiment continued for sixty days. Data for daily dry matter intake (DMI), body weight gain (BWG), nutrient digestibility, Body condition scoring (BCS), selected blood metabolites and economic were collected and analysed through one-way ANOVA technique. DMI, BWG, Digestibility, BCS and economics were affected ($P \leq 0.05$) by dietary treatments.The calves fed TMR3 exhibited a significant improvement in dry matter intake, blood metabolites, digestibility and feed economics compared to other groups. The same group also showed higher digestibility of dry matter, crude protein, neutral and acid detergent fibers than those fed on other TMRs. It is concluded that TMR with 30% sugar beet pulp has a potential to give an enhanced growth performance and nutrient digestibility in male Nili Ravi buffalo calves.

Key words: Sugar beet pulp, dry matter intake, growth, Nili Ravi buffaloes.

FRM-54

MYCOTOXINS IN DAIRY ANIMAL FEED AND THEIR HEALTH EFFECTS; DIAGNOSTIC AIDS AND TREATMENT, A BIG ANIMAL HEALTH CHALLENGE

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ABSTRACT

Monitoring the certain health conditions and properly identifying the diseases are the important steps in getting the high productions from dairy cattle. Mycotoxins are chemicals produced by fungi (molds) under certain conditions, not essential for fungal itself growth or reproduction, having toxic affects to animals and humans. More than 250 mycotoxins have been detected. For many toxins, their toxicological characteristics have not been fully determined uptil now. There are many kinds of mycotoxins, causing different kinds of mycotoxicoses. Mycotoxins enter into the body, usually by consumption of contaminated feed, do acts on cells causing the mycotoxicoses. Mycotoxicoses are not contagious, nor is there significant stimulation of the immune system. Aflatoxin produced by Aspergillus flavus and Aspergillus parasiticus, commonly found in corn, milo, cottonseed and peanuts, while its concentrations in grains is very enough to cause acute aflatoxicosis. The five important aflatoxins are aflatoxin B1, B2, G1, G2, and M1. Aflatoxin is a liver poison (hepatotoxin) in all species that consume it, however, ruminants tolerate it better than do monogastrics or poultry. It causes liver damage and liver cancer at high doses. Aflatoxin exposure leads to depress the immune system, causes liver damage, liver cancer and abortions. Depression, anorexia, reduced gain or milk production, subnormal body temperature and slow rumen motility are the clinical signs of aflatoxicoses. Ingestion of ergot alkaloids contain in the sclerotia of Claviceps spp, commonly found in cereal grains causing Ergot toxicosis, leads to cause agalactia in lactating females. Fumonisins are produced by Fusarium moniliforme and F. proliferatum, found primarily in white and yellow corn, having three kinds, fumonisins B1, B2, and B3. Equine leukoencephalomalacia (ELE) is a fatal disease of horses and Porcine pulmonary syndrome in swine are caused by fumonisins, through inhibition of enzymes involved in the production of sphingosine (important component of cell membranes for neurons) from sphinganine. Vomitoxin is produced by Fusarium roseum (F. graminearum) and F. moniliforme.. Vomitoxin is not very toxic, associated with feed refusal and decreased feed consumption leads to affect the animal performance by inhibiting the protein and nucleic acid synthesis. Zearalenone is produced by Fusarium roseum (F. graminearum) and F. moniliforme, found in corn, wheat, barley, milo and occasionally in oats.. Zearalenone content typically found in grains. Its production become increase due to unusual environmental conditions during the growing season and insufficiently stored dried grain usually having enough adversely affect on animals. Mycotoxins present in the feed/ration can be treated by adopting Modern agricultural practices, giving usually supportive therapy and Antidotes, giving activated charcoal to decrease the ingested mycotoxins absorption, using feed additives as mycotoxins binders, removing, stopping and preventing further exposure of contamination to animal feed.

Key words: Mycotoxins, Dairy Animal Feed, Animal Health Challenge.

FRM-55

QUALITATIVE AND QUANTITATIVE ANALYSIS OF NITRATE CONTENTS IN LIVESTOCK FODDERS

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ABSTRACT

Livestock is a primary source of income for small dairy farmers in developing countries. Dairy animals fed with a fodder containing a balanced nitrogen contents produce high quality milk. Excess use of nitrogen fertilizers in the soil cause excess accumulation of nitrates in fodder, which is the main source of nitrate poisoning in dairy animals. In the present study nitrate contents in fodder crops, *viz*., *Sorghum bicolor* (Jowar), *Pennisetumglaucum*(Bajra), *Zea mays* (Makai), *Avena sativa* (Jai), *Brassica rapa* (Shaljam) and *Brassica Campestris*(Sarson) were estimated twice a day *i.e.* early morning and afternoon. The fodder samples were collected from different villages of Okara, Pattoki and Ravi areas of the Province Punjab. Nitrate contents of different parts of the fodder plants were estimated qualitatively through the Diphenylamine Filed Test (DFT) and quantitatively by spectrophotometry. The nitrate levels were highest in Jowar, followed by Jai, Shaljam, Makai, Bajra and Sarson. The concentrations were lower in the afternoon in the leaves and in mature crops as compared to stem parts, immature plants, and in samples collected from plants during morning hours. The nitrate concentration was lower in samples collected from Ravi area, as compared to samples collected from villages of Pattoki and Okara. This high level of nitrates in fodder crops constitutes a threat to the health and productivity of dairy animals.

Key words: Livestock Fodder, Nitrate Contents, Poisoning

FRM-56

DAIRY ANIMAL FEEDING AND FOOD SAFETY SYSTEMS IN PAKISTAN WITH SPECIAL REFERENCE TO WORLD TRADE ORGANIZATION

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ABSTRACT

Pakistan being its member as a developing country has already availed a grace period of ten years in 2005, to adopt and amend its rules to fulfill the requirements of WTO. There are several main agreements in this regard but the agreement on Sanitary and Phytosanitary Measures (SPS) is important and most relevant with the aim to protect human, animal and plant life and health from any risks, hazards or disease. The global trade is further expanding rapidly and significantly due to increase in consumer demands, education and awareness of the consumer, internationalization of food tastes and habits, development in food science and technology, improvement in transportation and cold chain linkages. In recent years potential risks have been reported to human health associated with the contamination of dairy feed with chemical or biological agents at international level, thus raising public concern about the safety of foods of animal origin. These concerns have been further aggravated due to problems that have arisen with bovine spongiform encephalopathy (BSE), mycotoxins, dioxin contamination, outbreaks of food borne bacterial infections, as well as growing apprehension about veterinary drug residues and microbial resistance to antibiotics. These problems have drawn attention to dairy feeding practices within the livestock industry and have prompted health professionals and the feed industry to scrutinize food quality and safety problems that can arise in foods of animal origin as a result of animal feeding systems. The objectives of the present paper are to elaborate the existing procedures and legislation regarding the food /feed safety issues in Pakistan, to describe the potential hazards and safety procedures like HACCP, GMP and GHP etc. associated with food/feed production, along with recommendations to strengthen food/feed safety procedures in the country.

Key words: feed, food, safety, toxins, food laws, WTO, SPS, Pakistan

QCH-57

MEAT INDUSTRY IN BALOCHISTAN WITH SPECIAL REFERENCE TO HALAL MEAT

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ABSTRACT

Livestock plays an important role in economy of Pakistan which contributes about 19.8% to Gross Domestic Product (GDP) and 58.6% in agriculture. In Islam every food is considered halal except the foods specially prohibited in Quran. Meat production is a useful form of dietary protein and energy. Generally, the demand for halal foods are increasing mostly due to the growing Muslims population and hygiene nature of the food products. The food which is popular around the world is halal meat. The largest province of Pakistan is Balochistan and this province is the cradle of several valuable livestock breeds. Livestock is the major occupation of its habitants. In the province, sheep are about 48%, goats 22%, cattle 8% and camel population is 41% of the country. Sheep and beef meat production has a great export potential. The beef production can be stimulated more if International market be searched for newly developed beef breed, the propagation of the Nari Master boost up the beef production. Balochistan having a great potential for camel rearing in Arid and Semi-Arid Land. Camel can reproduce and survive under drought conditions being the main source of meat and milk consumed locally. Over 80 billion Halal meat industries exist and Balochistan has the capability to increase its economy by exporting organic meat at international market. Internationally, the Halal meat industry of Pakistan is getting ground and currently the government is focusing on important procedures to produce and export Halal meat by implementing quality assurance systems and halal certification in the world to meet the demand.

Key words: Halal Meat, Beef, Sheep, Goat, Camel

BAH-58

ARTIFICIAL GENE ANALYZER (AGA): A BIOINFORMATICS TOOL FOR ANALYZING INSERTED GENE

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ABSTRACT

With the advent of various high throughput technologies in molecular biology, the accumulated biological data grow ever rapidly. Since the Phage Φ-X174 was sequenced in 1977, the DNA sequences of thousands of organisms have been decoded and stored in databases. Thus, an enormous amount of DNA sequence data is available and even more will be forthcoming in the near future. This influx of DNA sequence data has encouraged laboratory scientists to engage large datasets in comparative sequence analyses for making evolutionary, functional and translational inferences. It is essential to have some bioinformatics tools to automate the analysis tasks that biologists manually carry out in order to handle such large volume of biological data. At present, the computer biologists are using different algorithms for DNA sequence Alignment, finding mutation in specific tissue, genomic sequencing etc how ever there is a need for a multifunctional bioinformatics tool (Algorithm) that should perform batter and fast DNA transcription, gene expression (Translation), finding Multiple Mutation, global alignment, finding evolutionary distance and finding open reading frames of the inserted DNA sequence (gene) but many fine algorithms are slow in analyzing such huge data sets. Therefore, the present study is designed to focus on a C++ multifunctional bioinformatics algorithm to perform multiple lab molecular functions more accurate and swiftly.

BAH-59

WHOLE GENOME SEQUENCING OF CATTLE BREEDS FROM PAKISTAN AND THEIR USE IN GENOMIC SELECTION FOR ENHANCING MILK AND MEAT PRODUCTION

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ABSTRACT

Livestock sector contributes more than 50% of agriculture in Pakistan and sustains life in non-irrigated areas as well as irrigated areas. Therefore, improvement in livestock sector can contribute significantly in poverty reduction in vulnerable areas. Moreover, improved milk and meat production can help in overcoming problem of stunting and malnutrition. Pakistan is blessed with a range of cattle breeds that are adapted to diverse climatic conditions. The success of genome-wide association studies (GWAS) based on genotyping for quantitative trait loci (QTL) identification has encouraged marker-assisted selection in model agricultural species. The GWAS have greatlyenhanced dairy and beef production. High-density SNP arrays have been constructed for bovine genotyping and genome wide association studies using the available SNPs from dbsnp. Recently, cataloging such genetic variations has been accelerated using massively parallel sequencing technology. Most of the recent studies have been concentrated on Bostaurus cattle and far more SNPs are deposited in dbsnp for Bos-taurus compared to Bosindicus. This results in a biased HD-SNP-arrays more towards Bostaurus. Thus, SNP-array is in urgent need to include many more validated SNPs for Bosindicus belonging to diverse geographical regions in Pakistan. We started work on whole genome sequencing of 12 cattle breeds of Pakistan in collaboration of local research institutes and Beijing Genomic Institute (BGI), China. The genomic sequence data has been obtained and will be presented. The whole genome sequence analysis of the best milking, disease resistant and tropically adapted Bosindicus Sahiwal breed, using massively parallel high-throughput sequencing technology. Sahiwal breed is the most populated and unexplored cattle in the tropical region of Pakistan. The genome of a proven Sahiwal bull was sequenced to approximately 30x depth, where 99.9% and 95.01% of the reference genome (UMD 3.1) was covered by at least 1 and 5 reads, respectively. In total, 3,104,573 SNPs and 92968 indels were identified, of which 414,759 and 88239 were previously unknown, respectively. Most of the SNPs (2308651) were located in non-coding regions. A total of 11,620 SNPs causing missense mutations were detected in 6398 genes, which could potentially contribute to variation in economically important. A total of 629 loss of function (LoF) variants were revealed in 544 protein-coding genes. The majority of LoF variants were caused by frame-shift variants. This study provides a valuable resource for further investigations of the genetic mechanisms underlying traits of interest in cattle, and for the development of improved and unbiased genomics-based breeding tools. A scheme for application of genome sequencing data in genomic selection of local breeds for improving milk and meat production is also underway.

BAH-60

ROLE OF BIOTECHNOLOGY IN THE PROSPERITY AND FOOD SECURITY THROUGH SUSTAINABLE LIVESTOCK IN THE DEVELOPING WORLD

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ABSTRACT

Biotechnology is a modern science that deals with the biological process through which technological innovation can be achieved and subjected to deliver goods and services for the benefit of human being. Biotechnology is making it possible for researchers and developers to deliver products that help farmers protect their crops and livestock; and improve the economy and environment while grow grains, develop dairy products that improve the quality of the food we eat. Biotechnology will enhance quality of life in many ways, while helping the environment by reducing our dependence on non-renewable resources. The most common reproductive biotechnologies include, semen processing, cryo-preservation, vitrification, sexing of sperm and embryos, artificial insemination, embryo transfer, *in vitro* fertilization, cloning, transgensis, juvenile *in vitro* embryo transfer, chimera production, multiple ovulation and embryo transfer, aspiration of oocytes from the live animals and zygote intra-fallopian tube transfer. In the developing world hence modern technologies have yet to play their due role in different areas of agriculture, medicine, dairy industry, environment and especially for food security. Nevertheless, the challenge has been, and will continue to be, for researchers to find ways of manipulating biotechnologies for improved production and food security. This will also provide great opportunity to network with colleagues worldwide to share knowledge and experience on teaching and research areas. However, a more widespread and competent use of the available techniques is required in order to gain benefit from their applications. Especially in the developing world, this future intra-disciplinary cooperation will also be needed among the industries, consumers and research institutes for food supply chain. Failure to achieve a high level of cooperation can potentially lead to a delay in biotechnologies application in development and will result in serious long lasting economic losses in food security through sustainable agricultural and environment in developing world.

BAH-61

ANALYSIS OF GENETIC CHARACTERISTICS OF INDIGENOUS HARNAI SHEEP NATIVE TO NORTHERN BALOCHISTAN, PAKISTAN UNDER CONSERVATION BY MICROSATELLITE MARKERS

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ABSTRACT

Aim: Livestock plays an active role in lifestyle of rural people of Balochistan, because of their main revenue generating ability in these areas. Local sheep breeders have very scare knowledge of cross breading, due to which the indigenous breeds are in danger and/or vanishing very fast in the province. Present study was aimed to look into the genetic characterization of a native northern belt sheep breed "Harnai" for the purpose of assessing its existing intra-population genetic diversity.

Materials and Methods: Total 50 blood samples were randomly collected from genetically unrelated animals of either sex and different age groups of two different native breeding tract locations (Small Ruminant Research Centre, Yet abad and Arid Zone Research Station, Sanjavi) of this breed in Balochistan. Samples were subjected to further processed (DNA isolation, amplification and sequencing) in high-tech laboratory of Centre for Advanced Studies in Vaccinology & Biotechnology (CASVAB) University of Balochistan (UoB) by applying FAO suggested sheep specific microsatellite markers, that gave observed and effective number of alleles, gene frequency, observed and expected heterozygosity that were then estimated by using Pop-Gene software version 1.32.

Results: As a whole 74 alleles were detected on 27 various loci. The values 2.45±0.87, 1.71±0.60 and 0.589±0.36 forobserved number of alleles, effective number of alleles and Shannon's Information index, respectively. Furthermore, 0.6±0.3, 0.37±0.3, 0.60±0.24, 0.36±0.219, 0.347±0.209 and 0.347±0.209 for observed heterozygosity, expected homozygosity, expected heterozygosity, effective number of allele and average Heterozygosity, respectively. Similarly, a range from 0.29 to 0.91 was observed for F-statistic. Maximum markers presented greater values as compare to the average one. The lower standard errors indicate the presence of homozygosity in the population, which may be due to intense inbreeding in Harnai sheep flock.

Conclusion: Study revealed high level of polymorphism across observed microsatellite markers; that can be used in future breeding planning, conservation and in improvement.

Key words: Characterization, Heterozygosity, Homozygosity, Harnai, Balochistan

EPD-62

ROLE OF WOMEN IN LIVESTOCK AND DAIRY DEVELOPMENT IN BALOCHISTAN, PAKISTAN

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ABSTRACT

Livestock is a very important sector of economy of Balochistan. It is the main source of income and they involve their women and children in the rearing of livestock. Women take care of feeding the livestock, cleaning the abodes, and even in providing traditional cures from diseases. They are further involved in milking and milk processing, poultry, and egg selling. Women have a significant role in the development of livestock in Balochistan. Since livestock plays major part in economy, its role can be enlarged when women are allowed to participate commercially in this field. Hence, training and development may be the first drop of water towards agriculture base economy and the consequences will be positive in terms of prosperity of the people specially living in this province. Balochistan constitutes two significant belts in terms of cast of tribe, Baloch and Pashtoon belt. The Baloch belt, are more active and agile to part her share in handling the livestock herds. On the other hand, women who are residing in Pashtoon belt can only take part fewer activities of livestock, which is within the boundary walls of house. There is acute need to give them proper training regarding the livestock management. Interestingly, livestock business can easily be managed by small, young, old, at home and margin of profit is very high as compare to crop cultivation. More importantly, women can manage them indigenously at home as the do the other chores at home. Role which women play in livestock marketing is best addressed by improving their access to livestock development activities in general. Increasing women's involvement in livestock development activities could be encouraged by making training and activities directly available to women. This paper is an attempt to highlight the role of women especially focusing the present livestock production systems in Balochistan.

EPD-63

CHALLENGES AND FUTURE SCOPE OF SME SECTOR; SPECIALLY ACCESS TO FINANCE IN BALOCHISTAN

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ABSTRACT

SMEs play a vital role in the development of an economy. The contribution of Pakistani SMEs to economic development is less as compared to other countries, yet their significance cannot be denied. The SME sector is facing multifarious problems with their growth making it difficult to significantly contribute to Pakistan's GDP. There is substantial evidence that SME's face larger growth constraints and have less access to formal sources of external finance, potentially explaining the lack of SMEs' contribution to growth. This paper attempts to focus on this major constraint "SME's Lack Access to Finance" faced by the SMEs of Balochistan, the main and important barriers/constraint for SMEs in Pakistan particularly in Balochistan. The impediments that SME's face generally with respect to getting access to finance are collateral issues, complex procedure in an obtaining of financial support from financial institutions (banks),wide cooperation gap between financial institutions and SME sector. The loaning mechanism is devised as such that the major portion of SMEs do not have the security needed for collateral, without which the sanction of a loan from banks and lending institutes appears very difficult. Most of the SMEs appear deficient in accounting and financial information that hinders them to avail information-based or financial statement-based lending and respective credit scoring. The majority relies on the personal finances, credit from suppliers, loans from friends and relatives. Banks role is limited as taxes, corruption, high interests and prices are the main grievances. As uncovered the main problem of SMEs is that it does not have access to formal sources of financing (including banks and lending institutions). To reach poor farmers and farmers without assets—in other words, to reduce poverty—stringent collateral requirements should be relaxed and outreach should be broadened. Both formal and informal loans matter. But formal lenders provide much more in production lending than do informal lenders, often at a higher cost than what they can recover.

Key words: Pakistan; Small and Medium-Size Enterprise, Policy Instrument, Economic development

EPD-64

CAMEL MILK IN BALOCHISTAN; AN UNEARTHED PRODUCT NEEDS COLLABORATIVE STRATEGY TO ALLEVIATE POVERTY OF CAMEL FARMERS

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ABSTRACT

Pakistan stands eighth major camel populous country of the world. Balochistan shares 41% camel population of Pakistan. The camel despite of healthy total strength and naturally gifted milk and meat potentials remained neglected by policy makers both at provincial and national levels. Of the twenty camel breeds documented at national level, seven breeds are native to Balochistan. Having all these resources of camel wealth, it is unfortunate that sale of camel milk is considered as "Forbidden Tree" among camel farming community of Balochistan due to some misconceptions. Of approximately 0.4 million camel heads in Balochistan, 0.32 million are found in top ten major regions i.e., Kharan, Kholu, Dera Bugti, Bolan, Lasbela, Khuzdar, Killa Saifullah, Musa Khail, Chaghi and Kalat. Rests of these top ten regions, other areas have less than 0.010 million camel population. On the basis of few assumptions i.e., half of the documented camel strength are she-camels, half of she-camels are adult, half of adult she camels are lactating and producing average yield of 4L/d; it is estimated that an average 1,65,860 L/d camel milk is being produced in these top ten regions of Balochistan. For estimating monetary worth at nominal cost i.e., Rs.100/L camel milk, it is found that 16 million rupees is being wasted per day in these regions. Of this value, if half of camel milk is fed to calf or used for home consumption, still 24 million per diem and 288 million per annum is being wasted by poor camel farmers. Hence, there is dire need to chalk out collaborative strategy by the provincial government, nongovernment organizations and academia for educating camel farmers through field schools and facilitating through milk collection, transportation and marketing interventions.

Key words: Camel, milk, poverty, market, Balochistan

EPD-65

GOVERNMENT SUPPORTIVE AND SMALL RUMINANTS-HOLDERS' PARTNERSHIP BUSINESS MODEL THROUGH FINANCIAL INCLUSION AND MARKETING STRATEGY IN BALOCHISTAN-PAKISTAN

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ABSTRACT

This study was conducted during December, 2018 to March, 2019 in twenty districts of Balochistan-Pakistan. The purpose of paper is to chalk out the framework for livestock business development strategy in order to pull out the small-ruminants-holders families from poverty and put them towards business development strategy in the province. Proportionate Purposive sampling technique was used through likert scale close-ended questionnaire to collect the data. As a matter of fact, livestock holders in the province of Balochistan, heavily depend on small ruminants rearing due to scanty vegetation in the major parts of province. It is due to its arid and semi-arid climate which does not allow to grow grassier field. However, they get almost sufficient rainfalls to rear their small ruminants. It is another fact that agriculture cultivation is extremely difficult to continue throughout the year but rearing livestock is possible for them to continue their livelihood. There are three stages to rear the small ruminants: one, to get finance to purchase kids, second, to feed them and third to sell them. In this regard, if government provides proper finance to herds owners to increase production or rear of small-ruminants in the natural rangelands and then provide them assistance to sell their herds on appropriate prices in the market. This will boost the economic activities and provide the livestock holders more profit. The results of the study were supportive and establish the possible framework of livestock business development and boosting the livestock economy especially for small ruminants.

Key words: Financial inclusion, Livestock small ruminants holders, Marketing, business model, Government support

EPD-66

EXPORT POSSIBILITY OF BALOCHISTAN'S HALAL RED MEAT; POTENTIALS AND OPTIMIZATION

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Abstract

Pakistan is considered a potential mutton meat market: however, due to lack of planning, coordination and use of primitive technique, the country struggled to meet its own demand of mutton meat. Present Government has its focus to take measures regarding mutton production to access international market. In this connection, the provincial government of Balochistan is eager to promote livestock rearing activities. As a matter of fact, Balochistan is the largest province of Pakistan, comprising 43.9 percent area but the least populated with low rainfalls from the rest of the country. Hence, its vast area and peculiar natural eco-system leveling ideal ground for livestock rearing activities especially for small ruminants. To achieve the development of livestock sector, we may divide it at least three phases; fulfilling the demand of mutton in the province, addressing the demand of the country and then finally looking it for export potential. Thinking of livestock export from here may be like over-estimation and exaggeration. Livestock census is conducted after every ten years which pave the way to plan appropriately on strategy level. Last livestock census was conducted in 2006 and then the government is unable to conduct it in 2016 up to today. This means planning phase cannot be suitably and correctly performed on raw estimation. In order to achieve export potential, the provincial government has to promote the livestock rearing activities. In this connection, the government has to encourage it by subsidizing the sector by procurement of free veterinary facilities effectively in the remote areas of Balochistan. Resources of water in the province are meagre, therefore, it is imperative that rather than to promote crop cultivation and orchard plantation, the provincial government must be active partner with small ruminants rearing. All those countries who have huge export of red meat in the world, has worked with their livestock holders; from rearing to marketing. In 2015 estimation, the halal food market was worth to $700 billion. Furthermore, Balochistan is surrounded with $80 billion organic meat export demand in the region. The major demand for Halal food has been coming from Central Asia including majority Arab population countries as well as Indonesia, Pakistan, and India. Whereas Pakistan ranks as 19th in halal meat market, which includes all forms of meat. Provincial government is well-aware of mutton potential of Province, hence, it has initiated the first ever livestock expo for three days in the way to increase the meat production which will boost the agrarian economy of the province. Nevertheless, the government can never tap the potential until it takes the solid and constructive measures. In this regard, it must revamp the livestock economy to achieve its dream of export in the region.

Key words: Export potential, Livestock economy, Halal meat market, Small ruminants holders

PS-67

COMPARATIVE EVALUATION OF HATCHABILITY TRAITS & FERTILITY OF RHODE ISLAND RED (RIR) & BLACK AUSTRALORP (BA) UNDER LOCAL CONDITIONS OF HAZARA DIVISION

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ABSTRACT

Hatchability and Fertility are important parameters that should be investigated before finalizing the cross breeding program for backyard Poultry. A Research study was, therefore, undertaken at Poultry Research Institute (PRI) Jaaba Mansehra to compare the hatching parameters of 2 different breeds of Chicken i.e, Rhode Island Red (RIR) & Black Australorp (BA) under local conditions of Hazara division. A total of 13540 hatching eggs were collected, 6811 & 6729 eggs from Rhode Island Red (RIR) & Black Australorp (BA) respectively during February-March 2015. All eggs were cleaned with the disinfectant before transport to hatchery & all eggs were fumigated with potassium permanganate and formalin at hatchery and set in disinfected incubator. Candling was done on 7th and 14th day of incubation for the identification and removal of dead germ, dead in shell &infertile eggs. On 21st day, the number of hatched chicks including the normal, abnormal chicks, dead chicks in shell and after hatch counted separately. Hatchability of RIR and BA were studied & data for Chicks hatched, Dead in Shell Dead Germ & Fertility was maintained &collected. Out of 6811 eggs of Rhode Island Red (RIR) set for Incubation, percentage of Hatched Chicks was 82.60%. Similarly, out of 6729 eggs of Black Australorp (BA) set for Incubation, percentage of Hatched chicks were 88.12%. The percentage of Unfertile eggs was 8.23% & 4.87% for Rhode Island Red(RIR) & Black Australorp (BA) respectively. The percentage of Dead Germ was 4 % & 2.76 % for Rhode Island Red(RIR) & Black Australorp(BA) respectively. The percentage of Chicks Dead in Shell was 4.9 % & 3.77 % for Rhode Island Red(RIR) & Black Australorp(BA) respectively. Fertility remained 92.12 % and 95.45% for Rhode Island Red(RIR) & Black Australorp(BA) respectively. It was concluded from the data that the fertility and hatchability was higher in Black Australorp than Rhode Island Red(RIR)& the Dead in germ & Dead in shell was comparatively higher in Rhode Island Red than Black Australorp.

Keywords: Rhode Island Red, Black Australorp, Hatchability, fertility

PS-68

EVALUATION OF TWO VACCINATION REGIMES FOR NEWCASTLE DISEASE VACCINATION IN BROILER

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ABSTRACT

Vaccination schedule trial and comparative immunogenicity of two locally available vaccines for Newcastle disease were studied at Poultry Research Institute, Jaaba Mansehra. For this purpose, locally available live (LaSota) and killed vaccine were used. A total of 450 birds were divided into three groups A, B and C comprising of 150 birds each. C group served as control group. The priming of birds of group A was done with ND+IB Live vaccine at day 1st and booster dose was given at the age of 7th day with ND Killed (Oil emulsified vaccine). While the priming and boosting of group B was done with ND Live vaccine at day 7th and 21st day of experiment. Serum antibodies against NDV were analyzed on day 7th, 14th, 21st 28th and 35th day of experiment using standard Heamagglutination Inhibition test. The obtained results revealed that both vaccination regimes produced effective antibody titers. Live vaccine as priming and boosting resulted in higher immune titres as compared to priming with live vaccine and boosting with killed vaccine regime. Post infection protection cannot be recorded due to limitations but researchers reported that post infection protection was higher in the birds when priming was done with live vaccine and booster dose was given with inactivated vaccines. Suggesting that usage of killed vaccine as priming at proper dosage is significally enough to produce long lasting serum antibodies to protect from infections.

Key words: ND, IB, vaccine, immunogenicity

PS-69

ANTIMICROBIAL EVALUATION OF PLANT EXTRACTS AGAINST COMMON POULTRY PATHOGENS

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ABSTRACT

The aim was to investigate *Opuntia dillenii* leaves for antibacterial potential against different pathogens (*Staphylococcus aureus*, *Escherichia coli*, *Clostridium perfringens type A*, *Salmonella enterica*, and *Haemophilus* species). Hexane, chloroform, ethanol and aqueous extracts of *O. dillenii* were prepared by sequential extraction. Antibacterial activity was determined qualitatively and quantitatively by well diffusion and microbroth dilution methods respectively. Chloroform and ethanol extracts showed significant antibacterial activity against all the pathogens studied. Hexane extract showed maximum zone of inhibition against *Haemophilus* species, chloroform extract gave maximum zone of inhibition for *C. perfringens*, ethanol extract presented maximum zone of inhibition for *C. perfringens* and aqueous extract showed maximum zone of inhibition for *C. perfringens*. Minimum inhibitory concentration for chloroform extract was lowest for all the tested strains. For *S. aureus*, *C. perfringens* and *S. enterica*, minimum inhibitory concentration was 1250µg/mL, for *E. coli* and *Haemophilus* species, MIC was 2083.3 and 2916µg/mL, respectively. The extracts were further investigated to test cytotoxic effect on Vero cell line using MTT assay. Ethanol and aqueous extracts were cytotoxic. Data were analyzed by one-way analysis of variance followed by Duncan's test. Now it is evident that *O. dillenii* extracts might be potential source of new antimicrobial formulations.

Key words: *Opuntia dillenii*, Antibacterial agent, Minimum inhibitory concentration, MTT assay, Cytotoxicity

PS-70

EFFECT OF LIQUORICE (*GLYCYRRHIZA GLABRA*) ROOT EXTRACT AS IMMUNOSTIMULANT HYPOCHOLESTEROLAEMIC HEPATOPROTECTIVE ANTICOCCIDIAL AND GROWTH PROMOTANT IN BROILER CHICKS

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ABSTRACT

The research trial was conducted to investigate the effect of different levels of Liquorice (*G.glabra*) root extract as immunostimulant, hypocholesrerolaemic, hepatoprotective, anticoccidial and growth promotant in broiler chicks at Agricultural University Poultry Farm. Peshawar. Two hundred and forty, 1-day-old chicks were purchased from the Hi-Tech hatchery and randomly distributed into four experimental treatments, designated as A, B, C and D. Each group was divided into two subgroups. Each subgroup was replicated three times with 10 chicks per replicate. The four treatments were given 0, 5, 10 and 15 g of Liquorice (*G.glabra*) root per liter of water, respectively. One subgroup in each treatment was vaccinated against ND, IB and IBD vaccine according to the local health schedule. The trial lasted for 42 days. Data were subjected to statistical analysis using two factorial randomized completely block design. Mean Feed intake, water intake and dressing percentage was found non-significant ($P>0.05$). FCR was significantly ($P<0.05$) lower in group B than other groups. Breast, thigh, leg, liver and intestine weight were not significant different. Body weight gain Gizzard, heart, bursa, spleen, thymus weight was significantly ($P<0.05$) higher in group B. ND, IB and IBD titre were significantly higher in treatment B. Cholesterol, triglyceride and LDL were significantly ($P<0.05$) lower in group B. HDL was higher ($P<0.05$) in group B than other groups. ALT, AST, ALP and serum protein was significantly lower ($P<0.05$) in group B as compared to other groups. Oocysts count was significantly ($P<0.05$) lowest in group B. Feed cost, gross return and net return was significantly higher in group B. It is recommended that 5 g Liquorice (*G.glabra*) root added per liter drinking water will be effective to enhance immunity, decrease lipid profile, reduce coccidiosis and improve liver function.

Key words: liver function test, alkaline phosphatase, alanine aminotransferase, aspartate aminotransferase, New Castle disease, infectious bronchitis, Infectious Bursal disease

PS-71

FRUIT ORCHARDS CAN AUGMENT FARMERS' INCOME THROUGH PRODUCTION OF ORGANIC CHICKEN EGGS

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ABSTRACT

Demand for organic meat and eggs are increasing due to social awareness. The grazing land for backyard chicken is squeezing rapidly with the increasing population. The orchards provide a rich pasture to the poultry birds for their shelter and feed requirements round the year. In this study, conducted during September 2018 through April 2019 in Peshawar, a peach orchard of four canals area with dense vegetation was fenced to avoid the losses through theft and or predators. The marked area was divided into four equal partitions for maintaining the birds in four groups. A shelter of 250 sq ft each was erected on one side of each partition to provide protection from harsh weather and or rain. Total 1000 RIR layers at the age 22 weeks were divided into four groups of 250 birds each. Birds in group A, B, C and D were provided with mixed grains at the rate of 25, 50, 75 and 100 g to cover the energy requirement while protein requirements were managed from the insects and worms through grazing. Regular cover of vaccination was provided according to the locally adopted schedule. Data on egg production, egg weight, shell thickness, Haugh unit, yolk albumin ration and total egg contents was recorded. Highest (52%) production was recorded in birds receiving 100 g grains fallowed by the other groups in descending order. Other egg parameters including egg weight, albumin weight, yolk weight, hough unit, shell thickness and shell weight remained similar among groups. Net profit for 100 and 75 g fed layers was statistically similar and higher than birds fed with 50 and 25 g grain mix. A 60 % high price on sale of layers post production was received. Inputs mainly included fencing of the orchard, birds feed, shelter labor charges and vaccination. A net profit Rs. 300, 000 were received to the farmer despite of manure in the orchard. This income could be doubled in coming years.

Key words: Fruit Orchards, Farmers' Income, Production, Chicken eggs

PS-72

ROLE OF A LOCALLY PREPARED BIVALENT INACTIVATED IBV VACCINE TO CONTROL IB DISEASE IN LAYER CHICKENS

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ABSTRACT

Avian Infectious bronchitis (IB) is a highly contagious, acute upper respiratory tract disease in chickens. A total of 350experimental SPF chicks (one day old) were divided into 4 groups with 100 chicks for Groups 1, 2 and 3 while the 4th group was 50. Chickens of group (1) were vaccinated with a vaccination regime in which the locally prepared inactivated bivalent IBV oil emulsion vaccine was included, while chickens of group (2) were received the same vaccination regime but with replacement of local inactivated bivalent IBV vaccine with a commercial imported one. The 3rd group was used as non vaccinated positive control while the 4th one was kept as negative control. Serum neutralizing antibodies against IBV were detected in the vaccinated chickens. The vaccinated chickens were challenged versus both IB classical and variant strains five times starting from 3rd week post 1st prime vaccination and the protection increased gradually with continuous administration of the IB vaccines. The vaccinated chickens were fully protected, since no PM lesions were observed, nor virus detected following challenge at 21 weeks of chicken age, while unvaccinated birds showed clinical signs of varying severity, predominantly affecting the upper respiratory tract. To show the effect of challenge upon the oviduct of vaccinated chickens, oviducts from challenged humanely killed birds were subjected to histo-pathological examination which revealed that oviduct of vaccinated birds appeared histologically normal, while that of the unvaccinated challenged control showed histo-pathological changes as degeneration and necrosis of sub-mucosal glands in the magnum region. For well control of IBV infection in layer hens, it is advised to use this locally prepared inactivated bivalent IB vaccine in a vaccination program primed with live IB vaccines.

Key words: *Bivalent Inactivated Infectious Bronchitis Virus (IBV) Vaccine, Infectious Bronchitis Disease, Layer chickens, Serum neutralizing antibodies.*

PS-73

PRODUCTION OF ZN BACITRACIN BY *BACILLUS LICHENIFORMIS* USING MOLASSES AS FERMENTATION MEDIA

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ABSTRACT

Poultry industry in Pakistan has been developed as the associated part of agriculture and livestock. The development of poultry industry depends on adequate and reliable supply of good quality feed and feed additives. Zinc bacitracin is such a feed additive which is used as a growth promoter and egg enhancer for broilers and layers. As Pakistan is a developing country, it does not meet the expense for the massive import of antibiotics from foreign countries, so Zn bacitracin can be produced through microbial fermentation. Industrial production of bacitracin was started after 1950. Biosynthesis of Zn bacitracin by *Bacillus licheniformis* under submerged fermentation is considered highly desirable. For this purpose we optimize some important factors for fermentation conditions in shake flask studies like pH, temperature, aeration, agitation, fermentation time etc. In this study, 40 bacterial strains capable of producing bacitracin were isolated from soil samples by heat shock method. Among all bacterial strains, the isolate No. 39 was found to be the most potential strain; it was identified and designated as *Bacillus licheniformis* Qila 15. Molasses was selected as fermentation media which was evaluated for antibiotic production under submerged fermentation in shake flasks. The medium gave higher us the production of (259.30 IU/ml. The antibiotic production was 280.3±0.91 IU/ml by using 24 h old inoculum. Inoculum size was optimized to be 1.0 %. The optimum pH was found to be 7.0 and bacitracin production was 281.2±0.26 IU/ml. At 37oCtemperature, production was81.6.0±0.97 IU/ml. Antibiotic activity was observed to be 291.9±1.50 IU/ml after 48 h of incubation. The optimum agitation speed and working volume were observed to be 159 rpm (290.0±0.65 IU/ml. Partial purification of bacitracin from fermentation broth was successfully done by precipitation method.

Key words: Poultry feed, Zn bacitracin, Fermentation, Optimization, Production.

PS-74

IN-VITRO ANTIMICROBIAL ACTIVITY AND MINIMUM INHIBITION CONCENTRATION OF SELECTED CULINARY AND MEDICINAL HERBS

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ABSTRACT

Antimicrobial activity of eight selected medicinal and culinary herbs viz., garlic (*Allium sativum*), cumin (*Cuminumcyminum*), jir (*Artemisia scoparia*), madran (*Achilleawilhelmsii*), sinna (*Cassia angustifolia*), fennel (*Foeniculumvulgare*), coriander (*Coriandrumsativum*), and paneer (*Withaniacoagulan*) was evaluated against five bacterial strains viz., *E. coli*,*K. pneumonia*, *S. typhi*, *C. perfringens* and *S. aureus.* Agar well diffusion assay was opted to evaluate the antibacterial activity. Crude extract of jir showed highest bacterial inhibition (17-25mm) and was most effective against all the bacterial strains than other treatments ($P<0.05$). The extract from cumin (12-17mm) and madran (8-13) exhibited better bacterial inhibition in comparison to coriander and paneer ($P<0.05$). The minimum inhibition concentration (MIC) results also showed variability among tested herbs. Lowest MIC was observed in jir (7.8-15.6mg/ml) and cumin (15.6-31.2mg/ml). A variable degree of antibacterial activities of selected herbs and spices was observed in this experiment under *in-vitro* conditions.

Key words: Herbs, spices, antibacterial activity, MIC

PS-75

EFFECT OF HERBAL FEED ADDITIVE ON THE GROWTH PERFORMANCE OF BROILER CHICKS ALTERNATIVE TO ANTIBIOTIC.

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ABSTRACT

The study was conducted to evaluate the performance of broiler supplemented herbs as feed additive alternative to antibiotics. Three hundred and twenty (n=320) one day old broiler chicks were divided into treatment groups with four replicates of ten chicks each. Seven treatments include three herbs i.e.,*Allium sativum*(G1&G2), *Cassia angustifolia*(S1 &S2) and *Artemisia scoparia*(J1 &J2)@1 & 0.5% respectively; a commercial product Oxyfeed® (OF) @ 2g/kg and control (C) basal diet. Addition of herbs and antibiotics to broiler feed significantly ($P<0.05$) improved WG, ADG, FCR. Non-significant ($P>0.05$) difference was observed in feed intake between treatment groups. The birds supplemented with *Allium sativum*showed highest growth performance as compared to *Cassia angustifolia*, *Artemisia scoparia* and control($P<0.05$). Relative organ weights and relative carcass yield of treatment groups were not significantly different ($P>0.05$). The relative length of intestine of treatment groups showed significant difference ($P<0.05$). The histomorphological parameters showed difference among treatments ($P<0.05$). Supplementation of herbal additives and antibiotic had significant effect on ileal bacterial enumeration ($P<0.05$). The supplementation of herbs and antibiotic to the feed caused a significant ($P<0.05$) reduction in aerobe and coli form bacteria as compare to control. Cecal VFA content was found significantly ($P<0.05$) different between treatments. In conclusion, supplementation of herbs as feed additive improved growth parameters comparable to antibiotic. It is suggested that herbs can be used alternative to antibiotics growth promoting feed additives.

Key words: herbs, alternative to antibiotic, broiler performance

PS-76

EFFECT OF HERBAL FEED ADDITIVES ON THE PERFORMANCE OF BROILER CHICKEN

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ABSTRACT

The study was conducted to evaluate the effect of culinary and medicinal herbs/spices as feed additive on performance of broiler chicken. Three hundred and sixty (n=360) one day old broiler chicks were divided into nine treatment groups with four replicates of ten chicks each. Treatments were four herbs *viz.*, coriander (*Coriandrumsativum*), cumin *(Cuminumcyminum*), fennel (*Foeniculumvulgare*) and madran (*Achilleawilhelmsii*) at 0.5 and 1.0% and control (C). The seeds of coriander, cumin and fennel while aerial parts (leaves and flowers) of madran were ground and added to basal diet @ 1.0% and 0.5% respectively and control (C) was offered basal diet. The treatment groups with herbs improved WG, ADG, FCR digestibility ($P<0.05$). Feed intake in the treatment groups was insignificant ($P>0.05$). The treatment groups supplemented with cumin showed higher growth performance in terms of WG and FCR in comparison to coriander, fennel, madran and control($P<0.05$). Relative organ weights and relative carcass yield of treatment groups were non-significant ($P>0.05$). The length and relative length and histomorphological parameters of the intestine of the treatment groups showed significant difference ($P<0.05$). Supplementation of herbal additives had significant effect on bacterial enumeration of Ileum and cecal volatile fatty acid (VFA) concentration ($P<0.05$). In conclusion, supplementation of herbs as feed additive improved growth parameters and present results suggests herbs could be used as alternative to antibiotics growth promoting feed additives.

Key words: coriander, cumin, fennel, madran, growth performance, broiler

PS-77

EFFECT OF HERBAL AQUEOUS INFUSION ON THE PERFORMANCE OF BROILER CHICKEN

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ABSTRACT

The experiment was carried out to evaluate the performance of broiler chicken supplemented aqueous herbal infusion in drinking water. Cumin (*Cuminum Cyminum*), garlic (*Allium sativum*), fennel (*Foeniculumvulgare*), madran (*Achilleawilhelmsii*) andjir (*Artemisia scoparia*) were used in the experiment. Day old broiler chicks (n= 440) were randomly divided into ten treatment groups and a control group, each comprised of forty (40) chicks. Aqueous infusion (5% w/v) was prepared and added to drinking water @ 20 and 40ml liter^{-1}and control was provided plain water *ad-libitum*. Feed measured and offered twice daily. Data of FI and WG was noted weekly. The broiler organ weights, hematology, serum biochemical parameters, and ilealmicrobial enumeration were observed at day42 of the experiment. The performance indices significantly ($P<0.05$) improved by the aqueous infused supplements. Supplementation of cumin, garlic, madran and jir showed significantly ($P<0.05$) better performance as compare to control in terms of WG, FCR and ADG. Significant ($P<0.05$) difference in relative weight of carcass, gizzard, heart and intestine was observed. Supplementation of herbal infused water modified intestinal microbial counts ($P<0.05$).

Key words: herbs, aqueous extract, growth performance, broiler

PS-78

COMPARATIVE EFFICACY OF SALINOMYCIN SODIUM, DICLAZURIL AND STEROIDAL SAPOGENIN FOR THE PROPHYLAXIS OF COCCIDIOSIS IN BROILER CHICKS

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ABSTRACT

Coccidiosis is an important disease of poultry caused by an obligate microscopic protozoan parasite, belongs to the genus Eimeria (Phylum Apicomplexa). Drug resistance is a major problem and continuous use and misuse of anticoccidial drugs have led to the emergence of drug-resistant strains. The present study was designed to determine the comparative efficacy of various drugs as prophylaxis against coccidiosis in broilers. For this purpose, one hundred and fifty day old broiler chicks free from coccidial infection were purchased and randomly divided into five groups viz. A, B, C, D and E comprising 30 birds each. The chicks of group A was given Steroidal sapogenin @ 500 gm/ton in feed for 42 days. The chicks of group B was given Salinomycin sodium @ 500gm/ton in feed for 42 days where as the chicks of group C was given Diclazuril @ 200gm/ton in feed for 42 days. The chicks of group D was kept as positive control where as the chicks of group E was served as negative control. Coccidial oocysts were cultured from the infected guts collected from the field. At the age of day-11 the birds of groups A, B, C, and D were challenged with 30000 coccidial oocysts irrespective of species. The weight gain, FCR, feed intake, clinical signs/severity of diarrhea, lesion score and mortality rate were determined on weekly basis in all experimental birds groups. The Effect of coccidiosis on haemoglobin, total leukocytic count and differential leukocytic count were also studied. Steroidal Sapogenin @ 500 gm/ton shown good result in terms of weight gain, FCR, oocyst count, reduction in mortality and intestinal lesions It is anticipated that the results of this study will help the poultry farmers/concerned to select best possible drug of choice to control coccidiosis.

Key words: Coccidiosis, steroidal sapogenin, oocysyt, Emria, drug resistance

PS-79

YEAST AS ALTERNATIVE TO PLANT AND ANIMAL PROTEIN SOURCE IN POULTRY

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ABSTRACT

Limitation of natural resources leads to shortage and high prices of feed ingredients especially protein sources like soybean meal, canola meal, poultry by-product meal and fish meal. Using alternative low price protein sources in the diet could be a suitable option for reducing the feed cost. Several microbes like algae, bacteria, yeast and fungus act as protein producers and can be used in the diet of poultry. Of these microbes, yeast is mainly used in single cell protein (SCP) production because of its rapid growth rate and high efficiency to convert carbon and nitrogen source into protein. Yeast and yeast products produced from agro-industrial by products are rich in protein contents. Yeast is rich in protein, vitamins and minerals therefore it can be used effectively as an alternate protein source in livestock feeds. Single cell protein consists of water, fats, protein, carbohydrates, ash and elements like potassium and phosphorous. Composition of SCP is influenced by the nature of substrate and organism used in its synthesis. Single cell protein from yeast and fungi has 50-55% protein it has high protein carbohydrates ratio. Yeasts have a balance proportion of amino acids, B-complex vitamins and also have prebiotic properties therefore more suitable for poultry feed. Single cell proteins produced by using bacteria contain more than 80% protein although they have small amount of Sulphur containing amino acids and high in nucleic acid content. Summarized outcome of research conducted, indicates that reports indicated that use of yeast cell protein has resulted in improved weight gain, feed conversion ratio and economic efficiency. So it can be concluded that use of yeast as replacement of vegetable and animal protein sources in poultry as it improve the growth performance in poultry birds.

Key Words: single cell protein, yeast, plant and animal protein source, poultry.

FRMI-80

NORMALITY TESTS OF MORPHOLOGICAL MEASUREMENTS OF SHEEP, A STUDY FROM PAKISTAN

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ABSTRACT

Generally, it is assumed that the biological data follow normal distribution otherwise the inference breaks down. Prior to statistical analysis, we therefore test the normality of the biological data. The main focus of this study was to apply different statistical techniques of normality on the biological data of sheep in order to see which biological body measurement (variable) followed normal distribution. A total of 164 sheep (85 female and 79 male) aged 28 365 days were included randomly in this study. Two renowned statistical tests of normality i.e. Kolmogorov-smirnov testand Shapiro-wilk test were applied on different body measurements of both male and female sheep, viz. withers height(WH), body length (BL), head length (HL), head width (HW), ear length (EL), ear width (EW), neck length (NL), neck width (NW), heart girth (HG), rump length (RL), rump width (RW), tail length (TL), barrel depth (BD), sacral pelvic width (SPW), birth weight (BW) and present weight (PW). A graphical technique quantile (Q-Q) plot was also used to see the data pattern of said variables. The Mean (± SD) of WH, BL, HL, HW, EL, EW, NL, NW, HG, RL, RW, TL, BD, SPW, BW and PW in all sheep were: 59.25 (± 8.37), 57.21 (± 9.61), 20.81 (± 3.29), 8.74 (± 2.09), 25.61 (± 2.79), 11.25 (± 1.41), 22.17 (± 3.86), 14.37 (± 2.39), 62.14 (± 9.82), 11.49 (± 2.22), 14.65 (±3.52), 10.37 (±2.54), 37.56 (±6.91), 66.68 (±12.16), 3.05 (±0.687) and 17.35 (±4.95) respectively. The mean WH, BL, HL, HW, EL, EW, NL, NW, HG, RL, RW, BD, SPW, BW and PW of male sheep were larger than female sheep. Among various body measurements of both male and female sheep, we observed that WH, BL, HG, BD and SPW body measurements were normally distributed by applying Kolmogorov-Smirnov test. While, body measurements WH, BL, NL, HG and BD were normally distributed by applying Shapiro-wilktest. However, WH and BL of both male and female sheep were normally distributed in both of the tests. From the results of study, we concluded that normality assumption should be checked for drawing robust inference of the data set.

Keywords: Normality testing, Sheep data, Kolmogorov-smirnov, Shapiro-wilk tests, Q-Q plot.

FRMI-81

DEVELOPMENT OF PREDICTION MODELS FOR ESTIMATING LIVE WEIGHT IN SHEEP

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ABSTRACT

To know about the body mass of small ruminants is very important for a good animal management, like understanding medication doses, adjusting feed supply, monitoring growth. Usually, body weights of animal can be accurately measured by using platform scales, but these facilities may not be available on various farms. Hence, the body weights of sheep have to be predicted by using different body measurements. The present study was conducted to estimate live body weight out of various body measurements of local sheep. For this purpose live weight and various body measurements of local sheep present in Multan were recorded. These body measurements were diagonal body length, heart girth, height at withers, height at rump, head length, neck length, ear length and width, tail length, tail diameter, fore arm circumference, neck circumference etc. were recorded in different age groups. The data was analyzed by using linear regression model to estimate prediction equations for determining live weight from body measurements. These equations suffice the need of weighing scale.The recent study was conducted for the following objectives: to develop models for prediction of live weight, out of body measurements in sheep in southern Punjab, Pakistan, to make prediction equations using regression models for estimation of live weight in sheep and to study correlations among body measurements of sheep.

Key words: sheep, body measurements, linear regression, prediction equation

FRMI-82

COMPUTATIONAL MODEL IN LIVESTOCK

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ABSTRACT

The aim of current comparative study is to understand the use of available computational models in livestock. Computational model in livestock easily propound as "use of information, communication technology and computer model to ensure good yield and efficient practices that is based on hardware devices and use of software as key tools for increasing the competitiveness of theindustry". In a past theoretical models are used, when a mathematical methods are sufficiently and well-developed that it can be automated for implementation, but the field now a day as "computational livestock" is a multidisciplinary product of the digital age. Through computational analysis it becomes easy to access the current situation and solve issue in effective way. This paper presents the results of a literature review about the use of computational ethology, automatic control system, management computational, pervasive tool for monitor and electrical stimulation in livestock, with the objective of identifying, cataloging and classifying the existing works in this context.

Key words: virtual aid, Quadruped, farmer friendly tool.

FRMI-83

USABILITY OF BOOTSTRAP AGGREGATING (BAGGING) MARS ALGORITHM FOR AN ANIMAL DATA SET AS A HYBRID APPROACH

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ABSTRACT

Known as a powerful algorithm, Multivariate Adaptive Regression Splines (MARS) is implemented to describe the multidimensional relationship between response and explanatory variables for regression and classification problems. Bootstrap Aggregating (Bagging) approach for MARS can be considered as a hybrid approach with the aim of producing and combining MARS prediction equations that have various basis function and degree patterns of explanatory variables in solving regression type problems. With the scope of bootstrap resampling, the aim of this study was to develop a Bagging MARS prediction equation for predicting a continuous response variable for an animal data set. For this purpose, the earth (enhanced adaptive regression through hinges) and caret (classification and regression training) caret packages in R studio were utilized. Predictive performances of the Bagging MARS predictive models specified for numbers of different bootstrap samples i.e. 2, 3, 5, 10,20, 25, 50, 100, and 500 were measured. In conclusion, it was suggested that detailed information on applying bootstrap aggregating (bagging) MARS algorithm for the animal data set will be convenient for researchers and animal breeders.

Key words: Bootstrap resampling, MARS, Bagging MARS, Regression type problem