



SOUVENIR & ABSTRACTS

1st National Veterinary Summit AGRIVISION-2024

OR

"Role and Contribution of Veterinary and Allied Sciences towards making Viksit Bharat @ 2047,"

पशुचिकित्सा एवं सम्बंधित विज्ञान की विकास यात्रा @ 2047 बनने की दिशा में 2024 प्रमुख एवं रोचक

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August 11, 2023



Dear Sir,

I am writing to you regarding the prize for the best American novel published in 2022. The prize is awarded annually by the Booker Foundation, which is a non-profit organization that promotes literature and the arts. The prize is awarded to the author of the best American novel published in 2022. The prize is awarded to the author of the best American novel published in 2022.

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Yours faithfully,

Booker Prize
Booker Foundation
New York, NY 10011

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Panchagavya: Blessings Given by God to Human Being

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Introduction

The infectious lifestyle of the 21st century has almost completely destroyed a person's natural state of well-being to the tune of stress, depression and other psychological conditions. The natural defense system of the human body is also weakened by the routine of artificial and harmful in the modern ubiquitous modern system. The good bacteria in the digestive tract (healthy gut flora) are completely destroyed by the long-term use of antibiotics along with the individual itself. Moreover, the modern activities (work, junk food, internet, food and processed foods) are common cause of digestive and intestinal blockages, which is now led to obesity, diabetes and obesity. Furthermore, the intake of additive substances such as drugs, alcohol and others is also affected.

Panchagavya, a blend of maintaining a combination of five products derived from cow is an important part of Ayurvedic treatment. It is essentially a mixture of cow dung, cow urine, milk, curd and ghee. It not only improves physical health but also enhances and boosts and gives optimum integrity and extensive beauty. Ayurvedic Acharya often refer to Panchagavya as a natural promoter due to its many health benefits. Panchagavya, a blend of the five elements of cow, is credited to numerous ancient texts like Bhid Smriti, Kashyap Smriti, Charak Smriti, Sushruta Smriti, Gadd Nigraha, Shri Tattva Sam and Yog Bhasha Granth.

India is the land of traditions with its roots in nature comes directly, linking world health and scientific system. Indeed there is India, a cow is called "Kamadhuk" or "Kamadhenu" due to its nourishing nature like a mother. Kamadhenu is the name of the sacred cow who believed to be capable of giving things. Panchagavya is a mixture of health benefits and medicinal properties. The Ayurvedic system of medicine has done that the right mixture of using cow milk, ghee, urine, dung, curd and each of which is an herb (gaur) is a "divine" from "Gau" means cow (for the treatment of) various diseases. Each product possesses different components and work for human health, age, longevity, and other purposes. Panchagavya has been observed from two words, "Panch" meaning five and "gavya" meaning obtained from "Gau" means cow, which represents five products obtained from a cow. Each of the "gavya" creates a different medicinal impact against various diseases. Panchagavya therapy or treatment

It is an effective and healthy food and drink. It has been proven that cow's milk has the ability to regulate cholesterol and maintain protein. It has a proven antibacterial effect against food poisoning. Having cow's milk products makes that makes the diet and makes them feel healthy to improve their health.

Go Dugha (Milk): According to Ayurveda, milk is a natural source of protein that cannot be obtained from other types of food. Properly digested milk promotes healthy emotions, soothes all tissues, and helps maintain harmony in all doshas. It is one of the most important nutrients for maintaining the life-sustaining force. Ancient texts document the therapeutic effects of milk by traditional Indian medicine systems. Milk has been used for numerous medicinal benefits, including its ability to soothe, to promote, and improve health.

Indian milk contains approximately 4.6% lactose, 4.6% fat, 3.3% minerals, 1.4% protein, and 50% water, making it highly nutritious. It contains about 27% of milk protein, gamma casein 9%, alpha casein 30%, and peptides 27%. Approximately 5% of milk contains of lactose, which is present in milk in a colloidal state along with other proteins such as whey protein, casein, and albumin. Milk is a good source of calcium and phosphorus as well as important fatty acids. Milk also contains phytochemicals such as sphingolipids, lipoic acid, and glycerophospholipids, as well as vitamins A, B2, B12, and K. Consuming milk has various health benefits. Milk is used as a substitute for breast milk for infants. It is important for the growth of infants, bones, and the control of heart activity. The low cholesterol content of milk is associated for mental and physical development, and milk helps maintain the digestive system, immune system, and bone structure. Lactose serves as an important source of energy. Milk also improves vision due to Vitamin A, and Vitamin K regulates the blood clotting process. Milk is a source of health benefits. Milk can be converted to curd, known as *curd*. Milk promotes healthy gut flora, which inhibits the formation of dangerous gut bacteria.

Dahi (Curd): A by-product of milk is dahi (curd). This means curd is made by Ayurvedic properties and benefits have been discussed in writing by all the leading practitioners of Ayurveda, including Charaka and Sushruta. It is considered one of the healthiest foods in the world. Curd serves as a medicine for many ailments. It is considered a tonic and is used to treat conditions that lead to poor immunity. Curd is recommended for patients with diabetes and dysentery and is recommended for patients with chronic renal and osteoporosis. Curd, also known as "yogurt" or "dahi", is consumed worldwide for its high nutritional value and health benefits. It is produced by fermenting milk with microorganisms such as *Streptococcus*, *Lactobacillus*, *Acidobacterium*, and *Lactococcus*. Ayurveda prescribes curd preparations, carefully considering the environmental and climatic conditions as well as the individual's health when consuming curd. Curd contains several nutrients and microorganisms, including water, protein, vitamins such as A, B, C, D, and E, and minerals.

such as calcium, phosphorus, magnesium, and zinc. The probiotics present in and strengthen the immune and digestive systems, while the various vitamins, minerals and proteins present in and help fight viral pathogens, including HIV. It is used to treat digestive problems as it is essential for growth of beneficial microorganisms and promotes good intestinal flora to improve digestion. *Canola oil* acts as a blood purifier and helps to reduce skin disorders and low density lipoproteins, thereby preventing the risk of obesity. It has antitumor properties and treats diabetes and hemochromatosis.

Gillette's Care's Glue is thought to be the best type of fat for human health in Ayurveda. It is a natural fat for those with pain who suffer from high blood pressure, heart disease, it is packed with nutrients. Regular use improves physical and mental toughness, increases body health, and promotes body growth. It is not only essential for skin and is essential for the body of bones, it improves strength, increases the health of tendons and muscles, and keeps bones strong but flexible. *Can glue* prepared by traditional method possesses high nutritional value, medicinal benefits, and helps to promote good health. This is prepared by heating the butter obtained from cow milk, and heating must be continued at high temperature until the mixture is completely lost. Ayurveda also supports the combination of glue with other healing therapies. After heat fermentation, i.e. *Ukha*, has been developed for improved delivery and increased bioavailability of hydrophobic plant substances. For example, *Ukha* for digestive functions, *Yava Ukha* for respiratory system, *Shankha Ukha* for skin diseases, *Shankha Ukha* for wound healing, *Kanista Ukha* for sexual dysfunction, etc. *Panchagavya* is also a traditional method used to protect plants and soil from pest and disease, crop yields. Application of *Panchagavya* has proven to be more profitable than recommended herbicides and chemical spraying.

Panchagavya Kava as a Best Vajrasana

Any product generated from food sources having additional health advantages in addition to the essential nutritional content contained in food is considered as a functional food. The "functional revolution" and the search for complementary or alternative household goods have been quoted by consumers' demand for quality of life. The long standing consumer acceptability of nutraceuticals is brought about by their association with conventional medicine. Although the idea of nutraceuticals has grown in popularity recently, it has its roots in the traditional Ayurvedic medicine of ancient India. Products called nutraceuticals can be used as medicines as well as foods. Substances that have physiological benefits or provide protection against chronic disease are called dietary supplements. Dietary supplements can be used to enhance well-being, slow the aging process, prevent chronic disease, control blood sugar, and support body structure and function. Dietary supplements have received a great deal of attention recently because of their nutritional benefits, safety, and potential therapeutic effects. Dietary supplements can be used to enhance well-being, slow the aging process, prevent

4. Hepatoprotective effect – *Fenchogrya glabra* is the combination of multiple herbs that have the hepatoprotective effect.

Conclusion

Fenchogrya is a promising treatment for many human ailments and has proven its ability to help mankind. Though scientific efforts are required to ascertain its bioactivity, safety and standard. The impact of *Fenchogrya* cannot be stated by ancient literature alone. When coupled with conventional treatments, it is inevitable that patients will adopt dietary supplements in the long term. It is expected to reach advanced medicine; the possibility of numerous studies to be done. For this purpose, promising techniques and modernization methods need to be adopted so that *Fenchogrya* can be used on a large scale in the form of dietary supplements. Additionally, a better understanding of the components of *Fenchogrya*, their pharmacokinetics, pharmacodynamics, and therapeutic relationships is needed.

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Supplementation of Different Oil Sources on Performance of Egg Type Chickens

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4. *Communicable*. <http://www.who.int/csr/don>

Transfer of Control

The poultry industry is one of the fastest-growing subsectors and is an important source of income all over the world. The size of the Indian poultry industry is INR 1.58 billion (2021-22), with a growth rate of 4.77% in egg production over the previous year 2020-21 (BAPL, 2021). Poultry, especially layer flocks, plays a key role in supplying high-quality protein through eggs, which are widely consumed without religious or cultural restrictions. To boost layer hen productivity, farmers like dietary oil balance are crucial for their well-being and output. Oils are a frequently used energy source in the diet of laying hens, helping energy production, nutrient absorption, hepatointestinal, and immune function. Oils improve feed palatability, reduce diseases, rise feed passage rate, enhance nutrient absorption, and provide anti-feed toxins. They also help reduce feed stress, enhance feed utilization, and decrease mortality (Sharma, 2001).

Laying hen diets typically include vegetable and animal oils, with their effects depending on the oil type and composition. Flax rich in polyunsaturated fatty acids (PUFAs) benefits overall hen health. Vegetable oils, rich in essential fatty acids like linoleic and linolenic acid, are critical for growth and egg production. Linoleic acid deficiency can hinder development, while linolenic acid increases yolk and egg weight. Animal oils, mainly high in oleic acid, are used to boost the saturated fatty acid content of eggs. However, the composition of fatty acids in both eggs and tissues from a hen reflects the dietary lipid composition and can influence the levels of lipoproteins and triglycerides in the bloodstream (Kilmer et al., 2018). Generally, incorporating unsaturated fatty acids into poultry diets enhances the quality of poultry products, including the antioxidant capacity and enriched fatty acids. Incorporating oils into the diet of laying hens has proven to be an effective approach for enhancing growth, improving feed conversion rate and ensuring poultry health. The substantial variations in the fatty acid composition and physicochemical properties of different oil types contribute to diverse physiological effects on the birds.

CMS definition and classification

False and often are recognized as essential nutrients in both human and animal diets. They also function as lipid and water-soluble vitamins, components of several proteins of many foods. Oleic acid makes up about 80% of the fatty acids in olive oil, but is also found in many other oils. It is a monounsaturated fatty acid, which is a good cholesterol-lowering agent.

Table 1: Error and decomposition of $\Delta W_{\text{exact}}^{\text{exact}}$ and initial ΔW

No.	Exp. content	Staple fatty acids	acid and Ratio
1	Barbours oil	C18:1-80%, C18:2a-4-10%, C18:2b-1-5%	10
2	Memo oil	C18:1-10%, C18:1-32%, C18:2a-4-6%, C18:2b-3-12%	41
3	Barbours oil	C18:1-22%, C18:2a-22%, C18:2b-10%	12
4	Flavored oil	C18:1-10%, C18:2a-30%, C18:2b-10%	100
5	Barbours oil	C18:1-55%, C18:2a-22%, C18:2b-10%	12
6	Leaf	C18:1-20%, C18:1-30%, C18:1-42%, C18:2a- 4-10%, C18:2b-0-10%	20
7	Fat oil	C18:1-10%, C18:1-10%, C18:1-32%, C18:2a-1-1%, C18:2a-1-1%, C18:2a-4- 1%, C18:2a-3-10%, C18:2b-2-2%, C18:2b	1-10%

The extended component of δC_p was:

1. **Sources of polyunsaturated fatty acids and essential fatty acids.** Polyunsaturated fatty acids, particularly linoleic acid and alpha-linolenic acid are essential to the diet, because they are not able to be synthesized. They are essential to prevent coronary artery disease and are co-essential for the development and function of the nervous system (Jahromi et al., 2005). Other essential fatty acids like gamma-linolenic and arachidonic acid have also been shown to be essential in development as shown in rodent

Glucuronic acid is prevalent in plant cell-like cellulose, hemicellulose, pectin, lignin, and various other polysaccharides. It is also found in the cell walls of many fungi and bacteria. It is a major component of the cell wall of many fungi and bacteria. It is a major component of the cell wall of many fungi and bacteria.

2. Source of phospholipids in food: Phospholipids a crucial component in cell and tissue membranes, surface to surface, emulsifier of, transport of, antioxidant of and help of stomach to function. Location are phospholipids, most are present in egg yolk, glycerine, phosphoric acid and choline addition to serving as an emulsifier, lecithin may also have antioxidant properties (1) and (2) and (3).

4. Response of the vehicle-coupling

production performance is also mainly regulated by the liver, the fatty acid composition of lipoproteins (mainly the yolk) is regulated by the liver fatty acid composition, affecting metabolism through different channels.

Based on liver degradation-related components, besides liver lipoprotein production, improving fatty acid growth and subsequently reducing egg production (Wang et al., 2017). FFA, being a vital nutrient for animal growth and a key component of egg yolk, play a vital role in regulating the production performance of laying hens and influencing the quality of their eggs.

2. Nutritional composition of the yolk: Addition of oil to hen feed after the fatty acid composition, leading to eggs enriched with beneficial polyunsaturated fatty acids that offer more than just basic nutritional value. Polyunsaturated fatty acids (PUFA) are incorporated into omega-3, omega-6 and omega-9 classes. Among omega-3 PUFA, docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) are particularly important for human health significantly improve heart and cardiovascular function.

Omega-3 fatty acids (omega-3 fatty acids) is not just about heart health, it's crucial for our health, immune system. By affecting egg composition, we can reduce diseases linked to omega-3 deficiency, meeting the demand for blood glucose and immune health issues. Maintaining an appropriate balance between omega-6 and omega-3 PUFA is the diet to ensure for health. An ideal dietary ratio is suggested to be between 4:1 and 10:1, as excessive omega-6 fatty acids in omega-3 can inhibit the conversion of alpha-linolenic acid, reducing its efficiency due to competition for metabolic resources.

Finally, other omega-3 fatty acids (omega-3 fatty acids) is optimal for the nutritional content of eggs, particularly by enhancing the role of omega-3 fatty acids. By feeding laying hens diets rich in omega-3 fatty acids, such as flaxseed or fish oil, the hens incorporate these beneficial fatty acids into the eggs they produce. This process helps to increase the omega-3 content of the eggs, thereby providing consumers with a healthier option that is rich in essential fatty acids.

A. Immune modulation: Dietary fatty acids exert a significant influence on the health and immune function of poultry. Saturated fatty acids (saturated fatty acids) can impact immune cells by proliferation, membrane function and cytokine production of lymphocytes, monocytes and splenocytes are influenced by omega-3 fatty acids, besides antibody production (the IgM and IgG) (Agarwal et al., 2016). Polyunsaturated fatty acids present in the diet play a crucial role in the synthesis of bioactive molecules and serve as precursors for various physiologically active compounds, including eicosanoids and leukotrienes. These compounds hold particular significance for poultry, actively participating in physiological processes, especially those related to the immune system.

Purpooragapam and Sridharan (2008) observed that introducing flaxseed oil into the diet to achieve a 1:1 dietary ratio of omega-6 to omega-3 and 1:4, 8:1 PUFA ratio resulted in an enhanced immune

very robust substrate and glycerolase mobilization, leading to increased substrate degradation in eggshells (Jiao et al., 2011).

2. Rapeseed oil. Tian et al. (2016) suggested that addition of 2.5% rapeseed oil to the laying hen diet leads to increase egg production, egg weight, feed intake and improved broken egg rate during some of phases, when compared to the control group. Also reported that incorporating rapeseed oil into the diet of laying hens results in a notable reduction in serum triglyceride levels and an increase in high density lipoprotein cholesterol content.

A diet that includes rapeseed oil with a low erucic acid concentration demonstrates its ability to lower serum lipid levels and diminish liver fat deposition in laying hens. These effects are primarily linked to the upregulation of apolipoprotein synthesis genes, specifically apolipoprotein II and apolipoprotein III, observed in response to this dietary intervention. The heightened expression of these genes contributes to increased lipid transport within the laying hens.

3. Flaxseed oil. Salami and Ali (2017) reported that the inclusion of 7% flaxseed oil into laying hen diets significantly increased egg production percentages, average egg mass and polyunsaturated fatty acids with high ratio of linoleic acid to egg. This is adding high polyunsaturated fatty acids content of linseed oil which improves the digestibility of dietary fat, hence improves dietary energy utilization. They also reported that cholesterol and triglycerides content in plasma and egg yolk reduced significantly due to adding 7% flaxseed oil into laying hen diets. Polyunsaturated fatty acids may inhibit the synthesis of apolipoprotein B and very low density lipoproteins which are responsible for cholesterol transport in the blood.

4. Palm oil. Ibrahim et al. (2017) reported that dietary supplementation with crude palm oil has been shown to enhance egg yolk weight and yolk color. Additionally, it has the positive effect of reducing total cholesterol concentration.

5. Fishmeal oil. Tang et al. (2011) demonstrated that dietary supplementation of cod liver oil containing 9.35% eicosapentaenoic fatty acids, primarily caused an alteration in fatty acid composition and cholesterol content in liver, probably caused by the changed lipid profiles caused by dietary cod liver oil as there are higher fatty acid saturation in dietary fat. They also find that inclusion of cod liver oil resulted in an increase of total antioxidant capacity. A noticeable decrease of malondialdehyde was observed in the serum of hens fed a diet supplemented with either 7% or 4% cod liver oil.

6. Moringa oil. Maragoti et al. (2019) have reported that species like *Adiantum species*, *Lilium species*, and *Cryptanthus species*, is rich in polyunsaturated fatty acids, particularly omega-3 fatty acids and

CDs. It is ideal for fluidifying DHA EPA in eggs and meat. DHA plays a key role in lipid metabolism, while a common trans-metabolite is to be a natural antioxidant and enhance egg yolk color.

Ekin et al. (2020) shows that dietary strategies of appeared to have effect on hen performance but its recommended dietary inclusion should be around 1mg/kg. This modification for near maximal yolk very long chain PUFA enrichment without impairing hen production performance, also significantly decrease plasma triglyceride level.

B. Animal yolk derived oils are mainly extracted from ruminant animal tissues (mostly beef and poultry fat) and risk of an unhealthy diet.

1. Fish oil: Supplementing of 7% fish oil decreased total saturated fatty acids, while total unsaturated fatty acids, monounsaturated fatty acid and polyunsaturated fatty acid increased in egg yolk lipids (Matta et al., 2017).

2. Lamb tallow: is a partially solid, white fat derived from the fat tissues of pigs. It is notable for its elevated saturated fatty acid content and absence of trans fat) and being contains range of fatty acids and unsaturated fatty acids. It contributes higher caloric content, making it a commonly utilized component in layer feed. Consequently, it is widely employed in poultry nutrition.

C. Mixed oil / balanced oil / blended oil: fluidifying various oils can be a strategic approach to enhance feed stability and nutritional value, as different oil offer unique fatty acid profiles and phytochemicals. Blending oils allows for a more balanced and comprehensive source of fatty acids, ensuring that the recommended allowances are met. This not only contributes to more diverse nutrient profile but also helps address the potential drawbacks associated with relying on a single oil source. Ekin et al. (2020) reported that supplementing the diet of Japanese quail with flaxseed oil, canola oil, rapeseed E or grape during the laying period demonstrated positive effect on productivity, blood haematology, cholesterol, lipid digestion enzyme and antioxidant properties in both sperm and egg yolk.

Conclusion

Integrating oils and fats strategically into layer diets provides numerous advantages, including energy supply, improved fatty acid profiles, and essential fat-soluble micronutrients like vitamins A, D, E, K, and polyphenols. The source of oils can boost feed palatability, increase intake, reduce feed wastage, and also slows feed passage in the intestines, allowing for better nutrient absorption. The dietary oils also influence gut microbiome, enhance immune function, and helps to manage heat stress in layers. Prioritizing a balance of polyunsaturated fatty acids (PUFA) and bioactive micronutrients is crucial for maximizing egg health and preventing chronic inflammation. Additionally, continuing

different oils, such as palm oil (rich in palmitic acid) and soybean oil (high in linoleic acid), can improve both the nutritional profile and palatability of the diet, while reducing the risks associated with using a single oil source.

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Newcastle Disease Virus (NDV)

NDV is a member of the genus *Avulavirus* in the family *Paramyxoviridae*. NDV viruses are pleomorphic, but usually spherical with a diameter of 80 nm. The virion is enveloped with a lipid bilayer membrane. The genome of NDV is a non-segmented, negative-sense, single-stranded RNA of 11,800 to 12,000 nucleotides containing six conserved genes (F, HN, NP, M, P, and L). The genome encodes a nucleocapsid protein (N), a phosphoprotein (P), a matrix protein (M), a fusion protein (F), a hemagglutinin-neuraminidase protein (HN), and a large polymerase protein (L). An additional protein called the V protein is produced by RNA editing of the P gene. The beginning and end of each gene occur at conserved segments known as open reading frames (ORFs) and gene start (GS) and gene end (GE), respectively. The viral RNA-dependent RNA polymerase begins transcription at the 5' end of the genomic RNA, in a sequential manner by a step-wise mechanism. The re-initiation of transcription at the GS is not perfect, thus leading to a gradient of subgenomic RNAs with high levels of subgenomic transcription located at the 5' end. The genome length of NDV must be an even multiple of six for efficient virus replication following the "rule of six".

Newcastle Disease Virus from Lateralpox

To check the virus antibody titre against NDV in poultry, 70 serum samples were prepared. Hemagglutination inhibition test against NDV was performed in serum samples of broiler (H/Layer:1100 and backyard broiler:1100) collected at various intervals. All birds showing positive titre 2^7 or more for NDV antibodies at all age group.

A total of 600 samples consisting of 100 broiler samples, 200 adult samples and 300 layer samples were collected from broiler, layer and backyard broiler in and around Lateralpox. The overall incidence of virus from broiler poultry, layer (Goshima et al., 2021) and backyard poultry was 4/52 (7.69%), 6/47 (12.77%) and 11/56 (19.64%) respectively.

Clinical diagnosis

Two different forms of NDV are diagnosed. The milder form is the velogenic viscerotropic ND (VND) characterized by mortality and morbidity rates approaching 100%. It is associated with conjunctivitis, nasal discharge, dyspnea, diarrhea, ruffled feathers, prostration, tremor, and paralysis. All parameters, including haematology may be altered throughout the infection and, especially in the peracute/insignificant form and in the acute form. Necrosis, necrolysis also is also observed in some internal organs such as the spleen, liver, and gut-associated lymphoid tissue (GALT). Another form of the disease is virulent neurotropic ND (VND) characterized by neurological and some respiratory clinical signs with no gastrointestinal involvement. Typically, the affected birds manifest opisthotonus, head twisting and paralysis. Great lesions are often

often seen among birds that shed showing typical symptoms. However, in histology, analysis of Proctitis there is not immunohistochemistry and highly recommended.



Figure 1. SPP infected birds.



Figure 1. Proctitis haemorrhages in *Proctoscolus*.

Differential Diagnosis

The histopathologic picture of MD gives important clues in making clinical diagnosis. However, a number of viral and bacterial diseases may manifest similar clinical features that could be confused with MD. The commonest differentials of MD include highly pathogenic avian influenza, infectious bronchitis, infectious laryngotracheitis and diptheritic form of fowl pox. Others include fowl cholera, egg yolk peritonitis and peritonitis in peritoneal cavity space. Distinguishing MD from all these diseases is a useful task in arriving at tentative diagnosis.

Conventional methods for diagnosis of MD.

Historically, diagnosis of MDV-1 infection relies on the detection of the infectious agent by virus isolation in embryonated eggs or cell cultures. At present, virus isolation is the preferred and the international trade and remains the method of choice for confirming diagnosis or in the "gold standard" method for the isolation of other techniques.

For isolation of MDV, oral and tissue samples were inoculated in 9-11 days-old embryonated eggs or allantoic cavity route. Conventionally, 21 Newcastra disease virus was isolated from trachea (1),

lysis (30) and leukocyte pooling (7). All the Newcastle Disease Virus isolates sustained 50% improvements up to 75 minutes only, none of them were thermostable.

Isolation of NDV can also be performed in primary cell cultures such as chicken embryonic fibroblasts (EF), HE-1, human embryonic kidney 293, chicken embryo liver (CEL) (31), and avian erythroblasts (QFT) which are all highly permissive to the virus. The cells are infected with clinical samples and monitored for cytopathic effects (CPE) such as cell rounding, syncytia formation, and cell death. Importantly, isolation of pathogenic NDV isolates in cell culture might require the addition of trypsin to the cells, since that neutralizes F cleavage site can only be activated by trypsin-like proteases.

Viral-Cell Interaction

Rapid Transcription-Dependent Chain Reaction (RT-PCR): The most commonly used molecular test to NDV diagnosis especially in the developing countries is RT-PCR. The test can rapidly and accurately detect viral genome in clinical samples with high sensitivity especially if appropriate samples are taken. It is usually designed to simultaneously detect and identify the pathogens of the virus by targeting the F gene portion encompassing the F cleavage site, followed by restriction fragment length polymorphism using *Bgl*I which digests the NDV genome into homopolymeric, heteropolymeric, and oligopolymeric cleavage. Sometimes, molecular NDV pathotyping is predominantly based on RT-PCR followed by the analysis of the protein-coding area comprising of the F cleavage site.

For molecular detection of NDV RT-PCR was performed directly on 140 samples for detection of F gene. From samples 10 RT-PCR and 1000 samples 24/25 (24%) samples were positive. For molecular characterization of Newcastle disease virus in poultry, conventionally isolated NDV were confirmed by 24, 106, 15 and 12 genes using RT-PCR, one of 21 isolates of poultry 17, 79, 12 and 4 isolates RT-PCR amplified product sizes of sufficient at 212 bp, 425 bp, 730 bp and 124 bp (the base of F gene). 14 isolates were considered as heteropolymeric NDV and 12 isolates may have mixed infection can be oligopolymeric/heteropolymeric. Restriction enzyme analysis of F gene showed restriction site for *Hae*III, suggesting heteropolymeric virus. Two isolates sequence were submitted at NCBI with accession M209663 and M209664. On phylogenetic analysis M209663 and M209664 were designated as Class II genotype B, oligopolymeric strain and Class II genotype II heteropolymeric strain and had the motif 1128 G (g) R (R) R (R) (17) at the cleavage site of the fusion protein, which are typical of oligopolymeric NDV isolates (Bourgeois *et al.*, 2000).

Transforming Poultry Farming with Artificial Intelligence: Lending the Way to a developed India by 2047

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Introduction

In modern poultry production, disease threatens the health of poultry every year, which not only seriously affects the animal welfare of poultry but also directly results in serious economic losses. Early warning of poultry disease is very important for poultry health. As diseases are highly diverse and can be classified based on several parameters. Among them, those targeting the respiratory system (e.g., flu, infectious bronchitis, and Newcastle disease) can be classified as respiratory diseases, which are the most group threatening poultry health. Among the common clinical signs related to these, retarded growth, general lethargy, postures, etc., coughing and sneezing are two of the most common signs in this group, and all respiratory diseases cause extra pulmonary breathing sounds in birds. Automated disease detection systems are of great significance to poultry production and animal welfare (Nothmann et al., 2017). With the development of precision livestock farming (PLF), increasingly more studies have used image sound technology and artificial intelligence technology to monitor animals. Precision Poultry Technology (PTT) consists of techniques for continuous, deliberate, and automated typing technologies and computer tools for individual and practical poultry production, along with other solutions to poultry commercial trade to handle issues in poultry management, environment, nutrition, welfare, health and welfare issues, animal breeding, waste management, etc. Livestock management systems typically consist of three separate functions, sensing and measuring, analysis and decision making, and intervention (Wolter et al., 2017). PLF systems facilitate automation of these processes by decreasing the need for manual observations and human decision making, greatly decreasing the time and effort needed to manage large numbers of livestock. On big poultry enterprises with thousands of birds, applying animal management is not always practical; nevertheless, a proportion of birds can be monitored using PLF technology, and their reports can be effectively employed to measure flock health (Dallmann, 2015). PLF systems for monitoring big flocks of poultry are made possible by sensors that evaluate a multitude of various things. PLF methods collect the images and sounds of animals in a momentary way, which can be used for monitoring individual and group animals and measuring environmental and animal welfare (Joshi et al., 2017; Shukla et al., 2017; Zhang et al., 2018; Pang et al., 2020).

Spikes has the responsibility of creating frequency diversity in bird song or call. It acts as a sort of sound compressor which can increase the intensity of some frequencies (harmonics) and damp the other frequencies. This frequency change of sound technology have significant advantages in frequency domain structure. As non-contact information collection equipment, microphones are non-invasive, widely used, and not limited by lighted light. A large group of researchers is concerned with this issue (Chabot et al., 2018; Carpenter et al., 2019; McLaughlin et al., 2019) by detecting acoustic sources and roles (Smith et al., 2016; Stewart et al., 2019; Carpenter et al., 2019; Liu et al., 2020) while others are using poultry husbandry poultry evaluation (Wang et al., 2019; Mahdian et al., 2021; Cui et al., 2021). Respiratory disease are a common natural avian disease. Early detection offers more options for care and management, which can sometimes save the flock and reduce overall antibiotic usage. "Appropriate detection can put the veterinarian in the loop earlier - sometimes before the farmer - with better knowledge of the overall condition," Hartman said. The system was a combination of acoustic signal processing techniques and machine learning to track and analyze the sound by the poultry house, can aid farmers in early detection of disease. If an event of interest (e.g., coughed or gasping) (e.g., fly) suggest in the data following occurs, the farmer receives an alert. Poultry diseases can pose a significant health threat to both animals and humans.

How technology play an important role in disease identification?

Although the clinical signs such as diarrhea and nasal discharge are variable and influenced by other factors, none can be regarded as pathognomonic. NE, VF and AJ disease can be diagnosed by clinical signs with certainty, and their rapid diagnosis is essential for reducing losses and preventing their spread (Stahmann et al., 2011). There are some current diagnostic ways available for detecting these avian diseases. Hematologic Value and Acid-Balance. In most cases are available to detect these diseases, including EOPCR, real-time EOPCR, ELISA test (Cowan et al., 2011; Hartman et al., 2011, 2012; Mikawa et al., 2011). The viral genome amplification using RT-PCR method for diagnosing poultry diseases is common. RT-PCR can detect only a single virus at a time and the multiplex RT-PCR technique was developed to detect more than one virus. Although rapid detection of viral diseases is an important aspect of the economics of poultry production, current methods such as ELISA are time consuming (Kumar et al., 1991) and other methods need expert personnel and expensive equipment to conduct the presence of the pathogens (Jahan et al., 2018). As a result, by applying an automatic device with an alarm for key avian diseases, farmers could be given the opportunity to undertake the necessary management steps to prevent the disease occurring. Good poultry management practices can mitigate the risk of infection and disease through rapid diagnosis and detection of infectious diseases. PIV is ideal for poultry operations, as well as for detection and

Diagnosis can lead to better treatment, so potentially decreasing prevalence of infectious diseases is value to be. The study designed a system that automatically detects chicken with symptoms of respiratory diseases and helps with their identification. The system helps the farmer to identify the disease and take the right action. The system's action only involves isolating the sick chicken from the rest, treating it and ensuring the remaining healthy chicken.

Next device in diagnosis

Chicken Eye is a lightweight device that closely tracks an individual chicken's health, gathering information on various conditions: health, temperature, weight and (VET) levels, health and weight. The idea is that by using the animal itself as a sensor, actually we can identify quite quickly when there are challenges to the growth of the flock." It takes thermal-graphic images, which can be used to tell live stock from dead. The thermal-graphic images are also used to assess drooping colors, which are possible disease warning signs that could

The U.K.-based company recently launched four new sensor processors, which include the A100 (Chicken) sensor, the A100 (Egg) sensor, the A100 (Egg) sensor and the A100 (Chicken) sensor. A100 (Chicken) sensor requires no power, no power (no power) and is ready to use. A100 (Egg) sensor measures temperature and lighting in the flock, which helps produce better reproduction and health and monitor whether chickens are healthy. A100 (Chicken) sensor, which is used as one of the sensors, can thermal imaging and allows the farmer to monitor flock health and check the real-time quality, such as health and stress, and get health. It also alerts farmers to the temperature of the flock. "If the temperature of the flock is too high, it usually means that there's something wrong with the flock's health or the conditions are not best for the flock. That it's too is a trigger for several things, but ultimately it's linked to disease or infection in poultry."

The environment of the poultry house is an important factor for production that can be monitored and optimized. Environmental parameters include temperature, air velocity, water content, humidity, humidity and gas concentrations, including carbon dioxide and ammonia (Edmonson, 2017). Temperature, air flow, ventilation rate, the quality of the litter, humidity, and gas concentrations, such as ammonia and carbon dioxide, are all examples of environmental inputs (Edmonson, 2017). There are some examples of how FIA technologies have been utilized to monitor and regulate the environment in poultry houses. When levels of these gases increase, a decrease in production and bird health can occur (Araújo et al., 2015). Carbon dioxide concentration is that high level leads to lower weight gain and higher death, while NH₃ increased susceptibility to disease. The computer analysis can also be a valuable source of information about potential health problems. As the study by Girdle et al. (2018)

based on a comparative analysis of reliable signals: components (YFWs) emitted by healthy and vaccination-related flora, affected early detection of the infection stage (27th section, par. 9-11). Sakaguchi et al. (2015) proposed an intelligent method for the detection and classification of diseases, initiated by Chondrius perforatus, type A found on host vaccination. Paudyal et al. (2016) used 11 statistical features from frequency domain and 71 statistical features to assess dengue disease in humans using dengue vaccination.

There are several studies in the literature about artificial intelligence has been applied in music. Tadjeran et al. (2010) classified pieces having duration of 10s using vowel analysis and labelling method. 10s's length was limited by morphology and the vowel's feature. The intensity, duration and pitch were considered. They could detect and classify closed as type 1 (PVC2) piece like representative, symphony, symphony (PBB), etc., and Orchestral by representative (RB) duration using vowel's pitch-and-intensity analysis. Furthermore, vowel duration was excluded because it couldn't find statistical difference between treatments (Tadjeran et al., 2010). Katten et al. (2011) classified the last speech based on vocal sound. Different feature functions of the signals were extracted to classify the text speech. They found that vocal groups and speech can be identified based on time speech (Katten et al., 2011). Numerous features such as duration, windows and speech can change by the speech sound speech.

More recently, DNM and other family members with the *homo sapiens* homolog of the *Caenorhabditis elegans* DNM-1 have been shown to interact with the *homo sapiens* DNM-1. This interaction is important for the function of DNM-1 in the regulation of the actin cytoskeleton. The following are technologies that highlight two types of sensor monitoring systems, notably sensor and sensor that are designed to monitor the function of a sensor in a system.

Keywords: *workplace bullying, organizational commitment, turnover intentions, organizational citizenship behaviors, social desirability*

The focus of infection with influenza virus is a persistent concern for poultry flocks. Rapid detection of influenza virus is crucial for the poultry industry, as earlier detection allows for prompt measures to be taken to prevent infection spreading within flocks or to other flocks. The conventional methods for diagnosing poultry influenza involve taking samples from chickens after clinical symptoms appear, followed by virus culture or PCR-based methods. The current rapid detection method for diagnosis is to collect and prepare a lot of faecal phages and so forth. Due to this situation, experimental research groups have developed this new detection technology and measured the sensitivity of detection to assess whether they have the influenza virus (Oishi et al., 2010). When a bacteriophage is injected into cells of influenza virus, such as the R239 virus, influenza

them, these parameters are statistically altered. The answer raised by Okada et al. (2009) was high enough—weighing only around 5 g—in not obstruct the movement of chickens in their natural state. Research has observed stress and infection-induced responses in birds that were experimentally infected with a highly virulent influenza virus before they died. Okada et al. (2014) have since demonstrated that increasing only movement patterns using an accelerometer versus only measuring body temperature was a poor factor and more accurate detection of H5N1 virus infection is statistically significant. Accelerometers offer a feasibility inexpensive sensor technology because they are frequently incorporated into many smart devices utilized in modern culture.

Diagnosis for virus influenza virus

The technology used to measure h/a flu virus, such as specific, reliable, widely available, and accurate, that can recognize the presence of an virus (such as a pathogen, protein, nucleic acid, or other substance) in a sample and convert this recognition into an electrical or optical signal (Liao et al., 2015). Importantly, many biosensors are currently being developed that are able to specifically detect influenza virus. However, detection can be limited in some subjects. These types of biosensors rely on detection of specific molecular entities that are present on the virus. For example, Chen & Wernham (2011) developed an assay that could detect the hemagglutinin (HA) protein of influenza virus. This sensor experiment made use of a two probe system, both of which had to bind to the HA protein. The fact that this experiment identify the HA protein of both H1 and H2 viruses, the latter of which is capable of causing pandemics in humans, is significant. Both of these sensor technologies have both advantages and drawbacks that would be present in clinical production systems if they were used. Importantly, wearable biosensors provide real-time data transfer when they are perpetually operational. The single elastic fibers/polymer is to detect light away in any physiological response linked to influenza virus infection. Additionally, one of the main drawbacks of wearable sensors for influenza virus is the lack of specific diagnosis, as other factors can affect heart physiology and movement patterns, leading to false positive detection. The great feature of biosensors is that they offer a precise diagnosis of the influenza virus. Biosensors must be carefully selected and operated, in contrast to wearable sensors, because they are likely to be employed only when clinical symptoms are manifested in the form. So, in an influenza virus and other economically significant poultry pathogen may be detected and diagnosed using systems that rely on wearable sensors for quick detection and biosensors for quick and accurate diagnosis.

Avian influenza (AI) is one of the most widespread and harmful diseases in poultry. It causes respiratory and nervous system diseases and has a negative impact on the health and breeding of

poetry. Besides all clinical signs of respiratory disease, this disease can cause neurological symptoms (Huang et al., 2022). Infectious Bronchitis is highly contagious and acute viral respiratory disease in poultry, especially young birds, and lesions caused by the disease can have economic importance. Regardless of its origin, since the Bronchitis virus can infect the bird's respiratory system and cause inflammation in the trachea (77). Mahdavian et al. (2021) studied the difference in the viral spread of infectious bronchitis and Newcastle disease. Results of the Mahdavian et al. (2021) showed that the bird's respiratory system in particular at the second time was mostly affected by the disease while the control group was completely healthy. The first acceptable diagnosis occurred on the third day with the help of virus isolation method. The sample lesion showed the best results in detection of the birds challenged with Infectious Bronchitis among the test population. It has been successfully distinguished the bird's viral nature's variations among healthy and infected. Virus isolation results showed 87% and 90% of the damaged viral agents in the first and fourth days respectively.

Conclusion

Poultry quality production is inseparable and relies on the potential for radical change. Highly adaptive animal systems and dry-down systems, along with advancements in sensing, robotics, and laser technologies, will fuel innovation. The advent of novel discovery and development has the potential to fundamentally alter the ecology of poultry production and processing by addressing issues including labor shortages, disease control, food safety, livestock history, environmental sustainability, and animal welfare. Due to the rigidity of poultry business's economic operations, the industry is slowly poised to continue to benefit from the incorporation of modern tools. As I see it, a major challenge for the future is how to apply precision farming and to ensure food health and welfare.

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Introduction to One Health concept

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Introduction

One Health is a collaborative, multisectoral, evidence-based, and transdisciplinary approach to acknowledging that human, animal, plant, and the environment are closely interlinked. In the mid-20th century, Carlos Chelista, a visionary response to the United States' concurrent approach to human and animal health and welfare, he suggested the concept of "One Medicine" highlighting the integrated, and interdisciplinary perspectives. During the 21st century, this idea was further developed by encompassing the health of the wider ecosystem, including plants, wild animals, and geographical areas. Later the Mediation Principles of Conservation, published in 2000, advocated for a more integrated sense of interaction between human and animals. A healthy human needs a healthy ecosystem and it includes everything from the commonalities we experience living in one place to our immediate environment, the wider environment, animals living in there, and the world as a whole. The increase in human population coupled with climate change, urbanization, and geographical problems are accelerating damage to biodiversity and ecosystem in general. The rapid climate and environmental change is leading to the emergence and resurgence of infectious and zoonotic diseases of human/animal/plant health significance. Zoonotic diseases are infections that are transmitted between animals and humans and are a major threat to public health globally. The highest zoonotic disease burden, with respect to illness and death, is prevalent in Africa and Asia. The global outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in 2020 sharply highlighted the risks posed by zoonosis and around this time, the term "One Health" was first coined. The One Health approach is increasingly gaining traction as the standard method for multiple interrelated globally zoonotic emerging and re-emerging infectious diseases and zoonotic threats such as SARS, H5N1, H7N9, Ebola, and COVID-19, etc. However, the success of One Health relies on effective international collaboration involving various stakeholders of complex health systems. Recognizing the importance of multi-disciplinary, transnational working, that global organizations, The World Health Organization (WHO), the World Organization for Animal Health (WOAH) formerly OIE, the UN Food and Agriculture Organization (FAO), and the UN Environment Programme (UNEP) have agreed upon to form the High Level Quadrilateral identifying six areas to focus on. These areas include: Laboratory services, Control of zoonotic diseases, Vaccines and medical diagnosis, antimicrobial resistance, Food Safety, and the human health.

requires a holistic and long-term "One Health" approach to achieve the goal of Health and Well-being for All. There are many One Health activities underway in various Ministries of the Government of India and private organizations. Therefore, it creates the need of focus on bridging such activity and to identify opportunities for collaboration and work towards filling any remaining gaps. The Prime Minister's Science, Technology, and Innovation Advisory Council (PMATAC) is the first meeting approved to set up a National One Health Mission with a governmental effort which will serve to coordinate, support, and integrate all the existing One Health activities in the country and fill gaps where it is appropriate. Under this mission, I hope to initiate the disease gap prioritization, mapping of existing surveillance programs, and mapping of existing BSL-1, 2, and 3 level laboratory capabilities, among others.

Way Forward

The human and environmental problems surrounding infectious disease necessitate the collaboration of several institutions experts, including veterinary practitioners, public workers, and ecologists. Promoting a cross-sectoral approach and developing recommendations and policy guidelines for governments, healthcare providers, nongovernmental and international organizations are among the declared objectives of the One Health Quadrangle of India. To enhance monitoring and surveillance, a robust interdisciplinary network of partners is pertinent. Efforts should be directed towards creating awareness about the One Health approach and promote disease amongst doctors, health managers, and communities. Use of advanced technology such as N/A, must be utilized to improve the environment surrounding the prevention, control and treatment of diseases of potential public health significance. It is necessary to create and implement best practices based on the lessons learned from the application of the One Health approach to various disease classes collectively. Promoting the idea of "think global, act local" would be the ideal outcome of a One Health approach.

Revitalizing India's Livestock Heritage: A Comprehensive Approach to Conserving Indigenous Animal Genetic Resources for Vibrant Bharat 2047

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Introduction

India's rich and diverse livestock heritage is a crucial asset, contributing significantly to the nation's agrarian economy, cultural heritage, and food security. Indigenous animal genetic resources (IAGR) in India include a variety of cattle, buffaloes, sheep, goats, poultry, and other livestock species, each uniquely adapted to the diverse agro-climatic conditions of its subcontinent. These breeds have been developed and sustained by farmers over generations, often through traditional knowledge systems, leading to their exceptional resilience to local environmental stresses, diseases, and other challenges.

Significance of Indigenous Genetic Resources

Indigenous breeds such as the Gir, Sahiwal, and Red breed cattle, or the Bhakra, Black Bengal, and Changuang goats, are well-known for their adaptability to local conditions and their ability to thrive on low inputs. These breeds not only provide milk, meat, and draft power but also contribute to the socio-economic fabric of rural India, where livestock rearing is an integral part of the farming system (M, 2019). The genetic diversity contained within these breeds is a critical resource, providing the necessary raw material for developing future generations of livestock that can withstand emerging challenges, such as climate change.

The genetic traits of these indigenous breeds, such as disease resistance, heat tolerance, and the ability to thrive on poor-quality feed, are invaluable. For example, the Bhakra breed of cattle is known for its high resistance to heat stress and drought, making it well-suited to the arid regions of Rajasthan (NABARD, 2020). Similarly, the Changuang goat, native to the Maharashtra region, is known for its resilience to dry conditions and is a vital resource for smallholder farmers (ICAR, 2021).

Challenges Posed by Climate Change

Climate change is a significant threat to the sustainability of these indigenous breeds. Rising temperatures, unpredictable rainfall patterns, and increased frequency of extreme weather events are leading to habitat degradation, altered disease dynamics, and decreased availability of water and fodder. This, in turn, affects the productivity and survival of these breeds (P, L, 2021). For instance,

the shifting resource patterns are impacting the availability of grazing lands, which is critical for the survival of browsing indigenous breeds.

However, climate change translates the challenges of sustaining genetic purity. As environmental conditions change, there is an increasing trend towards crossbreeding with exotic breeds to enhance productivity. However, this often leads to the dilution of indigenous genetic traits, which are crucial for long-term resilience and sustainability. The introduction of high-yielding exotic breeds, while beneficial in the short term, can lead to the loss of unique genetic traits that have been carefully selected over centuries (JICA, 2021).

Role of Veterinary and Allied Sciences

Veterinary and allied sciences are pivotal in addressing the challenges faced by indigenous animal genetic resources. These sciences encompass a broad range of disciplines, including animal breeding, genetics, veterinary medicine, animal nutrition, and conservation biology. The role of veterinary sciences is to ensure the health, productivity, and genetic integrity of indigenous breeds while developing strategies to mitigate the impacts of climate change.

Through the application of modern technologies, such as genetic selection, cryopreservation, and advanced reproductive techniques, veterinary sciences can help preserve the genetic material of endangered breeds and enhance their resilience to environmental stresses. Additionally, veterinary institutions are working to strengthen disease control and livestock management practices, improve disease surveillance, and promote sustainable breeding programs that protect the conservation of indigenous breeds (NBAEC, 2019).

The integration of traditional knowledge with modern scientific approaches is essential for the effective conservation of indigenous breeds. Indigenous communities have a deep understanding of local breeds and their management under varying environmental conditions. By involving these communities in conservation efforts, veterinary sciences can ensure that conservation strategies are culturally appropriate and sustainable (Sax et al., 2011).

Yousuf Hossain Bhui 2041

The conservation of indigenous animal genetic resources is not merely an ecological or economic imperative; it is also aligned with India's vision for a self-reliant and progressive nation by 2047 (Bhaskar Bhui). An India approach is necessary for indigenous breeds. The focus on sustainable agriculture and livestock rearing, which includes the conservation of indigenous genetic resources, will be critical for achieving food security, rural development, and environmental sustainability.

Veterinary and allied sciences will play a crucial role in realizing this vision by ensuring that indigenous breeds are not only preserved but also utilized in a way that contributes to the overall development of the country. This includes improving the productivity of these breeds through

scientific interventions, promoting their products in the market, and integrating them into the broader framework of sustainable agriculture and food systems.

Forest Breeds

India's forest sector is one of the largest in the world, contributing significantly to the agricultural economy and local livelihoods. Indigenous forest genetic resources (IFGR) form the backbone of this sector, offering unique advantages due to their adaptation to local environments. However, despite their importance, the future success of indigenous breeds in India is concerning due to several challenges that threaten their survival and productivity.

Diversity and Distribution of Indigenous Breeds

India is home to a rich array of indigenous forest breeds. According to the National Bureau of Animal Genetic Resources (NBAGR), the country has 977 registered indigenous breeds, including 38 cattle breeds, 17 buffalo breeds, 34 goat breeds, and 44 sheep breeds, among others (NBAGR, 2021). These breeds are spread across various agro-climatic zones, from the cold deserts of Ladakh to the tropical regions of Kerala, each adapted to its specific environment.

For example, the Nagpur breed of cattle, native to India's Madhya Pradesh, is renowned for its resistance to heat and diseases, making it an ideal breed for the hot and humid conditions of the region. Similarly, the Malnad Ghatka cattle, found in the Western Ghats, are small, hardy, and well-suited to the hilly terrain and hilly regions (KAR, 2022).

Threats to Population and Genetic Diversity

Despite their existence, the population of many indigenous breeds is declining. According to the 20th Livestock Census (2019), the population of indigenous cattle has decreased by 6% from 2012 to 2019, while the population of crossbred cattle has increased by 20% during the same period (Government of India, 2020). This decline is attributed to several factors:

- 1. Crossbreeding and Hybridization:** The increasing demand for higher milk yield and meat production has led to widespread crossbreeding of indigenous breeds with exotic breeds like Friesian and Jersey. While this practice improves short-term productivity, it often leads to the dilution of indigenous genetic traits, such as disease resistance and heat tolerance (FAO, 2020).
- 2. Neglect and Lack of Economic Incentives:** Indigenous breeds are often regarded as less valuable than crossbreeds due to perceived lower productivity. Farmers are not incentivized to maintain pure indigenous breeds as market prices for their products are often lower. This economic disincentive further accelerates the decline in their population (Rao, 2021).
- 3. Habitat Loss and Environmental Degradation:** Rapid urbanization, industrialization, and deforestation are leading to the loss of natural habitats. In many indigenous breeds, grazing lands

are declining, and water resources are becoming scarce, making it difficult for farmers to sustain their incomes. The growing lands in Rajasthan, known for the Thar Desert cattle, are being increasingly converted into agricultural land, putting pressure on the local breed (NMAIR, 2021).

Impact of Climate Change

Climate change is exacerbating the challenges faced by indigenous breeds. Rising temperatures, changes in precipitation patterns, and increased frequency of extreme weather events are directly impacting the health, productivity, and reproductive efficiency of livestock. Indigenous breeds, which are often more resilient to these changes, are still facing difficulties. The shifting climate is altering the availability of fodder and water, increasing the prevalence of diseases, and disrupting breeding cycles (IPCC, 2021).

For example, in the Rajasthan region, changing weather patterns are affecting the availability of traditional fodder sources for breeds like the Chauthalgar goat, known for producing the famous Bikaneri wool. Similarly, in the arid regions of Gujarat, the Kankrej cattle are facing challenges due to prolonged drought and increased heat stress (NAB, 2022).

Conservation Efforts and Challenges

Recognizing the importance of indigenous breeds, various conservation efforts have been initiated at both the governmental and community levels. The National Livestock Mission, launched by the Government of India, aims to conserve and develop indigenous livestock breeds through selective breeding, establishment of Livestock Genetic Conservation Centers, and the creation of National Livestock Genetic Conservation Centers (Ministry of Agriculture, 2018).

However, these efforts face significant challenges:

- Limited Resources and Infrastructure:** Conservation programs often suffer from a lack of adequate resources, infrastructure, and technical expertise. This limits their reach and effectiveness, particularly in remote and underserved regions where many indigenous breeds are found (ICAR, 2022).
- Low Awareness and Engagement:** There is a general lack of awareness among farmers about the importance of conserving indigenous breeds. Additionally, community engagement in conservation programs is often limited, reducing the impact of these initiatives (NAB, 2023).
- Insufficient Research and Data:** There is a need for more research on the genetic characteristics, adaptive traits, and economic potential of indigenous breeds. Understanding exactly why indigenous breeds are either resilient or vulnerable, making it difficult to design effective conservation strategies (NMAIR, 2021).

Case Studies of Indigenous Breeds

Raising Cattle: This breed, native to the Gujarat region, is famous for its drought resistance and ability to thrive in hot and arid environments. However, the breed is under threat due to habitat loss and overgrazing. Conservation efforts include artificial breeding programs and establishing Raising Cattle farms (U.S.A.R. 2022).

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Industry Takeaway

Recognizing the critical importance of indigenous natural genetic resources (NGR) to India's agricultural and ecological sustainability, a range of initiatives have been implemented by the government, research institutions, and non-governmental organizations (NGOs) at national and provincial levels. These initiatives aim to conserve the productivity of indigenous breeds, preserve their genetic diversity, and ensure their sustainable utilization in the face of climate change and other challenges.

Current research limitations

3. Maximizing Capital Windows

The Fisheries Global Mission, launched in 2014 by the Government of India under its Prime Minister's 15-point agenda, focuses on the Sustainable Development Goals (SDGs), a flagship initiative aimed at the country's growth and development of sustainable living trends. The mission focuses on

- **Establishment of Goat Units:** These are extra breeding centers dedicated to the conservation of indigenous breeds. The Goat Units serve as hubs for breeding activities, including artificial insemination with semen from elite bucks, and are equipped with modern infrastructure for housing, feeding, and healthcare of cattle (Ministry of Agriculture, 2019).
- **National Kattabone Breeding Centers:** These centers are being established to take the lead in the production of high-quality breeding bulls and to serve as repositories of indigenous germplasm. The centers also aim to enhance research and training in the field of indigenous cattle breeding (NAAR, 2018).
- **Field Performance Monitoring:** Under this initiative, the performance of indigenous breeds is monitored in their native herds to identify the potential and develop breed-specific strategies for improvement. This data helps in the selection of bulls for artificial insemination and other breeding programs (ICAR, 2020).

2 - Ballistol Liniments, Mixture

The National Livestock Initiative (NLI), launched in 2014, aims at sustainable development of the livestock sector, with a special focus on the conservation of indigenous breeds. The initiative's key components include:

- **Breed Improvement:** NLI supports selective breeding and genetic improvement programs to improve the productivity of indigenous breeds. This includes the provision of technical and technical support to farmers for the adoption of improved breeding practices (Ministry of Agriculture, 2019).
- **Livestock Insurance:** To protect the livelihoods of farmers who rear indigenous breeds, NLI provides livestock insurance schemes that cover the loss of animals due to natural calamities, diseases, or accidents. This initiative helps in mitigating the risks associated with livestock farming. (FAO, 2021).
- **Support for Rural Backyard Poultry Development:** NLI promotes the conservation and propagation of indigenous poultry breeds through backyard poultry farming, which is an important source of income and nutrition for rural households. Indigenous breeds like Aseel and Kalkaji are promoted under this initiative (NLI, 2020).

7. **Indigenous Knowledge Value Project (IKVP)**

Under the National Knowledge Value Project, national state government have initiated breed specific projects aimed at the conservation and development of indigenous livestock breeds. These projects focus on:

- **Conservation of Breed Specific Traits:** IKVP funded projects emphasize the conservation of unique traits of indigenous breeds, such as disease resistance, heat tolerance, and adaptation to local environmental conditions. These projects involve field visits, on-farm and on-station (official) conservation strategies (NLI, 2020).
- **Promotion of Indigenous Breeds in Value Chains:** Government are promoting IKVP funds to promote products derived from indigenous breeds, such as AI milk from indigenous cows, in local markets. This creates economic incentives for farmers to rear indigenous breeds (NLI, 2021).

Research and Development Initiative

1. National Centre of Animal Genetic Resources (NAGR)

The NAGR, under the Indian Council of Agricultural Research (ICAR), plays a pivotal role in the documentation, characterization, and conservation of indigenous animal genetic resources. Key activities by NAGR include:

- **Breed Registration:** NAGR has developed a systematic process for the registration of indigenous breeds, ensuring their recognition and protection under national and international laws.

In 2022, ICRAR has explored 107 indigenous breeds, with ongoing efforts to document and register more breeds (ICRAR, 2022).

- **Genomic Research:** ICRAR is involved in genomic research to understand the genetic makeup of indigenous breeds and identify markers associated with important traits like disease resistance and climate resilience. This research is crucial for developing breeding strategies that enhance the productivity and sustainability of these breeds (ICRAR, 2023).

- **Cryopreservation of Germplasm:** ICRAR has established a National Gene Bank, which conserves the genetic material (semen, embryos, DNA) of indigenous breeds through cryopreservation. This germplasm can be used for future breeding programs and to restore breeds in case of a population decline (ICRAR, 2019).

2. Collaborative Research Projects

Several collaborative research projects have been initiated between Indian research institutions and international organizations to promote the conservation and sustainable use of indigenous breeds. Examples include:

- **India-FAO Partnership:** The Food and Agriculture Organization (FAO) of the United Nations, in collaboration with ICAR, has launched projects focusing on the impact of climate change on livestock and strategies for the conservation of indigenous breeds. These projects involve field studies, capacity building, and the development of climate-resilient livestock management practices (FAO, 2020).

- **India-Japan Collaboration in Biotechnology:** A partnership between India and Japan has focused on the genetic improvement of indigenous cattle breeds through advanced biotechnological methods, including embryo transfer technology and somatic cell breeding (ICAR, 2021).

Community-Based and NGO Initiatives

3. Fairs, Shows and Breed Conservation Fairs

Several events in India organize Fairs, Shows, Cattle Fairs, and Breed Conservation Fairs, where indigenous breeds are showcased, and their importance is highlighted to farmers. These events serve as platforms for:

- **Knowledge Exchange:** Farmers, breeders, and experts come together to exchange knowledge on best practices in breeding, feeding, and management of indigenous breeds. These fairs also facilitate the sale and exchange of high-quality breeding stock (ICAR, 2023).

- **Preservation of Indigenous Breeds:** Fairs and shows help in raising awareness about the value of indigenous breeds and encourage farmers to rear them. Awards and incentives are often given to

Indians also maintain pure indigenous breeds, further sustaining conservation efforts (Khan, 2022).

4. NGO-Led Conservation Program

Several NGOs in India are actively involved in the conservation of indigenous breeds. For example:

- **SEVA (Sustainable Environment and Ecological Development Society):** SEVA has been working in Tamil Nadu and Kerala to conserve the Vechur cow, one of the smallest cattle breeds in the world. Through community-based breeding programs, SEVA has helped revive the population of this endangered breed (SEVA, 2023).
- **DAF Development Research Foundation:** DAF has been involved in the conservation of several indigenous cattle and goat breeds across India. Their programs focus on genetic conservation, breed improvement, and creating market linkages for products derived from indigenous breeds (DAF, 2023).

Strategies for Improvement

The conservation and sustainable utilization of indigenous animal genetic resources (AGR) in India requires a multi-faceted approach that addresses the various challenges facing these breeds. Strategies for improvement should focus on enhancing the genetic potential of indigenous breeds, improving their economic viability, and ensuring their adaptability to changing environmental conditions. The following strategies are proposed to achieve these objectives:

4.1 Genetic Improvement and Selective Breeding

a. Establishing Regional Breeding Programs

Regional breeding programs tailored to specific agro-climatic zones are essential for the genetic improvement of indigenous breeds. These programs should focus on:

- **Active Conservation and Selective Breeding:** Conservation of breeds in their natural habitats, combined with selective breeding, can enhance desirable traits such as disease resistance, heat tolerance, and productivity. For example, the Mahal Gaddi cattle in the Western Ghats have been selectively bred to improve milk yield while retaining their resilience to local environmental conditions (Vaid, 2022).
- **Community-Based Breeding Programs:** Engaging local communities in breeding programs ensures that breeding objectives align with the needs and preferences of farmers. Community-based breeding programs have been successful in maintaining genetic diversity while improving productivity. The success of such programs is evident in Ladakh with the Changthang goat, known for its resilience to harsh winters and potential (Vaid, 2023).

b. Use of Modern Biotechnological Tools

Modern biotechnological tools can play a significant role in the genetic improvement of indigenous breeds. Strategies include:

- **Artificial Insemination (AI) and Embryo Transfer (ET):** AI and ET can be used to disseminate the genetic material of superior sires across large populations, accelerating genetic improvement. These technologies have been successfully used in breeds like the Gir cattle to enhance milk production without compromising their adaptability (NBAAR, 2021).
- **Genomic Selection:** Genomic selection involves the use of DNA markers to predict the breeding value of animals. This method paves the way for more accurate selection of breeding stock, leading to faster genetic gains. Genomic selection is particularly useful for traits that are difficult to measure, such as disease resistance and feed efficiency (ICAR, 2022).

2. Conservation of Genetic Diversity

Maintaining genetic diversity within indigenous breeds is crucial for their long-term survival and adaptability. Strategies to conserve genetic diversity include:

- **Cryopreservation of Germplasm:** The establishment of gene banks for the cryopreservation of semen, embryos, and DNA from indigenous breeds ensures that genetic material is preserved for future use. The National Bureau of Animal Genetic Resources (NBAGR) has already established a National Goat Bank, which plays a critical role in conserving the genetic diversity of indigenous breeds (NBAAR, 2019).
- **Incentivizing the Conservation of Farm Breeds:** Providing financial incentives to farmers who maintain and breed rare indigenous animals can help conserve genetic diversity. These incentives could be in the form of direct payments, subsidies for feed and veterinary care, or premium prices for products derived from rare breeds (BAP, 2021).

3. Enhancing Economic Viability

3.1 Developing Value Chains for Indigenous Breed Products

Creating value chains for products derived from indigenous breeds can enhance their economic viability and encourage their conservation. Strategies include:

- **Promotion of A2 Milk and Organic Products:** Indigenous cattle breeds like Gir and Sahiwal produce A2 milk, which is considered to be healthier than A1 milk produced by many exotic breeds. By promoting A2 milk and other organic products derived from indigenous breeds, farmers can command premium prices, making the rearing of these breeds more economically viable (FAR, 2023).
- **Geographical Indication (GI) Tags:** Obtaining GI tags for products from specific indigenous breeds can help in branding and marketing these products. For example, the Dhani Badkhi from

Onkara, known for its high-quality yield, has revolutionized the market value of Kenyan milk-producing products (Ministry of Agriculture, 2023).

6. Value Addition and Processing

Value addition and processing of products derived from indigenous breeds can significantly enhance their market value. Strategies include:

- **Setting Up Local Processing Units:** Establishing small processing units for milk, meat, and wool from indigenous breeds can reduce post-harvest losses and add value to raw products. For instance, setting up wool processing units for Shagbush goats in Laikipia can boost the local economy by producing high-quality Pashmina shawls (FAO, 2023).
- **Branding and Certification:** Developing certification schemes that guarantee the authenticity and quality of products from indigenous breeds can help in building consumer trust and demand. Certification like organic or free-range can be used to market products from indigenous poultry breeds like Karikehi, which is known for its black meat (ICAR, 2023).

7. Adaptation to Climate Change

a. Climate-Resilient Breeding Programs

Developing climate-resilient breeding programs is essential for ensuring the sustainability of indigenous breeds in the face of climate change. Strategies include:

- **Incorporating Climate Resilience into Breeding Objectives:** Breeding programs should prioritize traits that enhance resilience to climate change, such as heat tolerance, water use efficiency, and resistance to emerging diseases. The Fleischschaff cattle, for instance, are being bred for their ability to thrive in arid and semi-arid conditions of Ethiopia while maintaining productivity (ICAR, 2022).
- **Utilization of Indigenous Knowledge:** Indigenous knowledge systems that have traditionally supported the adaptation of livestock to local environments should be integrated into modern breeding programs. This includes the use of traditional feeding practices, pasture management, and ethnoveterinary medicine (Rao, 2022).

b. Sustainable Livestock Management Practices

Adopting sustainable livestock management practices can help mitigate the impact of climate change on indigenous breeds. Strategies include:

- **Rotational Grazing and Pasture Management:** Implementing rotational grazing systems can prevent overgrazing and maintain the health of pastures, ensuring a consistent supply of fodder for indigenous breeds. This practice is particularly important in drought-prone areas like Gujarat, where the Kankrej cattle are raised (Bhal, 2023).

- **Water Conservation and Efficient Use:** Developing water conservation practices, such as rainwater harvesting and the use of more efficient irrigation systems for food crops, can help ensure the availability of water for livestock during dry seasons. These practices are vital to sustainable agriculture, where water scarcity is a major challenge (FAO/ILRI, 2023).

4. Research, Education, and Extension

a. Strengthening Research on Indigenous Breeds

Increased investment in research on indigenous breeds is essential for their conservation and improvement. Strategies include:

- **Collaborative Research Initiatives:** Encouraging collaboration between Indian research institutions, international organizations, and private sector companies can lead to innovative solutions for the conservation and improvement of indigenous breeds. Projects like the India-UK collaborative in biotechnology demonstrate the potential of such partnerships (Rao, 2022).
- **Focus on Understudied Breeds:** Research should focus on understudied and lesser-known indigenous breeds to fully understand their genetic potential and adaptive traits. This will enable the development of targeted breeding and conservation strategies (FAO/ILRI, 2021).

b. Extending Education and Capacity Building

Extending farmers, extension workers, and researchers on the importance of indigenous breeds and their potential for their management is crucial. Strategies include:

- **Training Programs and Workshops:** Equipping training programs and workshops for farmers on topics such as good stock breeding, disease management, and sustainable livestock practices can enhance their capacity to rear indigenous breeds effectively (ICAR, 2021).
- **Inclusion in Veterinary and Agricultural Curricula:** Incorporating modules on indigenous breeds, their conservation, and sustainable management into veterinary and agricultural education curricula will help build a knowledgeable workforce capable of supporting these initiatives (Ministry of Agriculture, 2020).

c. Strengthening Extension Services

Effective extension services are vital for the dissemination of knowledge and technologies related to the conservation and improvement of indigenous breeds. Strategies include:

- **Use of Information and Communication Technology (ICT):** Leveraging ICT tools, such as mobile apps and online platforms, can facilitate the dissemination of information on breeding programs, disease management, and disease management to farmers in remote areas (ICAR, 2023).
- **Farmer Field Schools:** Establishing farmer field schools focused on indigenous livestock management can create peer-learning environments where farmers share experiences and learn from each other under the guidance of extension workers (Rao, 2022).

Recommendations

To effectively conserve and utilize indigenous forest genetic resources (IGFR) in India, a comprehensive strategy is essential which should address the challenges of genetic erosion, climate change, economic viability, and the need for sustainable development. The following recommendations are proposed to guide policymakers, researchers, and farmers in the conservation and improvement of indigenous breeds.

1. Strengthening Policy Frameworks and Government Support

a. Formulation of a National Indigenous Breed Conservation Policy

India needs a dedicated policy framework for the conservation and sustainable utilization of indigenous breeds. This policy should:

- **Establish Legal Protection for Indigenous Breeds:** Legal measures should be taken to protect indigenous breeds from genetic erosion and exploitation by commercial entities. This includes the regulation of crossbreeding practices that may dilute the genetic purity of indigenous breeds (Ministry of Agriculture, 2023).
- **Integration of Conservation Goals into National Livestock Development Plans:** Conservation of indigenous breeds should be integrated into broader national livestock development plans. This integration would ensure that conservation efforts receive the necessary funding and institutional support (ICAR, 2022).

b. Incentivizing Farmers for Conservation Efforts

To encourage the conservation of indigenous breeds, financial incentives should be provided to farmers who rear and maintain these breeds. Recommendations include:

- **Subsidies and Grants:** Government subsidies and grants should be provided for the maintenance, breeding, and health care of indigenous breeds. These incentives could be linked to specific conservation activities, such as maintaining herd size or preserving genetic diversity (FAO, 2020).
- **Premium Pricing for Indigenous Breed Products:** The establishment of premium pricing for products derived from indigenous breeds, such as A2 milk or organic meat, can provide economic incentives for farmers. This can be achieved through market interventions, certifications, and branding initiatives (ICAR, 2021).

2. Enhancing Research and Development (R&D) Efforts

a. Expanding Genetic Research and Biotechnological Applications

To harness the full potential of indigenous breeds, further research is needed in the areas of genomics and biotechnology. Recommendations include:

- **Increased Investment in Genetic Research:** Expanding genetic research on indigenous breeds can facilitate the identification of valuable genetic traits, such as disease resistance and climate tolerance. This research should be supported by both public and private sectors (FAO, 2022).
- **Development of Genetic Selection Tools:** Tools for genetic selection should be developed and made available to farmers and breeders. These tools can accelerate genetic improvement by enabling more precise selection of breeding stock (VAMG, 2021).

6. Promoting Interdisciplinary Research

The conservation and improvement of indigenous breeds requires interdisciplinary research that combines the expertise of various genetic, veterinary, ecological, and socioeconomic. Recommendations include:

- **Collaboration between Research Institutions and NGOs:** Research institutions should collaborate with NGOs that work closely with farming communities. This collaboration can ensure that research outcomes are relevant and applicable to the needs of farmers (Rao, 2021).
- **Incorporating Indigenous Knowledge into Scientific Research:** Indigenous knowledge systems should be integrated into scientific research. This can provide valuable insights on traditional breeding practices, disease management, and adaptation to local environmental conditions (FAO, 2020).

7. Improving Extension Services and Farmer Education

a. Strengthening Extension Networks

Effective extension services are critical for disseminating knowledge and technologies related to the conservative management of indigenous breeds. Recommendations include:

- **Capacity Building for Extension Workers:** Extension workers should be trained in the specific needs and management practices of indigenous breeds. This training should cover topics such as selective breeding, disease control, and sustained financial management (ICMR, 2021).
- **Use of ICT for Knowledge Dissemination:** Information and Communication Technology (ICT) tools should be leveraged to reach a wider audience of farmers. Mobile apps, online platforms, and social media can be used to share best practices, market information, and updates on breeding programs (FAO, 2020).

b. Promoting Farmer Field Schools and Peer Learning

Farmer field schools and peer learning activities can play a significant role in enhancing the knowledge and skills of farmers. Recommendations include:

- **Establishment of Farmer Field Schools for Indigenous Livestock Management:** Farmer field schools should be established in regions where indigenous breeds are prevalent. These schools can provide hands-on training in breeding, feeding, and health care practices (FAO, 2011).
- **Encouraging Peer Learning and Knowledge Exchange:** Events should be encouraged to share best practices and knowledge through peer learning workshops. This can help in spreading innovative practices and solutions that have been successful in specific contexts (ILRI, 2016).

4. Promoting Sustainable Livestock Management Practices

4.1 Adoption of Climate-Smart Livestock Practices

To ensure the sustainability of indigenous breeds in the face of climate change, climate-smart livestock practices should be promoted. Recommendations include:

- **Implementation of Rotational Grazing Systems:** Rotational grazing systems should be promoted to prevent overgrazing and maintain pasture health. This practice is particularly important in drought-prone regions where indigenous breeds are raised (ICRAF, 2009).
- **Water Conservation Techniques for Livestock:** Water conservation techniques, such as covered watering and efficient irrigation systems for fodder crops, should be adopted to ensure water availability for livestock during dry seasons (ICRAF, 2021).

4.2 Integrating Livestock with Agroecological Practices

Integrating livestock management with agroecological practices can enhance the sustainability of farming systems. Recommendations include:

- **Promotion of Integrated Crop-Livestock Systems:** Integrated crop-livestock systems, where livestock and crops are managed together, can improve soil fertility, reduce the need for chemical inputs, and enhance overall farm productivity. Indigenous breeds, which are well-adapted to local conditions, are particularly suited for such systems (ILRI, 2006).
- **Agroforestry with Livestock Integration:** Agroforestry practices, where trees and shrubs are integrated with livestock farming, can provide multiple benefits, including fodder shade and carbon sequestration. Indigenous forest breeds, which are often well-suited to grazing under trees, can be an integral part of these systems (Vlek, 2012).

5. Enhancing Market Access and Value Addition

5.1 Developing Market Infrastructure for Indigenous Breed Products

Improving market infrastructure can help farmers gain better access to markets and realize higher prices for products derived from indigenous breeds. Recommendations include:

- **Establishment of Local and Regional Markets:** Local and regional markets specifically for indigenous breed products should be established. These markets can cater to niche consumer

ensuring that value the unique qualities of products from indigenous breeds (Ministry of Agriculture, 2021).

- **Improving Supply Chains and Logistics:** Investment in supply chain and logistics infrastructure, such as cold storage and transportation, are necessary to reduce post-harvest losses and ensure that products reach markets in good condition (Rao, 2021).

6. Promoting Value Addition and Branding

Value addition and branding can significantly enhance the marketability of products from indigenous breeds. Recommendations include:

- **Development of Branded Products:** Branded products, such as A2 milk, yogurt, meat, and stuffed bread, can command premium prices in the market. Branding initiatives should highlight the unique qualities and traditional heritage of indigenous breeds (ICAR, 2021).
- **Certification and Quality Assurance:** Certification schemes, such as organic, fair trade, or fair milk, can help build consumer trust and demand for indigenous breed products. Quality assurance mechanisms should be in place to ensure that these certifications are credible and meet consumer expectations (FAO, 2020).

7. Encouraging Community Participation and Empowerment

a. Engaging Local Communities in Conservation Efforts

The active participation of local communities is crucial for the success of conservation efforts. Recommendations include:

- **Community-Based Breeding Programs:** Community-based breeding programs should be supported and expanded. These programs empower local communities to take ownership of conservation efforts and ensure that breeding strategies are aligned with local needs and preferences (Rao, 2021).
- **Participatory Planning and Decision Making:** Conservation and development programs should involve local communities in planning and decision-making processes. This ensures that the programs are culturally appropriate and have local buy-in (ICAR, 2022).

b. Empowering Women and Marginalized Groups

Women and marginalized groups often play a central role in livestock management but are frequently excluded from formal decision-making processes. Recommendations include:

- **Targeted Support for Women Livestock Keepers:** Programs that provide targeted support for women livestock keepers, such as training, access to credit, and inclusion in breeding programs, can enhance their role in conservation and improvement efforts (FAO, 2020).
- **Inclusive Approaches to Livestock Development:** Livestock development programs should adopt inclusive approaches that ensure the participation of marginalized groups, including

smallholder farmers and pastoralists. These groups often possess valuable traditional knowledge and practices that are essential for the conservation of indigenous breeds (Rao, 2022).

Conclusions

The loss of indigenous Aurochs would not only result in the erosion of genetic diversity but also weaken India's resilience to climate change and other emerging challenges. Therefore, conservation efforts must be viewed not just as means to preserve heritage, but as a strategic necessity for ensuring long-term agricultural sustainability and food security (Kaur, 2022).

However, strong policy support is crucial for creating an enabling environment for the conservation and sustainable use of indigenous breeds. This includes the formulation of a national conservation policy, the provision of subsidies and grants, and the establishment of legal frameworks to protect indigenous breeds from genetic erosion and commercial exploitation (Singhania, 2021).

Looking ahead to Vision Bharat 2047, the conservation and sustainable utilization of indigenous Aurochs must be central to India's agricultural and environmental strategies. By leveraging the unique strengths of its indigenous breeds, India can build a resilient and sustainable agricultural sector that not only meets the food and nutritional needs of its growing population but also contributes to global efforts to mitigate climate change.

Advancing this vision will require a concerted effort from all stakeholders, including government agencies, research institutions, NGOs, and farming communities. Collaboration, innovation, and a deep respect for the wisdom embodied in traditional knowledge systems will be key to ensuring that India's indigenous animal genetic resources continue to thrive and contribute to the nation's progress.

In conclusion, the role of regulatory and ethical research in conserving indigenous animal genetic resources under the climate change context cannot be overstated. These efforts will not only preserve biodiversity but also pave the way for a more sustainable and prosperous future, contributing significantly to the realization of Vision Bharat 2047.

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Diversification in Livestock and Poultry Farming

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1. Introduction

The Sustainable Development Goals (SDG) have made significant contribution to improving the state of nations worldwide, as noted by Teyl et al. (2019). However, conflict, the severe Livestock production, and climate change all contribute to the developing world's sharp reduction in food consumption and nutrition quality. Particularly impacted by these issues are nations with low levels of resilience (Babal et al., 2019). Diversification in agriculture is a key driver of economic expansion. However, it depends on the availability of diversification options and the farmer's willingness to utilize them. Technological advancement, innovation in resource performance, innovation in risk assessment or government policies, and the construction of trade integration systems, and other infrastructure can all contribute to agricultural diversification. On the other hand, it may be hampered by natural hazards, financing issues, poor crop management techniques, the deterioration of natural resources, and competing socioeconomic demands, such as the need for more jobs, economic self-sufficiency, or produce through agricultural, livestock, fishery, or forest products to earn foreign exchange. The transition from the regional production of a single crop to the regional production of several crops is known as agricultural diversification. This is done in order to meet the growing need for food, vegetables, fruits, grains, pulses, oilseeds, fibres, fodder and grasses, and other products. It seeks to enhance the agro-ecosystem's dynamic equilibrium and soil health. Farmers are encouraged to add or replace existing crops in the cropping system due to factors such as the growing urbanization, changes in consumer food preferences, and the exponential growth rate of the population.

There are roughly one billion people living in India. In India, almost 50% of people work in rural areas where agriculture is the primary industry. Indian agriculture is typified by modest agricultural units. A farm mostly has an average size of 1.17 hectares. Nearly 50% of the arable area is under cultivation, while 40% of farmers have landholdings smaller than 1 hectare. However, just 1% of the farmers own more than 10 hectares of land for farming, accounting for 17.4% of all cultivated area. A wide range of agricultural products are produced in the nation because of its varied agroclimatic circumstances. These can be broadly divided into two categories: commercial crops and crops for food grains.

Self-reliance in foodgrains has been the cornerstone of our policy in the previous 35 years due to the difficulty of finding our large people and the rejection of food strategies in the free international rice, wheat and pulses, as foodgrains, make up around 60% of the consumption diet. Simultaneously, commercial agriculture that had grown prior to independence continued to prosper by various means during the post-independence era. In addition to serving the home market, commercial agriculture has kept a significant surplus of foreign exchange earnings for the nation.

2. Livestock Industry

The livestock industry is a significant part of Indian agriculture and the country's economy. At 1995-2005 prices, the gross domestic product's contribution from livestock was 6.7% percent in 1994-95. This is the industry in which the underserved, underclass contributes to growth rather than reaping the benefits of prosperity elsewhere. The cattle industry has maintained a consistent growth rate of approximately 4.7% annual, albeit with relatively low investment in the field. The ownership of livestock is more evenly divided, with the majority of livestock owned by marginal farmers and landless laborers. As a result of the sector's advancement, the rural economy develops in a balanced manner, with the weaker segments experiencing less poverty. The majority of the activities pertaining to the management, feeding, breeding, and health care of the animals are carried out directly by the rural women, who play a vital role in animal husbandry. Estimates from the CII place the livestock sector's gross domestic product at 1995-1998 prices at roughly Rs. 642 billion in 1999-2000, or 24% of the GDP of agriculture and related activities. In 2001-04, the turnover was Rs. 772 billion, of which 27% came from the agricultural and related industries. Family income is enriched by livestock, particularly in the country's and semi-arid agricultural regions of goat and milk is expected to rise from 229 to 441 million tons and 119 to 1941 million tons, respectively, between 2000 and 2050 (DAV, 2000; Bhatnagar *et al.*, 2006). Globally, more than 60 billion head animals are raised for meat, eggs, and dairy products. By 2050, when global meat output is expected to reach 1500 (DAV, 2010), there may be more than 100 billion livestock globally (Yadav, 2010).

Especially in the country's arid and semi-arid regions, livestock contributes heavily to income. The livestock sector is exposed to natural risks, including disease, drought, and other natural disasters. A livestock is a significant portion of the rural population's concentration in small and marginal properties. Livestock is both rural and urban citizens' dietary staples as livestock is provided from self-sufficiency and food for the foreseeable future. Indian power will probably continue to be the primary source of draught power for agricultural operations and the transportation of agricultural products to neighboring markets. Additionally, livestock continues essential support services to agricultural

production, livestock, poultry, and fish) are the subsectors that have grown the quickest in every sector, according to National Accounts Statistics (Union) Statistical Organization, 2019). The rise of these subsectors has contributed significantly to the expansion of the agricultural sector.

The rising practice of livestock are blamed for their negative environmental effect, however their production are profitable (Bhalal, 1993). Human has been using many animal species from the beginning of civilization for a number of reasons, including the production of milk, meat, wool, eggs, and further thought power, companionship, amusement, sports, research and security. Though from livestock is said to be the source of wealth for humans and was internally used as a proxy of social standing. The livestock industry is essential to the rural economy and way of life. In the pastoral sector, the unsupervised activity contributes to growth rather than causing the benefits of growth that occurs elsewhere.

1. Diversification

1.1. Goats development

Despite the fact that about 45% of goats are killed early on, the number of goats in India has grown at the quickest rate in the previous 40 years compared to other livestock species. According to the Livestock Census of 2003, there are approximately 129.4 million goats in the world now. The goat population has grown from 47.2 million in 1951-1952 to 129.4 million at present, demonstrating an significant potential for population development and its status as the most important animal species for meat production. Almost no significant development initiatives have been launched in the sector in line with the goal of harnessing goat rearing. Negative results were obtained from experiments involving the crossbreeding of Indian goats with exotic breeds such as Angora, Nigerian and Alpine.

However, there is a great need of an improvement in breeding, % body weight, or the effectiveness of feed conversion, for meat. Some superior goat varieties discovered abroad are largely being bred, there is no credit programme available to increase the output of meat. As a result, the strategy for increasing goat meat production should focus on selected breeding in addition to good management, fattening, culling, and improved health coverage.

1.2. Poultry development

The limited backyard farming of the Indian poultry business has given way to a well organized, scientific, technologically driven commercial industry. About 75% of the poultry industry's overall output comes from the organized sector, which makes up the majority of the industry. The remaining 25% comes from the unorganized sector. During the 11th Plan, the poultry industry had a remarkable success, ranking fourth in the world for egg production and 19th for broiler production, and contributed

over 11,000 tonnes in the national EBLA. About 1.5 million tons of chicken meat and 11.2 billion eggs were produced. Large amounts of poultry industrial and agricultural waste are used to produce high-quality, highly nutritious, protein-rich poultry feed.

It seems to fill the gap between the national human population's need and supply of high-quality protein. Poultry meat and eggs are the least expensive sources of animal protein. Moreover, one of the greatest advantages for chemical industries is poultry manure. An amount 40 kg of nitrogen, 20 kg of phosphorus, and 20 kg of potassium can be obtained from 1 ton of poultry manure. Poultry dung provides an equivalent amount of nitrogen equal to about 1 lakh tons of urea. There are many of around 100 opportunities in this industry. Over 2 million people are thought to be employed in the industry, either directly or indirectly. Additionally, an increase in per capita consumption of one egg and 100 grams of meat is predicted to provide jobs for roughly 27,000 and 30,000 people, respectively. It is noteworthy that this industry employs a massive and unskilled labour force, which helps the under-population to generating cash. The breeding industry is the other essential farming activity. In the nation, there are between 70 and 80 lakh farms in operation. The bulk of the nation's indigenous breeds of broiler and layer are supplied by many of them, which support both pure-bred and crossbred farms. The adoption of optimal nutrition, scientific breeding, and waste-management practices has resulted in a significant increase in the production of both layers and broilers. With a Feed Conversion Ratio (FCR) of 1.8 to 1.5, a broiler can now gain 2 kg or more of body weight in 42 days, and a layer can produce 115-120 eggs over a range of 52 weeks of production.

XX. Piggy Development

The primary industry in the northeast, particularly in the tribal communities, is the husbandry of pigs. The most common business initiative for women, both rural and urban, is pig breeding (Bhalla et al., 2019). With rare exceptions in the state of Assam, pork plays a significant role in these people's everyday diets. There have been reports of unusually high pork eating rates in the area. Additionally, a sizable portion of the nation—roughly 15% of all pigs—is in the region. However, the majority of people eat of the indigenous kind, whose productivity and growth are quite poor. On the other hand, the area is known for pig income as "Wings King," whose meat is highly priced.

The pig is ground because it weighs just about 25 kg when it starts fattening and gives birth as far this time at the age of nine months. The cost of the Northeast pig is not met by the native pig, despite their considerably smaller size. As a result, the area imports a sizable amount of pigs from neighbouring areas, including at West Bengal, Andhra Pradesh, Uttar Pradesh, and Bihar. In the

product, but, on part of the executive administration that is managed by the Department of Animal Husbandry and Dairy, a large number of interventions are postponed and have not evolved along with science and technology. It is important that the current administrative reorganization project be given top priority. A company like Delta Milk Scheme, which is losing a lot of money, ought to be shut down and sold off because it is no longer relevant. It is necessary to establish an authority to exercise quality control for the production and marketing of breeding stock, vaccines, and other biological products. It is advised that a National Institute for Livestock Information and Livestock Studies be established in order to provide policy advice to the Department of Animal Husbandry and Dairy. Likewise, the manufacturing of vaccines and other biological materials should be privatised, and the numerous livestock markets under state government management should be privatised.

6. Livestock and Rural Employment

Twenty percent of rural families in India own animals. In rural India, there are a significant number of work, particularly for women. Even if the average household holding is 1000, the livestock industry has an opportunity to provide additional employment through the production of eggs, meat, milk, and wool. More than 13 million small farmers are involved in livestock producing industry alone. In the cattle industry, where women make up 75% of the labour force, gender parity is more evident than in crop farming, where it is only 10%. Compared to 11 million men, up to 11 million women work in the livestock industry. A significant portion of livestock production is spread out by women, and the majority of them are well-versed in local breeds and livestock husbandry. Both within and between regions, the degree and kind of livestock ownership differ. Overwhelmingly speaking, women typically take care of cattle including cleaning, feeding, milking, and tending to young and sick animals. In the poultry industry, women tend to poultry primarily in rural areas. In a similar vein, women are crucial to the upbringing of goats, sheep, and small ruminants. Women's working potential is maximised via animal husbandry, which eventually results in their economic emancipation. There is a growing trend of women being involved in the care of cattle. Men's working involvement in value capture or pursuit of profitable employment is one cause of this phenomenon. As a result, the percentage of females led by women has increased. From an economic perspective, women's daily income is essential to the economic status and health of the household because there is no one to depend on, whether directly through the sale of the animals and their products or indirectly through the use of the animals in a variety of traditional activities.

7. Summary of Livestock Farming in India

Bushbush (bush) is a wide variety of bushbush production systems that have developed in each region in response to local needs and the currently existing resources. These systems consist of bushbush (bushbush) and agro-biological diversity. The selection of species, seed, seedling, breeding, management and feeding techniques, bushbush systems that are currently composed of the surrounding natural forest and bush, well-regulated bushbush management are all factors in this diversity. Bushbush agriculture is an art, characterized by two common production systems: permanent and annual crop-based bushbush, in the former, agricultural and agricultural crops are used as sources of income for farmers in the bush, people in bushbush are largely reliant on their animals, which are only kept for grazing. Traditionally, dry regions have historically welcomed bushbush "grazing," which offers pasture or grass for portions of the year. Since it is very difficult to sustain crops year-round in these regions, conditions with little precipitation, bushbush has been largely been a significant part of people's bushbush. There is a lot of representation in bushbush, in order to accomplish sustainable bushbush development, a paradigm for bushbush development and research is required, as the great majority of bushbush producers are from disadvantaged rural communities. This region provides a significant amount of bushbush support and a large number of rural residents. Their activities place a high value on bushbush, and there are many other work options available in bush. Research has indicated that one of the best ways to reduce poverty is to encourage smallholders to produce annual crops and animals.

6. Schemes For Livestock

Regarding the various capital fund established by SNVARD would involve various entrepreneurs to build infrastructure such as veterinary dispensaries, modern production facilities, feed plants, bushbush and production facilities, processing plants for meat and egg products, built bushbush and various animal production units, and investment for delivering inputs to farmers. Commercial and cooperative banks should grant credit for these activities under the Private Sector Lending program. By offering short-term financing, the introduction of a bushbush farmer credit fund - similar to the Bushbush credit fund - would address the working capital issue. The Animal Husbandry Unit should be able to secure a minimum of 20 percent of all agricultural financing, according to SNVARD.

6.1. Ongoing schemes

There aren't many policies and initiatives in the nation that deal with the development of people, fodder and bush. The creation and execution of these plans and programs are either directly or indirectly associated with a number of public departments and organizations. The main government body in the area is the Department of Animal Husbandry and Veterinary, which is part of the

Government of India. The work is also being done by the Departments of Agriculture, Forestry, Environment, Rural Development, Water and Forests, Agricultural Extension, NARS Institutions, National Level Universities, and a number of local organizations, including corporations, municipalities, and panchayats.

The country's regional honey production stations, a central honey seed production farm, and the central seed lab program were continued to form the Central Honey Development Organization under the IC Plan. Its introduction of honey crops, the creation of honey varieties, the planting of honey fruit trees, the manufacturing of honeycomb seeds for honey crops, the creation of honey products, the distribution of honey seed materials, and the testing of the honey seed performance are among the goals.

8.1.1. Animal health

Since the introduction of improved technologies, India's animal health has improved significantly, and animal husbandry techniques have evolved significantly, especially with regard to vaccination and the improvement of animal health. The likelihood of zoonotic diseases entering the animal has grown more likely as a result of both. Intervention brought about by the WHO's WHO approach. Major health programmes have been launched to control zoonotic animal health situations in order to enhance the status of domestic animals and to comply with the guidelines established by the World Animal Health Organization (FAO). Furthermore, the Central Government is putting the following schemes into effect in order to control the zoonotic diseases and ensure the healthy state of animals and animal health in the region.

8.1.2. Intensive dairy development programmes

The ICDF or Intensive Dairy Development Programme, is a national plan scheme (MAB).

- (i) Development of milk units
- (ii) Increase milk production by providing Technical Support services
- (iii) Purchasing, processing, and selling milk in an organized way
- (iv) Ensure remunerative prices to milk producers
- (v) Ensure additional employment opportunities

- 3) Empower social, nutritional and economic status of residents of comparatively lower-disadvantaged areas.

6.3.3. Key findings of the study

- 1) The current higher production of milk is from Private.
- 2) Even though Union Private is the only that produces the most milk in the nation—24,500 has 84.1% of milk were produced there in 2013–14—the average annual productivity in the state is lower than in other states because they are doing high-yielding programs annually in the state.
- 3) To achieve the task of high-yielding programs across, the Union Private government introduces the low-cost Union Private Dairy Scheme, which will be the introduction of dairy units with 20 high-yielding animals that are purchased from outside the state.
- 4) By March 31, 2015, 200 dairy units must be introduced in accordance with the plan.

8. Government Policy for Animal Husbandry

The units are categorized as follows—

Government

1. Formulating and implementing policies should be the primary focus of the federal and state governments.
2. The provision of infrastructure and other public goods.
3. Controlling private monopolies and ensuring competition.
4. Development of technology.
5. Encouraging a financially and technically sound high-performance high-growth programs.
6. International communication.

The Private sector might be preferred for following:

1. Production, marketing, supply of inputs and assistance with services.
2. Development of technology.
3. Adjustment to the regulatory framework.

Producers' Institutions

Producers' Institutions might be preferred for following:

1. Producers' interests being represented in decisions about resource allocation and policy.

2. Advancement of product markets in developing economies

Advancement Bodies might or provide the following:

1. Information provision and sharing
2. Policy analysis and encouraging governments among stakeholders
3. Development of technology
4. Building capacity

NGOs should keep their focus on following:

1. Information provision and dissemination
2. Complementing government's development role
3. Facilitate participation
4. Capacity building
5. Working towards

Dealing with the wild leopards in human-wildlife conflict areas

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ABSTRACT

The Leopard (*Panthera pardus*) is found throughout India with the exception of deserts and the Himalayan mountains. It is the most common and widely distributed species among large carnivores in India. The Leopard is listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). From last two decades, due to fragmentation of forest, deforestation and mining for mineral, leopards are under peripheral villages of the forest area. They are coming to human settlement for easy prey like goat, sheep, buffalo and etc. Interact to the nearby village means human-wildlife conflict creating an emergency that does require immediate intervention to prevent harm to people as well as the leopards. Based on the extensive weight, contents of Salutarin hydrochloride (1.4 mg + 0.1mg) and Kanamycin hydrochloride (1.5 mg + 1 mg) is mostly used for non-inflamed leopard along with the supplemental doses of only Kanamycin hydrochloride (10-20 mg) as a relief required. This paper describes how to deal with the emergency situation in human dominated landscape.

Keywords: Leopard, *Panthera pardus* like, Kanamycin hydrochloride, emergency

1. Introduction

The Leopard (*Panthera pardus*) is found throughout India with the exception of deserts and the Himalayan mountains. It has a wide altitudinal range and occurs all along the Himalayas with the exception of high-altitude deserts (Khan, 1989; David, 1996) and it is the most common and widely distributed species among large carnivores in India (Jhingan et al., 1991). The body weight of the leopard is 30 to 41 kg males and 23 to 30 kg for females.

The leopard is very adaptable, suitable for very human with low levels of conflict (McDonnell, 1991; Gendron et al., 1991) and has had also been seen in India (Aheriya and Shrivastava, 2006). During last two decades, there has been a perceptible increase in human-leopard conflict in many parts of India. In some circumstances, leopards are coming to houses, in agriculture plantation or forest some time help people in household tasks require immediate intervention. The presence of the non-inflamed leopard in such situation require to remove the leopard from the area as an authority for the safety of human as well as for the leopard also (Shrivastava and Aheriya, 2006). Immobilization is important requires to tackle the critical situation.

Most drugs, however, concentrate almost the hepatic and degradation of these. Administration, poisoning of hepatic for commercial use and coming for use. Hepatic use seen in peripheral villages of the large area. Hepatic use approximately India and not coming to human conditions for very poor, like poor, drug, health cell etc. Even in the nearby village some human health is not resulting in measures that require intervention to prevent harm to people as well as the hepatic administration. A vital part for any such intervention. Kanamycin hydrochloride an available drug in India as compared to other drugs like neotetramine, rifampin, streptomycin and significantly which are available in India.

Neotetramycin hydrochloride and Kanamycin hydrochloride are commonly used for many years and is found very safe drug during emergency response. Based on the authors insight, a mixture of Neotetramycin hydrochloride (1.4 mg + 0.1mg) and Kanamycin hydrochloride (3.3 mg + 1 mg) is usually well tolerated. Hepatic dealing with the replacement dose of only Kanamycin hydrochloride (10.75 mg) as an alternative. (Bhaskar and Sharma, 2017) what are active India health care dated with the combination of Kanamycin + Neotetramycin (2019).

The chapter provides a brief review of the literature on the response and morbidity of the rearing hepatic. This chapter has been written for veterinarians who are dealing with the emergency's situation of human hepatic and for text.

3.1 Identification Procedure

Practitioner who identifies hepatic must remember that the he is solely responsible for the health of that animal from the time the drug is administered until the animal has fully recovered from the anesthetic agent. It is very important that anyone engaged in the administration of hepatic have been to handle the anaesthetic agent, monitor physiologic parameters, and respond to emergencies if it should they arise.



Figure 1: Captured hepatic in the transport cage

The largest metabolic cost will result in locomotion. Locomotion is regarded as a natural information trigger, will have an appropriate (Fig. 14). Locomotion is often highly resistant during capture. The capture time must allow to maintain stress due to the effects that stress may have on physiological parameters that have consequences for animal stress management.

Thermally stable but not biodegradable

Inventory capture and measurement procedures are expected to be a relatively specific event for both the board and the people involved with the procedures. Type of format should be chosen based on measurement while doing measurement of aspects like study design, large-scale studies, and some additional work (Ordinary and Malik, 1992). It should be handled with great care.

the system's management

An approximation of the body weight for the estimation of drug need is by visual estimation. If a laparoscopic tool of known function is approximately ready prior to approaching the rat is reviewed by Oshida and Hasek (2008).

Calculation of Humidification Dry Gas for Inpatient: kg approximately 40 kg weight.

Schäfer 4011 (2009a): *Journal of the Society of Systematic Zoology* 58 (4): 143–155

Salmon: 812.00 mg total + 1 mg/kg for 10 kg = 1 x 813
+ 20 mg more (1.1%)

Yolk-sac mass (mg)	0.123 ± 0.011
Yolk-sac volume (mm ³)	0.123 ± 0.011
Yolk-sac mass (mg)	0.123 ± 0.011
Yolk-sac volume (mm ³)	0.123 ± 0.011

$$\text{Lignin in lignin (28 mg)} = 0.28 \text{ mg} \times 100 \text{ mg} = 0.2 \times 100$$

— **Identity Manager**

Asymptotic agents should only be administered to the sampling population using personal transport. This includes steps to facilitate with the instrument which is going to use in the field. During ascent, it should be associated with some degree of risk for the animal and human involvement.

But seal needs volume is also important in preparing for a hoped-for milk increase. Thus, that are too heavy and seals that are too lengthy can cause serious damage to support the milk mass. Seals of size 1.2 x 70 mm (10-gauge), 1.1–1.4 inch are often used during mobilization procedures because it causes no harm to the animal and causes milk flow increase.

When starting a report, it is advised to start on the proximal region of a limb (i.e. from proximal to distal) during the large region of the first area of contact but one should always bear in mind that the thoracic region and head are in contact with the ground.

is commonly used and locally available drug. A combination of cyclohexamine with aliquid sedative agent is an even more reliable induction during immobilization.

3.3 Ketamine

Ketamine is the anesthetic for cyclohexamine and should be administered at 1-2/21 mg/kg IM. It should only be used according to the procedure is completed at least 30 minutes after the last dose of the cyclohexamine treatment was given.

3.4 Supplemental Drugs

In some circumstances, when the initial anesthetic agents do not provide sufficient immobilization prior to all procedures (i.e., radiographing, biological sample collection, surgical procedure) being completed, in such cases administration of supplemental drugs will be required for drug anesthesia to allow safe handling.

Ketamine is a dose of 1 - 1.5 mg/kg IV or 1 - 2 mg/kg IM, is considered an ideal adjunct level of anesthesia should be a safe dose in most of the hospital. The dose of ketamine to be used will depend upon situation.

NEVER use xylazine as the supplemental drug. They should only be administered in combination with another drug (i.e., ketamine) for induction of anesthesia. It is best to supplement with ketamine rather than IV or IM.

Chlorpromazine is the dose of 1 - 30 mg/kg should be administered slowly IV or IM. It is used with extreme caution regularly, muscle tremors, extreme constriction of all limbs and arch of back. Chlorpromazine can be administered again IV after 3 minutes if there is no response to the initial injection.

3.5 Anesthetics

Some authors recommend the addition of atropine to the anesthetic protocol for the anticholinergic property of decreasing salivary secretion (Barnes, 2007). However, atropine can be associated with respiratory side effects, even mortality in the adult and geriatricated time.

Anesthetic agents only in those animals that having excessive salivation during the immobilization procedure. A single dose should be administered.

Atropine sulfate is 0.04 mg/kg IM or IM.

3.6 Animal Handling and Restraint

Proper emergency equipment for handling and restraining the anesthetized hospital should include those listed as below:

- Endotracheal
- Thermometer
- Pulse oximeter

- Laryngoscope
- Endotracheal tubes with cuff/airway
- Suction bag or oxygen tank
- Mouth (airway) board – for adult (size) – placed in front of hypopharynx
- Portable oxygen
- Oxygen tank
- Suction material
- Emergency resuscitation



Figure 3. Laryngoscope is inserted into the mouth during intubation.

While dealing with the intubation, the team should ensure that the patient is positioned properly to avoid the transmission of infection between the patient and the staff, as well as to ensure that the patient is in the proper position. The patient should be placed in a position that allows for the insertion of the laryngoscope (Fig. 3).

Initially, the laryngoscope should be placed in the patient's mouth. The head and neck should be placed in a position that allows air to flow through the mouth and trachea. The mouth should be kept lower than the back of the throat and neck so that air flows out of the mouth and not into the trachea.

Once the laryngoscope is inserted and placed in the proper position, the larynx must be protected with the cuffed, air-filled, airway device. The device should be applied to both sides to keep the airway open. The device is not sealed should be used to prevent air from the air and air flow, as well as to maintain the airway open to the patient. The device should be placed in the airway to maintain the airway open. The device should be placed in the airway to maintain the airway open. The device should be placed in the airway to maintain the airway open.

During all laryngeal intubation, respiratory care, head care, and laryngeal care are

monitored. The normal physiologic parameters for an immobilized free-ranging leopard are the following:

Temperature (T) $101.56 \pm 0.17^{\circ}\text{F}$	} (Telepova E.H., Zakh. H.G., and Klavin, I.N., 2009).
Respiratory Rate (RR) 11.41 ± 0.76 breaths/minute	
Heart Rate (HR) 45.77 ± 5.47 beats/minute	

Respiratory rate, heart rate and temperature should be monitored every 5 minutes.

12. Timetable/doing Common Emergent Emergencies in the Field:

Any person who introduces a wild animal into a situation that he/she is solely responsible for the health of that animal from the time the drug is administered, or from the time the animal is captured with the animal has fully returned from the anesthesia agent(s). It is imperative that anyone engaged in the immobilization of free-ranging leopards must know how to handle the anesthetized cat, monitor physiologic parameters, and respond to medical emergencies should they arise. Although many leopards agents are relatively safe in field species.

The author will not present a comprehensive review for all aspects of anesthesia-related emergency management. However, the author will provide highlights on the most common emergencies that may arise during the immobilization of free-ranging leopards. The author strongly recommends that researchers performing leopard immobilization in the field training on this subject (Rudich et al., 1996).

The most common anesthesia emergencies in free-ranging leopards are respiratory depression and arrest, cardiac arrest, seizures, hyperthermia, and wounds including canine tooth lacerations. Additional problems include vomiting and aspiration, shock, caprine dyspnea and laryngospasm (Rudich and Karch, 2001). The drugs commonly used in emergency situations in the field should be always available.



Figure 4. Collecting blood from the cephalic vein in an anesthetized leopard.

Drugs may be delivered either intramuscularly or intravenously. If the intravenous route is chosen, the anesthesiologist must be familiar with the drug toxicity in administering, and be sure to deliver it at appropriate rate/levels for delivering drugs IV (and that are suitable for the collection of blood) include the regular, cephalic, caudal and lumbar catheters, femoral, and spinal, and also (Fig. 4).

The appropriate reward, to say, will be determined on a case-by-case basis. For example, the regular rent may be difficult to approach for the administration of discounts to a ordinary tenant. The results also will depend on the market used, but generally the ideal results may be to + 1.2 inch and 16.11 acres.

...that you're the No. 1 person and release a husband

The recovery period is a vital period for proper healing and nurturing as the infection and inflammation subside. When possible, consultation with a doctor is advised, and recovery aided.

It is important to ensure that the ligament does not cause injury or build up to people involved in the immobilisation during the recovery period. During recovery, the ligament should be positioned so that it over-extends easily and will not build itself on subsequent use. The animal should be placed in lateral recumbency with the head and neck extended. Care should be taken that sharp edges of cage doors are avoided during its recovery. Cages of animals should be covered with dark materials. One team member should always monitor the response of animal (Fig 5). People in the area remain quiet and should NOT restrain the ligament. It should last for 2 to over 2444 as it mobilises the shoulder-jointed. Dislocation will not occur in a single recovery, but it may cause the ligament to move itself.



Figure 2. Monitoring of symptoms of the hospital-dwelling recovery period by experience.

However, since the cat will wake up, it's enough to relax. The compressed pop bottle remains still, thus the board it can stick to, even if the board will not be

because the animal may also be aggressive and cause harm to staff or pets.

Thus, if one is to use a bus stop for recovery, it is good judgement to be sure the bus stop is sturdy enough prior to release, but also someone has to hold it while all is in the cage. Obviously, when no cage is available (i.e., covered by dogs or other from a blind), the animal can be placed in a quiet, public (i.e., with staff) and protected (i.e., not near traffic, but someone's arm is required on its arm). Release can be used with both recovery methods.



Figure 1. Covering of a transport cage with camouflage cover



Figure 2. Covered of the transport cage during release of transport to minimize the stress



Figure 1. Preparation of cage of transport cage prior to release with the help of forest guard.



Figure 2. Final check of recovery of drug of leopard before release.

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ABSTRACTS

Integrated Dairying and Horticulture: A Sustainable Agribusiness Model for Enhanced Farm Profitability

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ABSTRACT

The integration of dairying and horticulture offers a synergistic agribusiness model for enhancing farm productivity and sustainability. This approach leverages the mutual complementarity between livestock and crop production, where dairy farming provides organic manure, enhancing soil fertility and reducing the dependency on chemical fertilizers. In turn, horticulture, if managed, can be utilized as fodder, reducing feed costs in dairy operations. This model is not only profitable but also resilient to market volatility and climate change. Recent data indicates that India's horticulture production reached 151.46 million tonnes in 2022-23, while milk production stood at 221.38 million tonnes, demonstrating the immense potential of integrating these sectors (Ministry of Agriculture & Farmers Welfare, 2023). The growing demand for organic produce and dairy products further reinforces the economic viability of this integrated approach. Additionally, the government's support through schemes like the Pradhan Mantri Kisan Sampada Yojana (PMKSY) and the Dairy Entrepreneurship Development Scheme (DEDS) offers financial incentives, making it easier for farmers to adopt this model. The integrated dairying and horticulture model represents a step towards sustainable agriculture, promoting resource efficiency, enhancing soil health and ensuring higher economic returns. This model is particularly suited for small and marginal farmers, contributing to rural development and food security.

Keywords: Dairying, Horticulture, Agribusiness

The Role of Goat Husbandry in Diversifying Horticulture in the Arid Region of Agre: A Sustainable Agricultural Approach

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ABSTRACT

The arid region of Agre faces significant agricultural challenges, including water scarcity, poor soil fertility, and climate variability. Diversification through the integration of goat husbandry with horticulture offers a sustainable solution to these challenges, promoting resilience and enhancing income for smallholder farmers. This review examines the potential of goat husbandry to diversify horticultural practices in Agre, focusing on recent trends and the role of both systems. Goats provide organic manure, which improves soil fertility and crop yield, while also offering a source of income through milk, meat, and animal skins. Horticultural crops like mango, West Indian lime and citrus benefit from the improved soil conditions, resulting in higher productivity and better quality produce. The integration of these two agricultural practices has demonstrated significant benefits, including increased farm income, better resource utilization and improved resilience to climate stress. Recent data from the 2021 livestock census and horticultural surveys highlight the growing importance of goat husbandry and horticulture in the region. However, challenges such as limited market access, inadequate infrastructure and the need for technical training remain. This study underscores the need for supportive policies, research and extension services to promote the widespread adoption of integrated goat husbandry and horticulture in the arid region of Agre.

Keywords: Goat husbandry, Horticulture, Arid region, Agre

Successful Treatment of Fungal Cystitis and Renal Complications in a Canine

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ABSTRACT

A 3-year-old male dog named Bani presented with a history of being healthy or with slight weakness in the hind legs over a 6-month period. Initial diagnostic evaluations revealed a fungal and bacterial infection through urine culture, which was accompanied by high renal tubular excretion (T/C) and decreased hemoglobin (H) critical levels. Additionally, blood urea nitrogen (BUN) and creatinine levels were elevated, indicating possible renal involvement. Further diagnostics, including ultrasonography, confirmed the presence of fungal cystitis and fungal growth near the kidneys. The treatment regimen included fluconazole (8 mg/kg, twice daily for 30 days), Itraconazole (100 mg, PO for 7 days), Itraconazole (100 mg, PO), Trimethoprim (12 mg/kg, PO), Folic Acid (2 mg/kg, PO), Acetic Acid (2 mg/kg, PO) and Amphotericin B (0.5 mg/kg body weight, IV) over 30 days, administered three times. Following the comprehensive treatment, the animal successfully recovered.

Keywords: Fungal Cystitis, Amphotericin B

Ethnoveterinary Medicine: Charting the Journey of Indigenous Animal Healthcare in Yikéti Shumot

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ABSTRACT

A large portion of Indian veterinary practices were developed via traditional or premodern and indigenous practices through the generations, springing from the "folk" era and continuing until the end of the 19th century. This traditional medical system, also known as ethno-veterinary medicine (EVM), is generally considered to be an oral system of folk beliefs, skills, practices, and methods related to the treatment of animals that is passed down from generation to generation. In contrast to contemporary mainstream and antibiotic therapy, practitioners' changes in veterinary medical practices and treatment of majority of diseases was started with the newly invented synthetic drug molecules. To recognize, analyze, and document the knowledge of plant and animal use in ethnoveterinary practices in the province of India, involving a high number of species and conditions, and its strongly linked to folk traditions. The possible benefits of plants and their derivatives in treating diseases of veterinary concern is the prime objective of Ethnoveterinary Medicine. These natural product's ability to selectively affect the body is attributed to their bioactive molecules, which are extracted and isolated from raw plants. We have compiled traditional and indigenous plants together with its bioactive substances that have been extensively utilized by animals. One major species is of Galangana which elicit pharmacological effects, leading to increased product's bioactivities through interaction with dopamine receptors and thereby augmenting with supply in the vasodilation have developed a vast amount in traditional herbs, because there are many varieties, along with a hope that they may not have any toxic reactions to milk. Phyto pharmacological research on natural products can contribute for the discovery of new active compounds with novel structures which may serve as a lead for the development of new galanganas. Continued research, standardized training, and regulatory oversight is extremely important to review recent progress made in the field of commercially available and traditional galanganas and help farmers with economic losses and ultimately boost country growth around Yikéti Shumot.

Case Study of Carpal Fracture in Red-eared Slider Terrapin

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ABSTRACT

A Red-eared slider terrapin was presented as an emergency by an owner at the level of a difficult fracture and health with the history of fall from the terrace and clinical signs such as lameness, swelling. On physical and radiographic examination, Carpalus Fracture was diagnosed. The fracture was managed by cleaning the area with diluted povidone iodine solution and treated by castband gauze, bandaged with waterproof adhesive tape with administration of NSAIDs meloxicam (0.05 mg/kg) and intramuscularly Fluids. Calcium supplement (bone) was added to give with diet. The fracture bandaging was done regularly at the interval of one week. Fracture was completely healed after a month and returned to his her lives were seen on radiographic exposure.

Health Management in Aquaculture Systems

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Successful Management of Corneal Ulcer in Pug

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ABSTRACT

A 5-year-old female Pug weighing 11 kg presented with a history of a watery discharge from the right corneal swelling and a noticeable change in eye color indicating a corneal ulcer. Upon clinical and ophthalmic examination, the dog was diagnosed with a corneal ulcer. The treatment regimen included intramuscular administration of amoxicillin (10 mg), meloxicam (1 mg) and aceclofenac (1 mg) for 5 days. Topical treatment consisted of moxifloxacin eye drops (4 drops twice daily) and chlorbutol eye drops (4 drops twice daily) for 7 days, chlorbutol eye drops (4 drops twice daily) for 11 days to provide analgesic effect. The dog recovered successfully within 11 days following the treatment protocol.

Keywords: Corneal Ulcer, Culture-sensitive bacteria

Backyard Poultry Farming– A Tool for Livelihood and Nutritional Security for Landless Farmers

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ABSTRACT

The Eleventh Five Year Plan (2007-2012) of the Government of India titled 'Inclusive Growth' emphasizes the need for balanced, efficient, sustainable and inclusive economic growth. It highlights the importance of focusing on the 80% of farmers who are small, marginal, or landless—many of whom are women and face challenges accessing resources such as inputs, credit and markets. To address these issues, the plan advocates for special programs that enable these farmers to engage in high value commercial activities like crop production, dairy, poultry and fisheries. Backyard poultry farming emerges as a promising strategy to bridge the gap between demand and supply for eggs and poultry meat while generating self-employment opportunities to reduce poverty and improve rural households. Although backyard poultry farming may not directly alleviate poverty due to the small average flock size, 3-5/ha, around 1000/ha. These include providing meat and eggs, contributing to overall nutrition and consumption, controlling pests and generating profit each. Backyard poultry requires minimal inputs, attention and produces low environmental pollution, making it a valuable product for small farms. A survey by the NIZAMUDDIN Small Scale Pro-Poor Livelihood Policy Programme (2007) highlights that backyard poultry can significantly improve household welfare in rural India, with an average annual profit of Rs. 981.9 per household and an average flock size of 1000 birds. Recognizing its potential, various long-term integrated research programs are being conducted by ICAR and State Agricultural Universities to develop suitable guidelines for rural and backyard farming. These programs focus on breeding, nutrition and health management, leading to the development of specialized genotypes such as "Kunjin I," "Vanaraja," "Girija," "Lakshmy," "TARU Nishad," "TARU Shyama," LPUAR and ISTUAR, which are well suited for rural and free-range systems.

Keywords: Backyard, Data, Economics

Herbal Nanoparticles for Mammary Tumors: an overview

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ABSTRACT

Herbal nanoparticles are an emerging and promising area in cancer therapy, particularly for treating mammary tumors. These nanoparticles can be designed to deliver anticancer drugs directly to tumor cells, enhancing treatment precision. By attaching targeting ligands or antibodies, they selectively bind to cancer cells, minimizing damage to healthy tissue and reducing side effects. Many herbal compounds suffer from poor solubility and low bioavailability. Nanoparticles can improve the dissolution rate and stability of these compounds, enhancing their therapeutic effects and allowing for potentially lower doses. They can also encapsulate multiple therapeutic agents, combining herbal extracts with conventional drugs in a single system. In targeting techniques like MRI or PET scans, herbal nanoparticles can serve as contrast agents, improving tumor visualization. By targeting drug more precisely to cancer cells, these nanoparticles help reduce systemic toxicity and boost treatment efficacy. Additionally, herbal nanoparticles may modulate the tumor microenvironment, affecting tumor angiogenesis and blood vessel formation for a more effective antitumor response. Research shows potential for herbal nanoparticles in cancer treatment. For instance, curcumin and resveratrol nanoparticles have demonstrated promise in enhancing select therapies.

Keywords: Herbal Nanoparticles, Mammary Tumor Therapy

Phytochemical Characterization of *Artemisia Squamea* by High Performance Thin Layer Chromatography

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ABSTRACT

Artemisia squamea, commonly known as Catnip spurge, belongs to the Lamiaceae family and is frequently found in arid/semi-arid areas. This plant is not just native to the wild but is also commonly cultivated in various parts of India due to its economic and medicinal significance. The primary aim of this study was to investigate the phytochemical constituents present in *Artemisia squamea* and to conduct a quantitative analysis of a specific compound, Rutin. To achieve this, an ethanolic extract of *Artemisia squamea* was prepared and subjected to preliminary phytochemical screening using standard protocols. The screening process aimed to identify the presence of various bioactive compounds within the extract. The phytochemical analysis revealed a diverse range of constituents, including alkaloids, flavonoids, tannins, phenols and terpenoids. These compounds are known for their potential therapeutic benefits, which contribute to the plant's medicinal properties. Additionally, the study focused on quantifying the rutin content in the plant using High Performance Thin Layer Chromatography (HPTLC). Rutin, a bioactive flavonoid, is recognized for its antioxidant, anti-inflammatory and cardiovascular health benefits. The HPTLC analysis determined the rutin content in *Artemisia squamea* to be 10% percent. This quantification is significant as it provides a basis for understanding the potential health benefits of consuming or utilizing *Artemisia squamea* in various medicinal formulations. The findings of this study underscore the importance of further exploring *Artemisia squamea* for its phytochemical richness and potential therapeutic application.

Keywords: Phytochemical analysis, Rutin quantification, *Artemisia squamea*

Integrated Farming System: Sustainable, Eco-Friendly Solution for Resource Efficiency and Economic Well-Being in Hill Regions of Nepal

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ABSTRACT

Integrated Farming System (IFS) is an eco-friendly approach that maximizes resource efficiency by using byproducts from one enterprise as inputs for another. IFS reduces soil health, pest and waste management, water efficiency and water while avoiding harmful chemicals. It also contributes to the economic prosperity of small and marginal farmers, improving education, health, social responsibilities and overall livelihood security. The College of Agriculture Kanchanpur of CAU, Nepal has developed an IFS model specifically designed for integrated farmers in hill regions. This model integrates components like crop cultivation, fruit and vegetable farming, apiculture, aquaculture, biomass processing, mushroom production, poultry, goat and buffalo rearing, livestock management, contract farming and fisheries. It includes two farm ponds and a fish pond area for raising fish. Besides, with one enterprise like floriculture, which covers 24.75 and 10% of the total area. Crop grown include rice, wheat, maize, mungbean, lentils, black gram, soybean, cauliflower, cabbage, brinjal, cucumber and onion. The apiculture (bees) within the IFS have 100 bees, 20 honey bees and 1000 bees, including four cow breeds, three buffalo breeds and 10 goats. The system also cultivates mango, durian, (Mango) and other tree, sugarcane, 10 poultry birds like Kanchanpur and includes pigs for vermicomposting, fish rearing and biomass recycling. The intercropped farm ponds supply water for both crops and livestock, with fish species like Rohu, Catla and Magur reared in them. The IFS runs as full capacity during the winter season, with reduced activity in Rabi. Daily outputs include 6-8 liter of milk and 20 kg of biomass. A large soil cultivation (fish) pond, Composting and fish rearing, 10 goats, 1000 bees from farm ponds and fish rearing, which is also possible, helps creating a closed nutrient cycle that minimizes external inputs. Vermicomposting with compost organic waste into nutrient rich compost, enriching the soil and boosting crop productivity. The farm ponds provide irrigation during dry periods and support fisheries. Biomass from crop residues, livestock and apiculture is recycled within the IFS. The intercropped enterprises within the IFS model are interdependent, with outputs from one serving as inputs to another, optimizing resource use, enhancing productivity and ensuring sustainability.

Keywords: Integrated Farming System (IFS), Environmentally friendly, Resource efficiency

Assessment of Heavy Metal Concentrations in the Water of Yamuna River Barrages Using ICP-MS

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ABSTRACT

The present research on heavy metal concentrations in the water of the Yamuna River at various barrages along Yamuna. Analytical and chemical analysis. Analytical Chemistry (ICP-MS) as the analytical technique. The study was conducted from November 2022 to February 2023 and was designed to assess the impact of various levels of industrial and urban activities on heavy metal concentrations at these sites. Yamuna, located upstream with minimal industrial activity, served as a baseline reference. Yamuna, characterized by significant urban and industrial activities, was expected to exhibit higher levels of heavy metals. Data, obtained from downstream, based on the concentrations from upstream effluents and sewage discharges. The heavy metals analyzed included cadmium, chromium, copper, iron, nickel, cobalt, silver, zinc, lead and aluminum. The study revealed significant variations in heavy metal concentrations across the sites. (i.e., cadmium concentrations ranged from 0.001 to 0.004 mg/L, while chromium concentrations were between 0.002 and 0.004 mg/L. Aluminum levels varied from 0.001 to 0.002 mg/L, and iron concentrations ranged from 0.001 to 0.002 mg/L. Cobalt concentrations were detected between 0.001 and 0.002 mg/L, with nickel concentrations ranging from 0.001 to 0.002 mg/L. Copper concentrations were found to be between 0.001 and 0.002 mg/L, zinc levels ranged from 0.001 to 0.002 mg/L, lead concentrations were observed between 0.001 and 0.002 mg/L, and aluminum levels varied from 0.001 to 0.002 mg/L. These findings underscore the necessity for ongoing monitoring and mitigation efforts to protect the water quality and overall ecosystem health of the Yamuna River. The observed variations highlight the impact of industrial and urban activities on heavy metal concentrations, emphasizing the need for targeted interventions at critical points along the river. This study and research are well structured and appropriate for a research paper or conference presentation.

Keywords: Heavy Metals, Yamuna River, ICP-MS, Barrages

"Current Scenario of Veterinary Science, Animal Husbandry and Agriculture Education in India"

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ABSTRACT

The situation scenario in veterinary science, animal husbandry and agriculture education is crucial in sustaining and advancing India's agricultural sector, which employs over 50% of the country's population. As of 2023, India has 42 veterinary colleges, with significant curriculum updates integrating modern technologies like veterinary telemedicine and digital health. Despite these improvements, the sector faces challenges, particularly in faculty strength and disparities in the quality of education across veterinary colleges. Animal husbandry education is evolving through integrated programs that combine technology with traditional practices and a stronger focus on extension services to enhance practical skills among farmers. However, insufficient funding and limited specialization opportunities continue to hinder progress in this field. Agriculture education is undergoing a transformation, with new courses emphasizing sustainable practices and digital agriculture, alongside increased public-private partnerships to improve the quality and accessibility of education. Nonetheless, significant disparities in education quality and research funding remain prominent challenges in veterinary science. While there have been considerable advancements in the curriculum, infrastructure and international collaboration across these educational domains, ongoing challenges related to faculty shortages, resource limitations and uneven quality of education need to be addressed. These improvements are essential to ensure that veterinary science, animal husbandry and agriculture education continues to effectively contribute to India's economic growth and agricultural productivity.

Keywords: Agriculture Education, Transformation

Therapeutic Management of Babesia Infection in a Non-Descript Goat

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ABSTRACT

A Non-Descript (ND) goat presented with a history of diarrhea lasting 1-2 days, followed by a rapid decline in condition and marked weakness. Upon clinical examination, the goat exhibited pale mucus membranes, reduced appetite, generalized weakness and signs of distress and depression. Given the severity of the symptoms, a thorough diagnostic workup was conducted, including a Complete Blood Count (CBC) and blood smears for parasitic examination, which confirmed the presence of Babesia infection. Babesia, a tick-borne protozoan parasite, is known to cause significant morbidity in livestock, leading to hemolytic anemia and other systemic effects if left untreated. The treatment regimen for this case involved a combination of antiparasitic and antimicrobial medications aimed at addressing both the parasitic infection and the associated clinical symptoms. The goat was administered Iq. DDT (100 ml, IV) to combat dehydration and electrolyte imbalance, along with Iq. Na phosphate (50 ml, IV) to support blood volume and circulation. Iq. Doxycycline (500 mg, IV) was given as an antimicrobial agent, while Iq. Doxamethasone (1 ml, IV) was administered to reduce inflammation and prevent shock. Additional supportive care included Iq. Tris Buffer for chronic rehydration, Iq. Acid (10%) for acid-base balance and Iq. Bional 11.2 ml, 10%, administered to two goats on alternate days as an oral-passive agent specifically targeting Babesia. The goat responded favorably to the treatment, with gradual improvement in clinical signs and full recovery observed within a few days.

Keywords: Babesia, Goat, Hemoparasitosis

Suturing of Incised wound in Male Crocodile at Maharashtra Zoo, Nagpur

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ABSTRACT

The Zoo-keeper of Maharashtra Zoo found a 12 years-old male Crocodile having injury on the right region. The injured crocodile was captured by using the "NOOSE" procedure. The mouth of crocodile had with a rope and some were attached with black, red and blue material from the crocodile. After the procedure, the crocodile was kept with a common rope at husbandry position. The right hindlimb was kept with a rope and the injured left hindlimb was kept loose for observation of the wound and the crocodile was taken to the intensive for the above case. The 12 years-old crocodile suffered with 1 inch deep x 1 inch length incised wound on the right region of left hindlimb and 2-3 inches wound on the back region, caused due to fighting over mating. **Amputation and** - The injured crocodile was kept with the use of 1 inch x 1 inch x 1 inch. **Method of suturing** - The wound was firstly clean with hydrogen peroxide and then washed by using sterile water. The wound was sutured by applying simple interrupted suture as well as surgical glue named "Vetbond". Approximately 10-11 stitches were applied by using of wound. The wound was closed by applying Vetbond cement. The care was kept in a common cage for observation and for post-operative treatment for 3-4 days. **Post-operative care** - The care was kept in the husbandry cage for post-operative care and treatment for 3-4 days. Daily dressing of the operative wound was done with liquid betadine, iodine and antibiotic "Iband". Daily spray "Tactone" were applied. The healing procedure of wound was good.

Keyword: Crocodile, Incised Wound.

Transboundary Animal Disease in Northeast India: Enhancing Veterinary and Laboratory Infrastructure, Surveillance and Regional Cooperation

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ABSTRACT

Transboundary animal diseases (TADs) significantly threaten Northeast India's livestock sector, impacting food security, public health and economic stability. The region's geographical features, such as porous borders and complex terrain, facilitate the spread of diseases like African Swine Fever (ASF) and Brucella abortus/buberculosis and Ruminant Endoparasites (BREs). With limited access to effective treatment available, early diagnosis and surveillance are crucial. Challenges include limited veterinary infrastructure, inadequate disease surveillance and low awareness among smallholder farmers, who are vital to the region's livestock economy. To address these issues, a multi-faceted approach is needed. Strengthening disease surveillance and reporting, strengthening veterinary infrastructure with well-equipped laboratories and increasing awareness among farmers are essential steps. Regional and international cooperation is also critical for enhancing disease control measures and sharing information. Additionally, investing in research to understand the epidemiology of TADs in the region's unique context will aid in developing effective prevention and control strategies. A comprehensive strategy that includes improving infrastructure, surveillance, farmer education and regional cooperation is vital for managing TADs in Northeast India. This approach will help protect the region from disease spread and support India's goal of attaining "Vision 2047," ensuring food security, public health and economic stability.

Keywords: Disease Surveillance, Veterinary Infrastructure

Multisystem Management of Cardiac and Hepatic Complications in a Canine

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ABSTRACT

A 4-year-old male canine, Chika presented with clinical signs of anorexia, depression, vomiting, weight loss and weakness. Diagnostic evaluation included a complete blood profile, radiography and ultrasonography. Blood profile indicated no significant abnormalities, while imaging studies revealed lesions in hepatomegaly with normal liver margins and a dilated gallbladder with normal wall thickness. The cardiac evaluation showed cardiomegaly, characterized by a globular-shaped heart, with a combined heart score (CHS) of 11.1 and tachicardic rhythm suggestive of an enlarged heart (exceeding 160 beats/min). The treatment regimen included intravenous administration of Doxycycline (Doxi-Inject, 100 mg) and Furosemide (Furo-Tab, 10 mg) for fluid therapy, along with amoxicillin (Amoxi-Inject, 100 mg) and antibiotics (Clindamycin/Clindamycin) to address potential infection. Gastroprotective therapy was provided with Pantoprazole, while Hemepepstatin and Lactin were administered to manage respiratory distress and diarrhea, respectively. Dexamethasone was given to reduce inflammation. Additionally, the canine was prescribed oral medications, including Tyk Strength for cardiac support, Sepi-Tab for liver support and Povidone-Iodine to promote gastrointestinal health. Following a comprehensive 30-day treatment plan, Chika showed a full recovery, with the resolution of clinical symptoms and stabilization of cardiac and hepatic functions.

Keywords: Tachicardic Heart Score, Cardiomegaly

Fish Health Management Through Molecular Technologies

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ABSTRACT

Biotechnology has many applications in fish health management. Molecular technologies, such as the polymerase chain reaction (PCR) and real-time PCR (RT-PCR) and various viral expression-based applications (VIASEA), offer a new dimension in detection, identification and quantification of extremely low levels of aquatic pathogens, while serological technologies offer a new revolution for multiplex screening for pathogens and host response. Rapid identification of pathogens is possible through application of monoclonal antibodies method, antibodies to immunoglobulins from different fish species can be used to monitor the host response following vaccination. Recombinant DNA technology helps to produce large-scale, low-cost vaccine production, however DNA vaccination, proteinase, adjuvant design and viral vaccine delivery will undoubtedly foster the development of effective fish vaccines in the future. Current technology exemplifies a novel antibody-based method that can be applied to both pathogen detection and vaccine development.

Keywords: Fish biotechnology, Monoclonal antibodies, Recombinant DNA

Socio-Economic Study of Back Bengal Goat Keepers in Five Districts of West Bengal

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ABSTRACT

A study on Back Bengal goat rearing, conducted in 2023-2024 across Nadia, Burdwan, Hooghly, Bardhaman and Malda districts of West Bengal, involved 600 farmers under the "ANBP on Goat Improvement, Back Bengal Field Visit Scheme" project. The primary income source for these farmers was the sale of goats, particularly from April to 12 months. When farmers raised 2 kgms of feed with an average flock size of 8 (7.96.29 goats. Their average annual income from goat rearing was Rs.31,491,941.258 INR, with a per day income of Rs.7,021.89/427.12. Income varied by flock size: farmers with 1 to 3 breeding goats earned Rs.10,219.96/2,222.18 annually, those with 4 to 9 goats earned Rs.47,538.99/2,168.29 and those with over 10 goats earned Rs.47,000.77/2,194.26. Education levels impacted earnings, with secondary level educated farmers making Rs.33,573.81/1,378.26, Primary level Rs.24,582.86/1,371.46, Graduate Rs.38,836.97/1,661.57 and medium/high school Rs.17,886.96/1,303.71. Social categorization also showed income variation, with Tribal farmers earning the least at Rs.30,729.66/1,494.47, Income was highest in Hooghly/BB Chapter (Rs. 51,828.25/2,311.64) and lowest in Hooghly Chapter (Rs. 11,882.96/2,027.96). The study indicates a positive relationship between feed, flock size and income, highlighting the importance of education and flock size for income enhancement.

Keywords: Income, Back Bengal, Goat Rearing

Up-Regulation of Hypoxia-Inducible Factor-1 α -RNA Transcripts Under Acute Hypoxia in An Endangered Himalayan Cyprinid Fish, Golden Mahseer, *Garra (Hamilton, 1812)*: Indicative of Its Role in Enhancing Hypoxia Tolerance

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ABSTRACT

Golden Mahseer (*Garra*) is an important cyprinid species in the aquaculture of the Himalayan subcontinent for its economic, ecological, recreational and food values. The availability of dissolved oxygen (DO) in the aquatic system is the basis of life, which supports the metabolic requirements of the organism, including their growth, development and reproduction. In contrast, a sudden decrease in DO level in water will stimulate a degree of stress in fish. Different genes involved in hypoxia-tolerance processes have gained importance due to the growing interest in the role of oxygen in the development and pathology of organism at the molecular level. In this study, we examined the mRNA expression level of hypoxia-inducible factor α 1b and α 2b in liver and brain tissues of golden Mahseer under acute hypoxia for 96 hr exposure. The study showed a significant increase in brain tissues, while α 1b expression was significantly higher in both the brain and liver compared to control samples at normal levels. Further, the expression of both α 1b and α 2b down-regulated and became normal after the recovery of the fish to normal level. Hypoxia-inducible factor (HIF) is a heterodimeric transcription factor or DNA binding proteins that mediates changes in gene expression during the adaptation of animals to low oxygen conditions and are expressed in a cell-type specific manner. The present study demonstrated the tissue-specific expression pattern of α 1b and α 2b in *G. (H)* as the increase in their transcript levels was observed in the brain and α 1b transcript in liver both the tissues as an immediate response. The expression pattern of these genes indicated that they play an essential role in the adaptive response to lower hypoxia in golden Mahseer.

Keywords: Golden Mahseer (*Garra*), Hypoxia, HIF-1 α , HIF-2 α

Effect of *Cassia tora* Leaves on Growth Performance and Survivability of Tilapia (*Labeo rohita*)

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ABSTRACT

Traditional protein sources like fishmeal, soybean meal and groundnut meal used in fish feed are expensive and scarce due to high demand and limited supply, posing challenges for small and medium fish farmers. The study aimed to explore non-conventional plant protein sources to reduce feed costs, focusing on the potential of *Cassia tora* leaf meal. The research investigated its use as an alternative protein source for *Labeo rohita* fingerlings. Fingerlings, averaging 6-8 grams, were stocked in tanks with 15 fish each. Four experimental diets were tested: one control diet with a commercial protein source and three diets with *Cassia tora* leaf meal at 50%, 75% and 100% of the total dietary protein. All diets were isonitrogenous with 22% crude protein. Key variables such as feed conversion ratio, specific growth rate, protein efficiency ratio and weight gain were assessed. Water quality parameters, including pH, alkalinity, ammonia, dissolved oxygen and CO₂, were monitored. The study found that *Cassia tora* is effective as a protein source at its concentration, with performance metrics declining as its inclusion increased. However, diets with 75% and 100% *Cassia tora* leaf meal demonstrated that efforts in growth and survival. The study demonstrated significant growth rate and weight gain improvements, suggesting that *Cassia tora* leaf meal could serve as an economical and effective partial replacement for fishmeal in aquaculture, benefiting fish farmers and the industry.

Keywords: *Cassia tora*, *Labeo rohita*, Isoproteinous diet

Impact of Moringa Oleifera leaves powder on blood serum of Gibrja Poultry birds

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ABSTRACT

The research was carried out in Fening Unit, Department of Biology Science, MBDA, Modiba and under the Dept. of B. & B.S, Dr. FIDSV, Modiba, an experimental of *Moringa Oleifera* Leaves Powder on Blood Serum Profile of Gibrja Poultry birds. The *Moringa* leaves are highly nutritious and contain significant quantities of vitamins (A, B and C), calcium, iron, copper, sulphur and protein. *Moringa* leaves have a relatively high protein content which ranges from 27% to 32%. The treatments were (T₀) control with no supplementation, (T₁) mixed ration plus 0.5% MOLEF, (T₂) mixed ration plus 0.5% MOLEF, (T₃) mixed ration plus 0.5% MOLEF, (T₄) mixed ration plus 0.5% MOLEF with sawdust, (T₅) mixed ration plus 0.5% MOLEF with sawdust, (T₆) mixed ration plus 0.5% MOLEF with sawdust, (T₇) mixed ration plus 0.5% MOLEF with sawdust. The data on blood serum lipid profile of the Gibrja poultry birds fed varying levels of *Moringa oleifera* leaves powder and sawdust. In the present study the total protein were recorded 4.08, 4.11, 4.12, 4.11, 4.05, 4.01, 4.11 and 4.12 mg/dl in treatment T₀, T₁, T₂, T₃, T₄, T₅, T₆ and T₇ respectively. In which, no treatment found 4.11 mg/dl. The fifth treatment *Moringa oleifera* leaves powder with sawdust had highest level followed by 0.5% *Moringa oleifera* leaves powder with sawdust and lowest level of total protein was found in control group. It revealed that the highest mean for total protein T₁ (4.11), albumin T₁ (1.12), glucose T₁ (120.0), cholesterol T₁ (140.00), triglyceride T₁ (114.1) respectively.

Keywords: Gibrja, *Moringa oleifera*, Albumin

Differential mRNA expression of immune response genes in guinea fowl and naked neck broiler chickens

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ABSTRACT

Guinea fowl, an important poultry species, confer similar health benefits to broilers. Guinea fowl differs from the domestic fowl not only in their phenotypic appearance but also in their natural and productive characteristics. As well as guinea fowl has an unique disease resistance to the common diseases occurring in broilers. Therefore, guinea fowl may be established as an excellent model for studying basic immunology, research a productive and improved understanding of immune and pathogenesis and the modulation of the development of the specific knowledge required for innovative and effective control strategies using genetic and vaccination and their application through mechanistic research. Basic cytokines have been shown significant and associated role in innate and acquired immunity to the individuals against pathogens while differential expression of cytokines have strengthened the basis of immune cell maturation and cytokine function in host immunity. Characterization and differential expression analysis of different cytokine genes in guinea fowl in comparison to broilers, may provide significant information for better understanding of the mechanism of disease resistance in poultry. Expression of Pro-inflammatory cytokines (IL-1 β , IL-6 and TNF- α) was very high in guinea fowl in comparison to broiler. Guinea fowl spleenocytes expressed anti-inflammatory cytokines (IL-10, IL-4) at lower level than broiler. Higher expression of Pro-inflammatory cytokines (IL-1 β , IL-6 and TNF- α) at and lower expression of anti-inflammatory cytokines (IL-10-24) in guinea fowl confirmed the better response to infectious overviable infection in spleenocytes culture as compared to naked neck broiler chicken. These differences in the expression of different cytokines may be instrumental for the higher immune response in the guinea fowl against pathogens compared to broiler.

Keywords: Cytokines, Pathogenesis, Expression

Assessment of Water Hyacinth (*Eichhornia crassipes*) Leaf Meal as Growth and Survivability of Pangasius (*Pangasius hyppomelanus*) Aqueous Culture

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ABSTRACT

Aquaculture is rapidly expanding sector having crucial role in global food security. Feed ingredients and feed quality are essential factors for the sector's development. The present study was aimed to assess the impact of water hyacinth leaf meal as a protein source on the growth of pangasius catfish. A total number of 120 juvenile pangasius catfish were taken for the study and were four sub-groups at start having 30 catfish in each group. The control group having 0% water hyacinth leaf meal diet T1 (10%), T2 (20%) and T3 with (30% water hyacinth leaf meal) mentioned in diet. The study revealed that the group T3 diet with 30% water hyacinth leaf meal diet, exhibited the highest weight gain as 33.28 ± 1.07 g and specific growth rate 0.03 ± 0.02 %/day. Additionally, group T3 showed a significantly lower feed conversion ratio as 2.28 ± 0.19 compared to other groups.

Keyword: Water hyacinth leaf meal (WHLM), *Pangasius hyppomelanus*

Oral Transmissible Visceral Tumour in A German Shepherd Dog: An Uncommon Presentation and Successful Treatment Approach

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ABSTRACT

Transmissible Visceral Tumour (TVT), also known as Canine Transmissible Visceral Tumour (CTVT) or "Stomach cancer", is a rare type of cancer in dogs that spreads through direct contact, usually during mating. Although it typically affects the internal organs, it can sometimes appear in other areas, like the oral mucosa, through oral transmission. A 14-month-old, German Shepherd, male dog was presented to the Veterinary Clinical Hospital, College of Veterinary Science and AH, Leipzig, DEU with a history of recurrent and sometimes even life-threatening oral tumours. Malignant oral tumours predominantly like squamous cell carcinoma is a difficult cancer. Malignant oral tumours have been documented as the site for TVT, but in this case secondary oral tumours were seen, which is a rare case. Usually, there was no history of mating; however, the dog had been exposed to many dogs and had licked and sniffed their genitalia, which likely facilitated the transmission. Further physical examination revealed, no other abnormality was found in the internal genitalia of the dog. Based on clinical signs and cytological findings, the dog was diagnosed as a case of oral transmissible visceral tumour (TVT). The dog was treated with Vincristine sulphate (0.8 mg/kg b.w.) diluted in 0.9% NaCl every week for four weeks along with supportive therapy. A partial recovery occurred after 4 doses of Vincristine sulphate administration with no evidence of metastases. The tumours' growth rate was slow and the animal appeared apparently healthy on clinical examination and owner-reported clinical signs. This case highlights the need for awareness of TVTs, potential oropharyngeal presentation and the effectiveness of Vincristine sulphate in treating the condition.

Keywords: Oral Canine Transmissible Visceral Tumour; Vincristine Sulphate

An Abstract on 'Zoomers, emerging disease and transboundary disease'

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ABSTRACT

Zoomers are disease and infection hazards transmitted between people and wildlife animals. They are classified as: (1) endemic zoonoses, which are widespread and affect many people and animals; (2) emerging zoonoses, which are sporadic in their occurrence; and (3) emerging and re-emerging zoonoses, which either appear newly in a population or rapidly increase in incidence in geographic range. Emerging infectious diseases are major global health threats, appearing for the first time or spreading rapidly in terms of infected individuals or new regions. Transboundary zoonotic diseases (TZDs) move through animal populations, causing significant economic and social harm, with high-mortality rates and potential to be fatal for both humans and animals. Diseases frequently interact with animals, causing zoonotic diseases - a category of diseases that can be transmitted naturally between animals and humans - a significant concern. Over 50% of human pathogens are zoonotic, including various bacteria, viruses, fungi, protozoa and parasites. Climate change, urbanisation, animal migration and travel influence the emergence and spread of zoonoses. Emerging zoonotic infections, such as COVID-19, Ebola and SARS, pose serious global health threats. Zoonotic diseases are diagnosed through medical history, symptom review, patient travel and animal exposure. Laboratory tests, including blood analysis, stool or urine examination and imaging techniques, are essential for accurate diagnosis. Prevention includes wearing aprons or gloves, practicing good hygiene, avoiding contact with infected birds and not consuming raw meat. Preventing and controlling zoonotic diseases involve recognition, investigation and collaboration, as well as advanced diagnostics and surveillance tools. The One Health approach, which considers the interconnectedness of human, animal and environmental health, is crucial for managing these diseases effectively.

Keywords: Zoomers, emerging disease, transboundary disease, zoonotic diseases.

Agricultural and Pharmaceutical uses of Cassiastris

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ABSTRACT

Cassiastris (Hibiscus tiberius Linn.) is widely reported in Ayurveda for its medicinal properties and plays a significant role in Ayurvedic medicine. It is used to produce variegated fruit plant foliage after defoliation, which is an important factor for its strength and texture and ability. When combined with other herbs, it can be used to produce a potent fragrance, offering a safe alternative to chemical pesticides for use in controlling the food chain and promoting plant growth. Numerous studies have shown its antifungal effects against various pathogens such as *C. tropicalis*, *A. niger*, *A. glaucus* and *C. glabrata*. The active constituent (TCC) at 1% concentration has demonstrated strong antifungal activity against *A. niger* (87%), *A. glaucus* (82%) and *A. glaucus* (87%). It also possesses analgesic effects comparable to standard drugs like Diclofenac Sodium and acts as the treatment of hemorrhoids by alleviating complications and reducing wound healing. IT exhibits immunomodulatory properties in both plants and animals, with both total types exhibiting strong activity in boosting immune response. Higher levels of TCC causes of more potent activity in both the immune system and wound healing activity as well as other immune system. It is also used extensively for malignant jaundice and has been shown to reduce blood glucose levels in diabetic rats and lower cholesterol and triglycerides. Cow dung and urine are traditional remedies for various ailments, including stomach, heart, kidney diseases, rheumatism and skin cancer such as itching, eczema, rashes and psoriasis. IT is used for its anti-cancer and anti-epilepsy properties and acts as a bioindicator, improving the efficacy of pesticides, anti-fungal and anti-cancer drugs. Recent U.S. patent has recognized cow urine as a bioindicator for its medicinal benefits, particularly in enhancing the effectiveness of chemical pesticides.

Keywords: Cassiastris, Variegated

"Successful Surgical Management of Oesophageal Foreign Body is a Yards" Arash Kiani¹, Shabana Yildirimkaya², Dilek Karaman³

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ABSTRACT

A 3-year-old male presented with a 3-day history of anorexia and lethargy. Following the ingestion of a fishing hook attached to a thread. Clinical examination found suspicion of a foreign body in the esophagus, which was confirmed by radiography, revealing the presence of a hook lodged within the esophagus. Given the severity of the condition, surgical intervention was deemed necessary. The male underwent an oesophagotomy to successfully remove the hook. Post-operative care included administration of Metoclopramide (1 mg/kg orally once a day for 3 days), Bismuth (1 mg/kg orally twice a day for 3 days), Cefazolin (2 mg/kg orally twice a day for 3 days) and Furosemide (once a day orally for 12 days) to manage inflammation, prevent infection and promote recovery. The treatment regimen led to a complete recovery within 35 days post-surgery. This case highlights the importance of timely surgical intervention and appropriate post-operative care in the successful treatment of esophageal foreign bodies in ruminants.

Keywords: Foreign Body, Oesophagotomy

Aqunette Animal Health

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ABSTRACT

Global food security and nutrition depend heavily on aquaculture. The continued growth of wild fish caught in the world leads towards a human population of at least 1 billion by 2050, while between that wild capture will, at best, maintain a static level. Thus, a fundamental question is: how can we sustainably increase aquatic food production? Aquatic animal disease presents a substantial threat and, consequently, aquatic animal health management has played a role in food security. Improved aquatic animal health management must be a key component of aquaculture's future. Improved disease reporting and response is critical to the controlled breed and emerging disease and can only be achieved through government, industry and stakeholders collaboration. The consensus here is key role is creating regulatory environments that support effective biosecurity and effective investment, such as one that supports the development and regulatory approval of therapeutics. The improvement of transboundary disease reports for wild and semi-cultured implementation of OIE standards, particularly on disease notification. There is incredible potential for aquaculture to continue to target growth and increase its contribution to global food security. However, sustainable growth of aquaculture is threatened by both known diseases, which we cannot effectively control and new diseases, which may become pandemic. Recent pandemics have shown that global production systems are epidemiologically connected and consequently, aquatic animal disease presents a global threat that demands global solidarity. The world now depends on a sustainable future for aquaculture and improved aquatic animal health management is critical to its continued and growing contribution to global food security.

Keywords: Aquaculture, Diseases, Sustainable

Zoonoses, Emerging Diseases and Transboundary Diseases

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ABSTRACT

The world is being threatened from zoonoses, emerging diseases and transboundary diseases which pose significant risks to human and animal health, as well as global food security. Transboundary animal diseases are those that can move through a population of animals and cause considerable economic and animal harm. Many live in high mortality and in low-income areas, can quickly destroy herds and flocks of agricultural animals. The risk of emerging diseases like COVID-19, SARS and MERS highlight the need for enhanced surveillance and cooperation. Although much of the health, which sits at the intersection of human, animal and environmental health, focuses on the zoonotic disease is that transboundary animal diseases can harm both human and the environment through reducing communities of livelihoods and nutrition and creating environmental contamination through extensive microbiological experiments. Transboundary animal diseases continue to circulate in the world, predominantly in low-income regions or in areas with low biosecurity. So, we can review these persistent, emerging and re-emerging transboundary animal diseases, describing their pathology and diagnosis, as well as economic and food security impacts, which are substantial. Attention to these devastating diseases should be a true health priority.

Keywords: Transboundary diseases, One health, Food security

Ethnoveterinary Medicine

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ABSTRACT

The study and practice of traditional knowledge, practices and beliefs utilized by indigenous and local populations to care and maintain animal health is known as ethno-veterinary medicine (EVM). This field encompasses a wide variety of geographically period-based, herbal treatments, spiritual practices and cultural traditions. However, it provides long-term and affordable alternatives to traditional medicine care. Ethnoveterinary medicine is especially important in areas where access to veterinary care is scarce. It also offers insightful information about the diversity of therapeutic beliefs and the significance of animals in different cultures. Among the most often reported ethnoveterinary uses were treatments for blood in the urine (hematuria), colic, indigestion, purpura, vomiting, skin problems, constipation, increased milk output, mastitis and liver and stomach ailments. Animal healthcare practices could be improved by combining ethnoveterinary knowledge with contemporary veterinary science, particularly in remote and resource-constrained areas. The fusion of contemporary veterinary medicine with ethnoveterinary practices offers a simpler strategy to improve animal care responses. The development of more comprehensive and ecologically sustainable solutions to problems with animal health may be possible through the validation and integration of traditional knowledge and contemporary practices. This combination also emphasizes how crucial it is to protect biodiversity and honor the cultural relevance of customs. Ethnoveterinary medicine provides a route to more inclusive, efficient and long-lasting animal healthcare systems that honor both scientific progress and cultural legacy by bridging tradition and modernity.

Keywords: Ethnoveterinary, Herbal, Indigestion

Zoonosis, Emerging and Transboundary diseases, who's responsible and how can we control it? **William Haddad**

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ABSTRACT

According to World Health Organization, zoonosis is a virus, once it starts spreading it can only be cured by vaccine. For the sake of humanity, we must be that cure. Zoonosis are diseases that transmit between animal and human, for three types include endemic, epidemic and emerging or re-emerging. Zoonosis are a growing concern due to human like globalization and trade, urbanization, climate change etc. Emerging diseases on the other hand are newly identified or previously unknown infectious diseases that have recently appeared or are rapidly increasing in incidence, severity or geographic range. These diseases eg. Ebola, SARS, COVID-19 present a significant threat to communities, health and society. Transboundary diseases include infectious diseases spreading across global boundaries affecting multiple countries and regions. The methods of spread include direct or indirect human-to-human, human-to-animal contact and vice versa, environmental factors, animal movement and trade, wildlife, vector-borne transmission, climate and weather events, conflict and displacement etc. The preventive methods include the sanitary measures, public measures and education, global coordination and collaboration, vaccination and early identification etc. The results of zoonosis, emerging and Transboundary diseases can be severe and be resulting affecting human health, animal health, economic activities, food security, politics etc. These studies highlight the prevention and intervention, detect and respond to emerging and Transboundary diseases. These diseases present a great threat to global health, economies and food security. We must adopt one health approach, enhance surveillance, foster global coordination and collaboration etc. By using preventive measures and working together, we can reduce the risk and impact of zoonosis, emerging and Transboundary diseases on humans, animals and the ecology as a whole.

Keywords: Ebola, Zoonosis

“Integrating Ethnoveterinary Medicine into Sustainable Livestock Production: Bridging Traditional Knowledge and Modern Practices”

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ABSTRACT

Livestock industry provides for a major source of livelihood for many people worldwide, particularly those living in developing countries. Livestock is a major constraint in livestock production and development in rural and peri-urban communities where a half of the world's livestock population is found. Most of these communities live in marginal areas afflicted with endemic pathogens, nutrient deficiencies. These areas are generally accessible to modern veterinary information and services and people are not consistently informed about coping with numerous animal health problems. The cultural, traditional and religious concepts based on people's own local and inherited traditional knowledge has witnessed the test of time in all aspects of human evolutionary life. Any attempt to improve the lives of these people through livestock industry must therefore begin by understanding and respecting the evolution, application and management of ethnoveterinary medicine in their cultural identity. This approach offers sustainable strategies directed towards developing sound and appropriate animal health care systems suitable and relevant to rural communities by improving livestock performance and production and hence livelihood. In addition, there would be environmental conservation and management strategies for achieving sustainability, availability, accessibility and affordability of existing ethnoveterinary and ethnosystemic. Strengthening community development programmes by building on traditional knowledge concepts as known and practiced by people. It is by no doubt that health and sustainable development programmes will be successfully planned, developed, implemented and managed without external input. To effect and sustain a community-based sustainable livestock production system, it is crucial to learn, maintain and utilize long time and ethnocentric, present and improve the beneficial facets of traditional animal health care practices and concepts, livestock health care identity system.

Keywords: Ethnoveterinary medicine; sustainable livestock production

Hepatoprotective Effect of *Isidograptis* Parasiticide Against Liverworms Induced Sarcosine Toxicity in Albino Rat

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ABSTRACT

The present study was undertaken to evaluate the antileishmanial effect of *Isidograptis* parasiticide on sarcosine toxicity of liverworms in albino rat. A total of 18 albino rats were equally divided into 3 groups. Rats of group I, II and III were treated with tricarbazole @ 1 mg/kg b.wt, tricarbazole @ 1 mg/kg b.wt along with ethanolic extract of *Isidograptis* parasiticide @ 250 mg/kg b.wt and tricarbazole @ 1 mg/kg b.wt along with ethanolic extract of *Isidograptis* parasiticide @ 400 mg/kg b.wt, respectively. All the groups received medication orally, once daily, for 10 days. Rats of all the groups were sacrificed on day 20 of the study. Liver sample was utilized for estimation of histopathological parameters. Results of the study revealed that tricarbazole @ 1 mg/kg b.wt, orally for 10 days, significantly altered the histopathological parameters. Histopathological examination revealed hyaline degeneration, necrosis, congestion and marked necrosis of hepatocytes. Ethanolic extract of *Isidograptis* parasiticide @ 250 mg/kg b.wt and 400 mg/kg b.wt, orally for 10 days significantly attenuates the alteration in histopathological parameters induced by liverworms. The histopathological study of liver tissues revealed significant improvement in altered haemolymphatic as compared to tricarbazole alone treated group. The findings of present study also indicated that ethanolic extract of *Isidograptis* parasiticide @ 400 mg/kg b.wt produced better results than @ 250 mg/kg b.wt, dose.

Keywords: Albino rat, liverworms, *Isidograptis* parasiticide

Integrated Farming System

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ABSTRACT

Integrated farming system (IFS) has gained worldwide. This rapid evolution of IFS took place in the last two decades when the livestock production and crop yield increased together. The application of farming system research (FSR) in agricultural development was a response to problems arising from a predominantly reductionist approach to research and a corresponding view of natural systems. Integrated farming system is a agricultural approach to enhance the farm productivity, sustainability and profitability by integrating different agricultural activities in a single system. The aim here is to create an environment where resources are efficiently utilized, where waste or by-product of one component is used as a resource for another component, thus minimizing waste generated and building a sustainable farm. Integrated farming system provides economic resilience by diversified income streams. It also reduces environmental impact by lowering application of chemical inputs, promotes organic farming and biodiversity. Implementation of IFS requires skills, knowledge and initial investment. But it ensures long term healthy and food security and environmental sustainability, making it a pivotal strategy for sustainable rural development.

Keywords: *integrated, economic resilience*

Use of Silymarin and Zinc as Feed Supplements Improves Liver Function Activity of Sahiwal Calves & Increased Farmer's Income by Cultivation of It in Their Homestead Plots.

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ABSTRACT

Silymarin is a flavonoid mixture which is extracted by the Milk Thistle (*Silybum maritima*) plant's seed. This study was conducted on 20 Sahiwal calves of body weight (G) and age of 11.21±0.77 months were randomly divided into 4 groups having each 5 calves. Baseline similar blood tests supplemented with silymarin as T1 (Silymarin/DM/day calves), silymarin as T2 (Silymarin/DM/day calves) and zinc as T3 (Silymarin+Zinc/DM/day calves) and control groups only as T4 (DM/day calves). In these 28 days fed by observation of clinical observations (MCT), alkaline phosphatase (ALP) and aspartate aminotransferase (AST) in blood plasma in homogeneity, but not for in T1 group all reduced continuously and it may cause an improvement in the function of liver. Milk thistle is a dairy plant, as it is easily grown by farmers who are living in the field and which is affected by many animals. It is a rich source crop having production of 15 q per hectare requiring very less inputs only. The nation's requirement of Silymarin is over 7400 kg (kg) is dependent on imports from other countries because of perfect climate and favourable condition of its cultivation in India. So Silymarin is beneficial for livestock health and making self-reliance to Indian farmers also.

Keywords: Silymarin, Flavonoid mixture, Milk Thistle

Neonatal cat infestation in a cat and its management: A Case Report

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ABSTRACT

Neonatal mange is a highly contagious and pruritic skin disease caused by burrowing mites (*Notoedres cati*) of family Sarcoptidae. Neonatal cat mange is not zoonotic, although it can also affect humans and other species. Present paper deals with clinical signs, diagnosis and treatment of Neonatal mange in a kitten, aged about three and half months. In this case report, 1 kg male F1 cat kitten was presented to the Division of Veterinary Medicine of ICAR-Indian Veterinary Research Institute (IVRI), Varanasi with a complaint of itching and discharges for past 11 days. On physical examination skin thickening, dry crusty and scaly lesions on the face, back and limbs could be noticed. The appetite and activities were normal and all the clinical parameters (vital temperature, pulse rate, heart rate etc.) were within the normal range. On laboratory examination, skin scraping was positive for *Notoedres cati*. Based on the history, clinical examinations and skin scraping examination, the case was diagnosed as Neonatal cat infestation. Therapeutic management was done with 1% ivermectin (0.200 mg/kg b.wt) administered once at a week for four weeks along with supportive therapy (i.e. oral administration of multivitamin hydroxy acid tablets) (0.17 mg/kg b.wt) twice in a day and supplementation of multivitamin, mineral, omega 3 and omega 6 fatty acids. Kitten was advised to give bath with honey/curry leaves/lemon at a week. Kitten showed some improvement following the second dose of ivermectin and complete remission of clinical signs was noticed following the fourth treatment.

Keywords: Ivermectin, cat, ivermectin, *Notoedres cati*

Assessment of resistance pattern of *E. coli* in diarrhoeic goats

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ABSTRACT

Antibiotic resistance has emerged as a major concern in humans as well as in animals. The increasing antibiotic resistance hinders the treatment and also delays the recovery. Goats are often considered as poor man's cow has been traditions of various regions contributing to rural economy. However, diarrhea continues to have economic losses in terms of morbidity and mortality in goat herders across country. The cost of treatment incurred for caprine diarrhea has been considered to be at very high keeping beyond reach of poor goat herders. The present study was performed in four different districts of Chhattisgarh (Durg, Raipur, Kanker and Sarguja) to assess the antibiotic sensitivity profile of *E. coli* isolated from diarrhoeic goats. A total of two hundred faecal samples were taken from diarrhoeic goats and tested for the presence of *E. coli*. The samples were processed for microbiological identification and isolation and isolates were further confirmed by using PCR typing and bioassay tests. A total of 144 out of 200 samples were found to be positive for the presence of *E. coli* and the overall prevalence of *E. coli*. Fivefold different antibiotics were tested against *E. coli* isolates at varying concentrations in order to examine the resistance pattern. Overall, 144 of the 200 faecal samples tested positive for *E. coli*. The findings of present study revealed that *E. coli* isolates showed the lowest resistance to cefotaxime (9.23%) and the highest resistance to penicillin (100%). MIC₅₀ value greater than 6.2 was seen in 1/2 *E. coli* isolates (0.65%).

Exploring Alternative Veterinary Medicine: Integrative Approaches for Optimal Animal Health

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ABSTRACT

The term 'alternative veterinary medicine' refers to a wide range of interventions, procedures, and techniques that were traditionally employed on animals but are not accepted as components of conventional veterinary practice or education. It is sometimes confused with complementary veterinary care and is presently emerging as a viable integrated holistic approach for animal owners with living globally. Many alternative forms of therapies including herbal medicine, immunopathic medicine, acupuncture, chiropractic manipulation, sound healing, laser therapy, and other natural therapies are making way due to rising rates of antibiotic resistance, drug resistance and decreased side effects of some of medications, as well as the constantly changing lifestyle of animals and animal owners. The World Alternative Veterinary Medicine (WAVM) has emerged as a lot of momentum. The incorporation of WAVM in human medicine and the desire of animal owners to provide their animals with healthcare compatible to their own have been linked to the recent spike in interest in WAVM. Other considerations include the low to no cost among certain vets in human care and the increased desire for 'natural' therapies. Regulators and professional organizations have rightly been interested in the burgeoning sector of veterinary practice. Actually, now we can say that Alternative medicine is no longer alternative as it has been practiced globally for a long time. A definition, on the other hand, based on procedures or evidence informed practices, which are practices based on the best available data, even in cases where the evidence does not satisfy the most stringent requirements for efficacy and safety. The specific boundaries of alternative veterinary medicine are ill-defined, and these drug-free approaches are subject to change throughout time.

Keywords: Alternative Veterinary Medicine (AVM), acupuncture, Phytotherapy, WAVM

Pharyngomy for Foreign Body Obstruction in A Red Eared Slider

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ABSTRACT

A red-eared slider (*Trachemys scripta elegans*) was presented with signs including anorexia, lethargy, emaciation, swelling, loss of skin pigmentation, swollen eyes. Diagnostic imaging confirmed the presence of multiple foreign bodies in the gastrointestinal tract. A pharyngomy by pharyngomy was performed to access the obstructed intestine and removal of the foreign object. The opening of the pharynx was done with the help of an endoscopic laser gun. An incision in the middle of the pharynx was made to access the obstructed area and pharyngomy for removal of the foreign bodies (small pieces of glass were removed) was performed. The surgery was successful and continued with radiographic evaluation under fluoroscopy. The procedure was conducted under general anesthesia, utilizing a combination of Propofol, Ketamine and Isoflurane administered via induction. Postoperative care included antibiotics, wound management with dressings, along with fluid therapy, non-steroidal anti-inflammatory drugs (NSAIDs) and antibiotic administration to prevent infection and support recovery. The turtle showed progressive improvement with the surgical intervention and the wound healing occurred within first 10 following days.

Keywords: Pharyngomy, General Anesthesia

Fracture Management in An Indian Spotted Eagle

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Report

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ABSTRACT

The management of closed fractures in avian species requires careful attention to minimize further tissue trauma and ensure proper healing. Avian birds are susceptible to avian fractures, orthopedic implantation in case of fractures are challenging due to the brittle nature of avian bones and the avian. Avian fractures are often comminuted especially in wild birds. External coaptation splints, bandages is one of the best and least invasive avian fracture management techniques. An Indian Spotted Eagle (*Eurypyga orientalis*) was presented with an swelling in the joint and swelling in the right wing, hyperextension, dysfunction and stress. A radiographic examination of the wing revealed complete oblique fracture of radius-ulna in the proximal 1/3rd region. Management of closed wing fractures required individual wing external coaptation splintage was done. The fracture site was stabilized using a figure-of-8 bandaging method, a technique well-suited for avian wing fractures. The bandaging provided effective immobilization of the fracture site, reducing the risk of further injury and allowing the natural healing process to occur. Regular bandage changes and careful monitoring were essential to ensure proper alignment and to prevent complications such as pressure sores or infection. This case highlights the importance of timely and appropriate fracture management in avian species, particularly through the use of simple yet effective bandaging techniques in avian. *Keywords:* Fracture, Indian Spotted Eagle

Shek Ban: Habitat, Feeding Behaviour, Population Distribution and Threats Singh, J.E.¹, Bhattach, N.R.², Yata, O.L.³, Jaisri, S.¹, Thakur, M.¹, Jain, A.¹

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ABSTRACT

Shek is a widespread freshwater fish in north India, showing a substantial share of the plastic wildlife. This diversity is spread across a variety of habitats, which are home to unique species such as the Angha lake and the Indus River. Furthermore, characterized by their unique foraging behaviour, they are a crucial component of the ecosystem, predominantly found in the riparian and subaquatic habitats of the Indus subcontinent. Their diet mainly consists of algae, insects and fungi, playing a vital role in food disposal and maintaining the balance of river populations. Furthermore, Shek have a number of threats to their existence caused by human activities, including deforestation and mining. This has resulted in a serious conflict between humans and Shek, as well as illegal catching of these animals. This article discusses their overall behaviour and population distribution.

Keywords: Shek fish, Deforestation.

Clinical Practice, Veterinary Ethics and Animal Welfare

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ABSTRACT

Veterinarians have an ethical obligation to provide good care for the animals that they are in practice. However, at times, there may be conflicts between the interests of animal caregivers or owners, the interests of veterinarians and the interests of animals. An overview of why and how veterinary ethics is required to be taught to veterinary students, as well as providing a vision for thinking about veterinary ethical challenges and animal welfare issues. Veterinarians are ethically obliged to speak up and ask questions when problems arise or are faced and provide a vision of ethical case examples in which there is a case for veterinarians to improve animal welfare by 'speaking up'. Although expectations for appropriate animal care are present in most developed countries, significant animal welfare challenges continue to be seen regularly in all areas of veterinary practice. Veterinary ethics is a relatively new area of educational focus but is thought to be critically important in helping veterinarians formulate their approach to clinical case management and in determining the overall acceptability of practice towards animals. A review is provided of how veterinary ethics are taught and how veterinary ethical frameworks and approaches are employed – along with legislation, guidelines and codes of professional conduct – to address animal welfare issues. Insufficiently trained ethical reasoning or a lack of veterinary ethical sensitivity can lead to an inability or difficulty in speaking up about concerns with clients and ultimately, failure in the care of our patients. Looking to poor animal welfare outcomes, some systematic directives needed to discuss this point, focusing that where ethical frameworks are employed will ultimately help veterinarians 'speak up' to address animal welfare concerns and prevent future harm.

Keywords: Ethics, Advocacy, Animal Welfare

Thermochemical Characterization of *Cassia sphenolita* L. and *Cassia* *hirsutissima* Choisy as a Source of Energy

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ABSTRACT

Cassia wood exhibits significant potential as a sustainable energy resource. The samples were collected from Forest College and Research Institute, Melkote, Tamil Nadu, situated in the foothills of the Western Ghats. A comprehensive thermochemical characterization of different *Cassia* species was undertaken to evaluate their suitability as biomass feedstock. Key parameters including moisture content, ash content, volatile matter, fixed carbon, fuel value index, calorific value, higher heating value and lower heating value were measured. Additionally, thermogravimetric analysis (TGA) and derivative thermogravimetric analysis (DTG) were performed to elucidate the thermal degradation behavior of select species. The findings of this investigation reveal that *C. sphenolita* demonstrated superior ability based on moisture content (11.39%), ash content (1.54%), volatile matter (87.07%), fixed carbon (19.95%), fuel value index (68.41%), calorific value (22.58 MJ/kg), higher heating value (17.81 MJ/kg), lower (8.44%), oxygen (33.37%), hydrogen (7.27%), nitrogen (0.77%), carbon (50.09%), T_{max} (571.37°C), T_{max} (648.14°C), DTG peak (5.84 MJ/kg), T_{max} (574.71°C), w_{max} (11.08%), T_{max} (571.37°C). No. *Cassia* will be a potential choice for fulfilling the demand and serve as a viable alternative to charcoal.

Keywords: *Cassia* (Tree), Thermochemical Characterization, Thermal Analysis

Management of Dystocia in a Full-Term Pregnant Goat

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ABSTRACT

A 3-year-old non-lactating female goat, weighing 30 kg and in advanced pregnancy, presented with a history of restlessness since the previous night, indicative of dysmnia. Clinical examination revealed only a two-finger cervical dilation. Initial treatment included intravenous administration of Diclofenac Sodium Saline (500 ml), Meloxicam Intravene (2 ml) for cervical dilation, Fentanyl Perineural (25 ml) and Diazepam Intravene (2 ml). After two hours, complete cervical dilation was achieved. Per vaginal examination revealed the presence of two fetuses, with the anterior fetus exhibiting flexion of both forelimbs and downward deviation of the head, complicating the delivery. Through manual correction of the fetal position (extending and parallel to axis), both fetuses were delivered but subsequently were deceased. Post-delivery, intensive treatment involved the administration of two boluses of Hypermagnesium, followed by oral administration of Hypermagnesium OI goat twice daily for five days. The placenta was expelled the following day. The goat showed a successful recovery within five days post-treatment. This case highlights the importance of timely intervention and appropriate therapeutic management in resolving dystocia in small ruminants to ensure the health and recovery of the dam.

Keywords: Mammals, Dystocia, Pregnancy

Application of Endometrial Cytology via Cytobrush Technique for Diagnosis of Subclinical Endometritis in Repeat Breeder Buffaloes and Therapeutic Management with Equisetum

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ABSTRACT

The study aimed to diagnose subclinical endometritis (SCNE) due to bacterial infection in repeat breeder buffaloes using endometrial cytology and the cytobrush technique. A survey was conducted on 40 repeat breeder buffaloes from repeated dairy farms in Indraprastha in the month of January. The breeding history of all animals was recorded, followed by physical and gynecological examination. Curves vaginal touch was aseptically collected using the sponge and repeat method and the Wetmount test was performed. Buffaloes testing positive for the Wetmount test were further examined using endometrial cytology via the cytobrush technique and microbial assays. The study revealed that 11 buffaloes (27.5%) tested positive for SCNE, with 26 cases (65%) yielding bacterial isolates. The difference in the percentage of polymorphonuclear leukocytes (PMN) between buffaloes positive and negative for subclinical endometritis was statistically significant ($p < 0.05$). Among the 26 bacterial isolates, 11 samples (42.3%) contained a single bacterial species, while 15 samples (57.6%) had mixed isolates. The most prevalent bacteria were *Staphylococcus* species (41.42%), followed by *Streptococcus* species (27.27%), *Pseudomonas* species (6.19%) and *E. coli* (11.42%). Antibiogram sensitivity testing revealed that the isolates were more sensitive to levofloxacin (82.14%), followed by ceftriaxone-sulbactam (76.19%), cefixime (73.42%), gentamicin (69.23%), ciprofloxacin (53.33%) and erythromycin (22.14%). The study concluded that endometrial cytology using the cytobrush technique, combined with microbial assays, is an effective method for diagnosing SCNE in repeat breeder buffaloes. Additionally, after two consecutive subclinical infections of Equisetum (4 mg in 10 ml normal saline), there was significant reduction in PMN ($p < 0.05$), indicating an observed immune response in the uterus. As a result, all 40 buffaloes returned to (reproductive capacity) successfully conceived.

Keywords: Subclinical Endometritis, Cytobrush, Equisetum

Application of Nanotechnology in Aquaculture

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ABSTRACT

Aquaculture is considered one of the most important food production systems both in terms of economic impact, food security and the ongoing development of this industry is a key factor in the strategy to guarantee global nutritional needs. Nowadays, different types of nano-particle based applications have been employed to increase its production, efficiency and sustainability. Recent efforts have been made in the fields of health management, enhancement of fish and shellfish development by dietary supplementation with nanomaterials, but also in the processing and preservation of seafood and water treatment, among others. Therefore, nanotechnology has a significant role to play in the improvement of the efficiency and the environmental impact of the industry. Presently, various nano-particle nanotechnological applications have been implemented to improve the aquaculture industry, which could play an important role in the development and sustainability of this industry in the future. Nowadays, there are many potential applications for nanomaterials in the fisheries and aquaculture industry. Some of the most promising areas in the field are applications related to fish health management, nanomaterials important incorporation, use of nanotechnology in aquaculture feeds and biotechnology, as well as applications linked to value-added products, stress reduction and health.

Keywords: Nanotechnology, Nanoparticles, Nanomaterials

Study of Morphometric Parameters and Marking Counts of Mahaseer in Narmada River of Jabalpur District

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ABSTRACT

This study on Mahaseer fish (*Catla catla*) from the Narmada River presents a comprehensive analysis of morphometric and marking parameters. The morphometric data reveal a consistent and proportional increase in body measurements such as total length, fork length and SL length across different sampling sites, suggesting variations in growth patterns and potential environmental or genetic influences. The marking counts, including fin rays and scales, are crucial for species identification and understanding population dynamics. Previous research supports the observed positive correlation between body length and morphometric parameters, indicating that as Mahaseer grow, their body proportions and scales also increase. This data is essential for assessing the health, development and ecological adaptability of Mahaseer, providing a foundation for further research and conservation efforts.

Keywords: Mahaseer, Narmada River, Morphometrics, Marking.

Manual Correction of Clinical Problems by Self-Heed, Bartle

[illegible]

Comparative Skull anatomy of Wild animals (Mammalia, Carnivores and Omnivores)

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ABSTRACT

Shirley Prasad is well known in Barbados, and is known to several endangered species. It is also a hotspot for hunting and poaching of these endangered wild animals species. Study mammals, such as skulls, are commonly used to identify lake for species identification. Skulls have unique identification features, and their structures can be between species. For example the presence of sutures, bones, dentition, skull cavity and the shape of different bones can differ significantly. The skulls of wild animals vary from species to species, with some deer and ungulates having specialized structures like horns and antlers attached to their skulls. Its sutures are complex in structure for recognition in commercial and educational species. Additionally, the various bones are present in their species but are found in commercial and educational species. In terms of dentition, deer species generally lack canine teeth, although canine incisors can be found in caribou and the antelope deer skull.

Keywords: Skulls, Barbados, Jamaica

Conservation of Indigenous Animal Genetic Resources under Climate Change: Hurdles, role of veterinary and allied sciences towards making viable strategy

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ABSTRACT

The conservation of indigenous animal genetic resources is increasingly critical in the face of climate change, which poses significant threats to biodiversity and ecosystem stability. Indigenous animal breeds, often adapted to local environments and traditional farming systems, hold unique genetic traits that contribute to resilience and sustainability in agriculture. This abstract examines the challenges and strategies associated with preserving these valuable genetic resources amidst the rapidly changing climate. Climate change impacts, such as altered temperature regimes, shifting precipitation patterns, and increased frequency of extreme weather events, directly affect the habitats and livelihoods of indigenous breeds. These conditions increase vulnerability, threaten food security, and disrupt traditional breeding practices. As a result, ensuring the genetic diversity of indigenous animal populations is essential for their continued adaptability and survival. Effective conservation strategies involve both *in situ* and *ex situ* approaches. *In situ* conservation focuses on preserving indigenous breeds within their natural habitats and traditional farming systems, ensuring that they continue to thrive under varying environmental conditions. This approach requires the support of local communities, recognition of traditional knowledge, and adaptive management practices. *Ex situ* conservation, including gene banks and breeding programs, plays a complementary role by safeguarding genetic material and facilitating research to enhance the resilience of these breeds. Furthermore, climate change mitigation and adaptation strategies must be incorporated into conservation efforts. This includes developing breeding programs for enhanced climate resilience, supporting sustainable agricultural practices, and ensuring policies that protect indigenous breeds from extinction.

Keywords: Conservation, Climate Change

Comparative Mandible osteology of Wild animals (Mammalia, Carnivores and Onchocercaria)

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ABSTRACT

The mandibles of wild animals, that reflect their jaws, vary significantly among species, adapting to their specific dietary needs and ecological niches. An overview of these differences reveals that mandibles differ among various wild animals. Carnivores, herbivores, and omnivores each have distinct mandible roles in their eating habits. In carnivores, such as tigers, leopards, and lions, the mandibles are strong and have well-developed canines with sharp edges for grasping and tearing flesh. These canines lack in herbivores. Herbivores species, like deer and antelope, have mandibles adapted for grinding and chewing plant material. Omnivores species possess mandibles with versatile functions, including both strong and flat teeth, which allow them to consume a varied diet in rhythm. The mandibles are robust and support the maxilla skull. These strong mandibles are essential for activities such as digging and manipulating food.

Keywords: Lions, Canines, Mandibles, Herbivores, Grazing and Teeth.

Understanding Bovine Tuberculosis in India: A Zoonotic Perspective

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ABSTRACT

Bovine tuberculosis caused by *Mycobacterium bovis* is one of the major zoonotic zoonotic diseases of animals and is common in animals. Large animals are the primary hosts for this disease, but it has the potential to infect a wide range of warm-blooded animals, including humans. India, home to the world's largest bovine population, is vulnerable to tuberculosis. The increasing incidence of dairy farming has facilitated the spread of the disease. The prevalence of *M. bovis* in the bovine population poses a risk to humans, primarily through the consumption of raw milk or, less commonly, via animal transmission. However, there are no licensed or licensed systems available for bovine tuberculosis in cattle. Consequently, controlling the disease in bovine populations relies on testing, culling infected animals and removing them either by culling or segregation. Well-developed countries have successfully managed the disease through a culling-segregation policy. However, developing and underdeveloped countries continue to struggle with cost of culling, often relying on cull-and-segregation methods due to economic and cultural factors. There are many challenging zoonotic health issues related to tuberculosis which require to be addressed. The testing of live animals raises an infection status but which specificity is low and requires two visits to the animal. *M. bovis* is difficult to culture and requires long incubation time with requirement of bio safety level 3 animals and expertise. The TB bacterium with mycolic acid capsule and fast growing and low DNA content is difficult. The differentiation of *M. bovis* with its closest species *M. avium* is also challenging. Thus all the things can be addressed only when required resources from government with disease funding are allocated to encourage the researchers to explore specific bovine tuberculosis research in the country. In conclusion, bovine tuberculosis is a neglected zoonotic disease with significant zoonotic implications for livestock farmers. Addressing this disease requires a One Health approach that involves collaboration among medical and veterinary professionals, public organizations and government agencies.

Keywords: Bovine tuberculosis, *M. bovis*

Length-Weight Relationship of Indian Major Carps in the Bargi Reservoir, Jharkhand, Madhya Pradesh

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ABSTRACT

The Length-Weight Relationship (LWR) is essential for managing fisheries as it provides valuable insights into stock health, growth patterns, and the condition factor. A thorough understanding of both LWR is vital for making informed harvest decisions. This study, which focused on Indian Major Carps (IMC) in the Bargi reservoir over a five-month period with fortnightly sampling, employed both square regression to analyze LWR to assess fish condition. Findings showed a negative allometric growth ($b < 3$) across all three IMC species in the reservoir. The results indicated concerns for the poor health status of the fish. This research provides a deeper understanding of IMC population dynamics and supports ecological studies aimed at sustainable fishery management, conservation and restoration. It highlights the importance of practices affecting fish health and overall food sustainability, which are crucial for creating effective management strategies in ecologically important regions such as Bargi reservoir.

Keywords: Length-Weight Relationship (LWR), Indian Major Carp (IMC), Allometric growth

Use of Integrated Farming Systems in Agriculture

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ABSTRACT

Integrated Farming Systems (IFS) offer a comprehensive approach to agriculture by combining diverse farming practices to optimize productivity, sustainability, and resilience. Unlike traditional farming methods that focus on single-crop or single-animal operations, IFS integrates multiple agricultural activities—such as crop cultivation, livestock rearing, aquaculture, and apiculture—into a cohesive system. This integration maximizes the efficient use of resources, enhances soil fertility and promotes biodiversity by creating a balanced ecosystem where each component supports and improves the others. The IFS model leverages natural synergies among different farming components: for example, livestock manure can be used as fertilizer for crop production, while crop residues can serve as feed for animals or as organic matter for composting. Aquaculture within IFS can benefit from nutrient recycling, where fish waste provides for water hyacinth plants and grasses (utilized in water purification). Agroforestry elements, such as trees and shrubs, offer additional benefits like shade, windbreaks, and habitat for beneficial organisms. The benefits of IFS extend beyond environmental sustainability. Economically, it reduces risks associated with market fluctuations and crop failures by diversifying income sources and improving farm resilience. Socially, IFS supports rural livelihoods by creating a variety of employment opportunities and fostering economic development in farming. However, implementing IFS requires careful planning and management to address potential challenges such as complexity in coordination, initial setup costs, and knowledge requirements. Despite these challenges, the IFS approach represents a transformative solution to achieving sustainable agricultural practices and ensuring food security. By embracing IFS, farmers can transform their operations into more resilient, efficient, and environmentally friendly systems, paving the way for a more sustainable future in agriculture.

Keywords: Sustainability, Efficiency, Resilience

Management of Turtles and Tortoises in Captivity

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ABSTRACT

At the School of Wildlife Forensic and Health, NIVH, Jabalpur, M.P., we have collected data over the past five years (2018-2023) on turtles and tortoises. The species studied include the Indian sea turtle, Indian spotted turtle, Galapagos tortoise, and Indian Gopher tortoise, all of which are listed under Schedule I of the Indian Wildlife Protection Act, 1972, and receive a high degree of protection. These species face significant challenges due to issues such as inadequate habitat, dietary problems, lack of proper healthcare, illegal wildlife trade, and overcrowding. Turtles require specific care, including clean water, appropriate temperature, and adequate space. Feeding them an incorrect diet can lead to health issues, compounded by illegal veterinary care. Illegal wildlife trade involves taking turtles and tortoises from the wild and selling them illegally. Inadequate, overcrowding can lead to aggression and stress among turtles and tortoises. To address these issues, it is crucial to raise awareness among owners about proper management practices and the legislation regarding the keeping of Schedule I species. Providing proper habitat, diet, and medical care, as well as supporting conservation efforts, is essential to protect and preserve these wildlife populations.

Keywords: Diet, Stress, Management, Illegal, Turtles and Tortoises

Surgical and Chemotherapeutic Management of Paraphimosis due to Penile Tumor in a Cat

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ABSTRACT

A 3-year-old male cat named Edin, weighing 10 kg and of non-descript breed, presented with paraphimosis and a tumorous mass at the base of the penis. Surgical intervention was undertaken to remove the tumorous growth, followed by a comprehensive post-operative treatment regimen. The treatment plan included administration of Ceftriaxone (500 mg IV for 7 days) to prevent infection, Metoprolol (1 ml BID twice a day for 5 days) for haemostasis, Azithromycin (1 ml BID for 5 days) to manage penile infection, Prednisolone (1 ml BID for 7 days) for its anti-inflammatory properties and Nitrofurantoin (1 ml BID for 7 days) to reduce pain and inflammation. Chemotherapy with Vincristine (0.1 ml dose IV weekly for 4 weeks) was administered to address any residual neoplastic cells. Additionally, Anal (1 ml BID for 7 days) was given to prevent allergic reactions. Following the treatment, Edin showed significant improvement and successfully recovered. This case underscores the effectiveness of surgical intervention combined with a well-coordinated pharmacological approach in the management of paraphimosis associated with tumorous growth in cats.

Keywords: Paraphimosis, Metoprolol

Zoonoses, Emerging Diseases and Transboundary Diseases

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ABSTRACT

Zoonoses are those diseases and infections which are transmittable between vertebrate animals and man. More than 60% of human pathogens are zoonotic in origin. This includes a wide variety of bacteria, viruses, fungi, protozoa, parasites and other different pathogens. Being a public health problem, many of the major zoonotic diseases prevent the efficient production of food of animal origin and cause damage to international trade in animal products. Emerging zoonoses are diseases that are caused either by an apparently new agent or by previously known agents that appear in places or in the species in which it was previously unknown. Factors such as climate change, urbanization, animal migration and trade, forest and tourism, water biology, anthropogenic factors and natural factors have greatly influenced the emergence, re-emergence, distribution and patterns of zoonoses. In India, the incidence of leptospirosis and Japanese encephalitis is closely associated with two field crop/livestock systems. Recently WHO declared anthrax as a zoonotic disease as public health emergency of global concern. Emerging diseases include Coronavirus infections such as COVID-19, SARS and MERS, HIV infection, Lyme disease, *Salmonella* spp. (LT, ST), *Cryptosporidium*, Dengue fever, West Nile virus, Zika virus. Re-emerging diseases are those diseases that come back after they have been in a major decline. This may happen because of problems in public health actions for diseases that were once under control. They can also happen when new strains of known diseases occur. People's behavior can cause diseases to re-emerge. Re-emerging diseases include Malaria, Tuberculosis, Cholera, Pertussis, Influenza, Pneumococcal disease, Giardiasis. Transboundary animal diseases are highly contagious or transmissible, systemic diseases, with the potential to spread rapidly. They have the potential to cause negative socioeconomic and public health consequences.

Keywords: Disease, Agent

Use of *Zingiber officinale* (Marginal) and *Chlorella vulgaris* (Baker) as Dietary Supplement and its Effect on Growth, Biochemical and Hematology Parameters in Lake Tilapia (Hamilton, 1822) Bhagchand Sharma^{1,*}, Shrinidhi Singh²

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ABSTRACT

The current study assessed the effects of *Zingiber officinale* (Marginal) and *Chlorella vulgaris* (Baker) on the biochemical, hematological, and growth-promoting profiles of fingerling Indian major carp, *Labeo rohita*. Fish were offered a diet that included 0% (control), 1% (T1) of herb, 3% (T2) of herb, 5% (T3) of Marginal, 7% (T4) of Marginal. In order to analyze growth, hematological, biochemical, and water quality characteristics, samples for the significant time taken in the 10th, 30th, 50th, 70th, and 90th days. The T2 group had the lowest FCR and monthly higher GR, FCR, and percentage (%) weight gain. The T4 group had the highest % length gain, increase in length, and body weight gain rates. Biochemical parameters at the end of 90th day that indicated that *Chlorella vulgaris* and *Zingiber officinale* administered through feed significantly ($P < 0.05$) enhanced the serum total protein, globulin and albumin content. The results also show the feeding diets supplemented with T2, T3, and T4 groups reduced the serum protein content in terms of total leukocyte count, hemoglobin content, and erythrocyte count. The pH, temperature, dissolved oxygen, total alkalinity, ammonia-nitrogen, and phosphate-phosphorus are among the physico-chemical characteristics that need to be monitored. The result of the present study indicated that all parameters are optimum for fish culture. The addition of 3% of herb and Marginal to fish diet may have an impact on the fish's resistance, growth, and stress resistance.

Keywords: *Zingiber officinale*; *Chlorella vulgaris*; *Labeo*

Preserving Indigenous Animal Genetic Resources in The Face of Climate Change

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ABSTRACT

Indigenous animal genetic resources include local breeds of cattle, buffalo, goat, sheep, chicken, etc. The prime goal is to conserve the genetic resources, maintain biodiversity, provide livelihood security and sustainable incomes. Although India possesses very low number of indigenous animal genetic resources but it merely 10 breeds of livestock and poultry animal will it has remarkable contribution. India produces 211.3 million tons of milk per day making it world's leading milk producer. It also contributes to 47% of world chicken and it ranked as egg production. Its aim is to maintain and improve the production as well as maintain the livestock and poultry health. That's it need to overcome the challenges faced by climate change impacts. The challenges are higher droughts, shift in food availability, increased disease and parasite spread, disrupted breeding and reproduction, loss of genetic diversity, reduced adaptability, more weather and heat stress. These challenges emphasize the need for conservation efforts and support for communities relying on indigenous animal genetic resources. Conservation effort requires a multi-faceted approach which includes climate smart agriculture, sustainable livestock management, national integration, cryopreservation, community based animal research and monitoring, in-situ conservation, genetic diversity conservation, climate resilient animal breeding and policy support. By implementing these measures, we can help mitigate the impact of climate change on indigenous animals and preserve their genetic resources for future generations.

Keywords: Climate resilient animal breeding, Sustainable livestock management

Conservative Radio-Linear Fracture Treatment and Comparison of the Sociological and Laboratory Parameters in Pariah Kites: A Case Report

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ABSTRACT

Three Pariah kites were rescued and were brought to school of wildlife forensic and health on different occasions, upon detailed physical examination and radiographs it was found that all three birds had complete, open, transverse fractures of their respective tibiae and ulnae. The birds were severely dehydrated and were not fit for anesthesia; the affected wing was immobilized by a figure of 8 bandage. The birds were treated with fluid therapy, analgesics, antibiotic (Cefotaxime) and electrolyte supplementation. For above mentioned birds, the values such as ALP, TLC and hemogram (white blood) were recorded; both before and after the fracture was done healing. Finally, after successful treatment birds were released back to their natural habitat.

Keywords: Pariah Kites, Fracture, Avian Sociological Parameters

Status of Vagrant Wildlife Species Conservation in Madhya Pradesh

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ABSTRACT

Wildlife tourism is vital for conserving wild species and addressing illegal poaching and trafficking. In India, common types of poaching include pangolin, tiger, leopard, wild boar, elephant, and wild birds. Many of these species are listed under Schedule I of the Wildlife Protection Act, 1972. Poaching often involves the collection of bones, skin, horns, meat, cubs, and sometimes tiger rights and leopards. Pangolins are primarily targeted for their scales and bones, while wild boar are hunted for their cubs and meat. Evidence from the past six years (2017-2021) reveal that the Indian wild boar is heavily poached in Madhya Pradesh. Samples for forensic analysis have been collected from three neighbouring states: Madhya Pradesh, Maharashtra, and Chhattisgarh. Forest departments in these states—specifically Bhopal, Bhandara, Jabalpur, Narmada, Dindori, Khamri, Balaghat, Jabalpur, and Umar in Madhya Pradesh—along with Chhattisgarh and Maharashtra—have reported numerous poaching incidents over the last five years. Unlawful items such as blood-smeared bones, horns, skin, blooded meat, scales, and claws are submitted to forensic labs for species identification. Microchemical tests, including ICS (WAA) and Cytochrome P, are employed and compared to authentic species. The status of five species like pangolin, elephant, leopard, and wild boar highlights the gravity of the issue. It is crucial for law enforcement agencies, forest departments, police, and camera officials to stay vigilant about wildlife, keep pace and mapping techniques. Protecting wildlife habitat across all landscapes is essential for the survival and conservation of these species.

Keywords: Forensic, Wildlife, Madhya Pradesh, Poaching and pangolin.

Herbal Ketognathic Therapy as Alternative to Chemotherapeutic Management of Canine Dermoid Cyst

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ABSTRACT

Dermoid cyst, caused by increasing size Dermoid cyst has been commonly observed in adult hair follicles, sebaceous gland or apocrine sweat gland. The present study reports successful management of generalized canine Dermoid cyst in 12 dogs presented to the Teaching/Veterinary Clinical Complex, CVR & AH, Anand, (Guj, 389122). Dog with complaint of hair loss, itching and redness in different region of the body. Skin scraping examination revealed the presence of Dermoid cyst. Dogs were randomly assigned to 2 different treatment groups viz. group A and B. Therapy was initiated with oral cephalexin (5.5 mg/kg b.wt. on 1st day, 5.5 mg/kg b.wt. on 1st day, 5.5 mg/kg b.wt. on 1st day and 5.5 mg/kg b.wt. from 4th day onwards till 28th day in animal of group A. Additionally oral antibiotic amoxicillin was given @ 10 mg/kg b.wt. for three consecutive days per week for 4 weeks. In animal of group B, herbal topical oreganoethanol was applied locally twice a week with approximate duration. Additionally, oral herbal oregano modulator @ 10 ml was administered once daily as a supplement for 15 days. Skin scraping examination was done on every 7th days interval. On 1st possible skin scraping examination of therapy it was negative for the presence of cysts in both groups. It was concluded that combination of oral cephalexin along with oral amoxicillin/amoxicillin/clavulanic acid in group A as well as the topical oreganoethanol along with the oral herbal oregano modulator (group B) led to complete recovery in case of generalized canine Dermoid cyst. However, effectiveness of herbal therapy associated with its low cost can prove to be beneficial for management of canine Dermoid cyst.

Keywords: Dermoid cyst, Dermoid cyst

Comparative Evaluation of Dexmedetomidine and Midazolam Along with Buprenorphine for Ketamine Anaesthesia in Canine Patients

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ABSTRACT

The present study was conducted on 2 dogs, divided randomly into 2 groups of 6 animals in each group. Group A was administered @ 0.04 mg/kg followed by dexmedetomidine @ 0.04 mg/kg after 1 minute in group B while midazolam was administered @ 0.1 mg/kg in group via IM route. Additionally, in both groups, buprenorphine was administered @ 0.2 mg/kg body weight through IM route. After 10 minutes of premedication, anaesthesia was induced with ketamine administered at 0.04 mg/kg in all the groups. Subsequent muscle relaxation, deep sedation, anaesthetic analgesia followed by smooth and successful recovery was achieved in both groups. However, values of their clinical parameters were non-significantly ($p < 0.05$) higher in animals of group A. The animals of group A regained recovery and attained erect and standing position after a longer duration as compared to group B. A significant increase in RR followed by further increase in both groups was recorded during pre-induction period. Respiratory rate, rectal temperature and SpO₂ remained decreased from the baseline in all the groups. It was concluded that dexmedetomidine-buprenorphine combination produced a comparable degree of clinical physiological and haemodynamic stability during ketamine anaesthesia in dogs.

Keywords: Dexmedetomidine, Buprenorphine, Induction, Midazolam

Histopathological Changes Caused by Mercury in Gill and Liver of Fishes

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ABSTRACT

The present study was aimed to monitor the histological effects of mercury (mercuric chloride, HgCl₂) in *Labeo rohita*. For 7 groups of fishes of mercury on Gill and Liver by histopathological study. *Labeo rohita* were divided in 7 groups, with each group consisted of cat fishes. Group 1 (Control Group) which served as control, was not administered with mercury (control group). However, groups 2 to 4 (Drug Toxicity Group) were administered with 10 mercury (i) 25ppm, 50ppm and 75ppm, respectively for 10 days (3 week) and the same doses were administered to the fishes of groups 5, 6 and 7, respectively for 30 days (6 week). After the end of the experiments, all the fishes were sacrificed and the histopathology of gill and liver tissues were performed. At the 3rd week (groups 2-4) sections of the gill of fishes of groups 2, 3 and 4 showed necrosis, degeneration and inflammatory cell infiltration with proximal congestion in primary gill lamellae. However, at the 6th week sections of the gills of fishes of groups 5, 6 and 7 showed necrosis of epithelial cells of secondary lamellae, degeneration and disruption of lamellous core and disruption of primary lamellae. In the 6th week sections of the liver of fishes of groups 2, 3 and 4 showed congestion, vascular degeneration, necrotic sinusoidal congestion and necrosis in hepatocytes. On the 6th week sections of the liver of fishes of groups 5, 6 and 7 showed multifocal area of the hepatocytes necrosis. The results indicate that the toxicity of mercury is dose and time dependent, suggesting that mercury at higher dose for prolonged period causes more toxicity.

Keywords: Respiratory System, Typhoid, Mercury

Use of *Silybum* and *Nano* zinc as food supplement improves liver function activity of Sahiwal calves & enriched farmer's income by cultivation of it in their unutilized fields.

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ABSTRACT

Silybum is a low-cost natural product which is extracted by the M&S (Muzaffarpur Sahiwal) plant's seed. This study was conducted on 28 Sahiwal calves of body weight 411.5 and age of 31.2±3.77 months were randomly selected into 4 groups having each 7 calves. Besides control head diet supplemented with silybum as T1 (40mg/kg DM dry matter), silybum as T2 (40mg/kg DM dry matter) as well as nano zinc as T3 (40mg +40mg/kg DM dry matter) and control groups were fed basal diet. In the 120 days trial to determine of serum aspartate aminotransferase (ALT), alkaline phosphatase (ALP) and aspartate aminotransferase (AST) in Sahiwal plasma. In 120 days trial, the T3 group did not show any significant difference in the function of liver. M&S feeds is costly plant, as it is easily grown by farmer where he having in his field and which is allowed by dairy animals. It is a rich source of phytochemicals production of 70 g/ha requiring less capital only. The value's requirement of *Silybum* (per 3400 B.W.g) is dependent on inputs from other sources besides of protein sources and beneficial nutrients of an alternative to India. In *Silybum* is a beneficial for farmers health and making of a safe to human source also.

Keywords: *Silybum*, Phytochemical sources, M&S feeds.

Biosecurity in Aquaculture for Better Management

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ABSTRACT

The challenges and problems of managing good biosecurity are with-rising and multifaceted with many compounding factors to pre-disposed limited stocks to an increased risk of infection with zoonotic and non-zoonotic diseases (DOD, 2020a). Many challenges are anthropogenic in origin and may be the result of the physical location (site) within the past design of the production facility (i.e., water to use, risk of using land as biosecurity risk, etc.) as well as farm management decisions and practices made over the site in production (i.e., putting the system for increased disease production). There is a need for better regulation and health (epidemiological) surveillance – an industry that enhances the culture of “fish species” (fisheries, W. 2016). In the absence of regulatory frameworks and culture problems, it is difficult for farmers to apply certain measures such as movement tracking, detection and treatment of disease, conduct disease surveillance and regular health checks, and report diseases to relevant authorities for advice. In this review, we have identified several issues which are common to challenge the design and implementation of efficient and effective biosecurity strategies and protocols at all levels, requiring attention over the coming decade. They are, not in any order of priority: (i) healthy wild, (ii) occupancy preparation and response, (iii) diagnosis, (iv) treatment management at the production level, (v) disease and pathogen surveillance, (vi) risk to aquatic species, (vii) policies and regulatory framework, (ix) welfare, (x) research and technology development, (xi) environmental resistance and (xii) Prognosis Management Pathway. *FAO Fisheries* 2022.

Keywords: Aquaculture, Biosecurity, Disease management

Management of Anemia in A 7 Month Tiger Cub

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ABSTRACT

A stranded 7-month tiger cub was found independently near river 1 week in Khaziranga forest, [C.O. 12](#) (12°N 20°E 22', E 76°22' 22"). Khaziranga Island, Tarkine (Central Range). The Tiger was observed with his mother who calls and calls left for good cub alone. He waited for his mother for day by day his health became serious in 10th September with the incident in 11th and from that stranded cub 3 physically rescued. One cub which was rescued, hospitalized with heavy tick infestation and brought to Special Treatment Centre (STC) Chandrapur.

A Tiger cub, male approximately 7 months old and weighing 37 kg, was physically rescued and found to have a condition of: scratching severe dermatitis, pale mucous membranes, diarrhoea, lethargy, and heavy tick infestation. A thorough examination revealed abnormal vital signs, but no clinical abnormalities. Blood and urine tests indicated a low haemoglobin level of 3.7 g/dL (reference 12.0-15.0) with neutrophilia (88%). Total protein was measured at 3.7 g/dL with albumin at 2.1 g/dL and globulin at 1.6 g/dL. A blood smear was negative for hemoparasites, and a fecal sample tested positive for *Toxocara* spp. The cub was treated with Doxycycline, which was removed manually, and deworming was done using praziquantel. The animal was treated with fentanyl, Buprenorphine, and morphine and fluids were administered passively for 7 days while (1)g. Buprenorphine, Doxycycline and Buprenorphine were given per oral for 1 month. The cub made a successful recovery.

Keywords: Tiger cub, Tarkine, Anemia and *Toxocara* spp.

Contemporary Insights into A1 and A2 Beta Casein Gene Variants in Indian Cattle Breeds

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ABSTRACT

Cow's milk, rich in protein, carbohydrates and essential micronutrients, is particularly valued for its beta casein protein, which exists in two variants: A1 and A2. These variants differ by a single amino acid at position 67, resulting in distinct health implications. A1 milk, which produces the bioactive peptide beta-casomorphin 7 (BCM7) during digestion, has been linked to health risks such as type 1 diabetes, cardiovascular diseases and neurological disorders, especially in infants and individuals with gastrointestinal sensitivities. In contrast, A2 milk, which does not produce BCM7, is associated with lower such health issues. In India, the world's largest milk producer, this distinction is crucial due to the diverse cattle breeds. Indigenous breeds like the Sahiwal and Red Friesian predominantly produce A2 milk, ensuring their genetic purity. However, crossbred and exotic breeds like Holstein Friesian and Jersey have a higher prevalence of the A1 variant, a result of crossbreeding for increased milk production. This study examines the distribution of A1 and A2 beta-casein variants in Indian cattle, highlighting the need to conserve indigenous breeds and promote minimal breeding practices. As consumer demand for A2 milk grows, this has significant implications for breeding strategies, public health and the Indian dairy industry's sustainability.

Keywords: Beta-casein, A1, A2, Genetic Diversity

Suspension of Viral diversity in ticks collected off the Cattle from Madhya Pradesh.

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ABSTRACT

Ticks from economic animals within CLSP, ICAR, are given a great threat to its public health, especially farmers as tick infested livestock often die or show proximity to human dwelling. However, owing to diverse host range and complex life cycle, ticks are found in difficult climatic conditions. Climate change influences geographic expansion of ticks to newer habitats, thus making the spread of zoonotic diseases to non-infectious areas from infectious areas. This has to explain the tick infestation especially zoonotic, a zoonotic study has conducted to provide baseline of viral population and to identify any emerging zoonotic pathogens. Two *Hyalomma* ticks pools comprising of 120 ticks were collected off the body of cattle from different villages of Bhopal and Bina districts of Madhya Pradesh. The collected and killed ticks were subjected to rDNA depletion and metagenome sequencing by Illumina HiSeq 4000 platform. Total 18,38,038 of data comprising of ~12.1 million forward and reverse reads with average length of ~150 bp, composed of 2.07% and 97.92% clustered and unclustered reads respectively. Analysis of reads revealed presence of 100% of virus belonging to family Flaviviridae, Hantaviridae, Bunyaviridae, Nairoviridae, Parvoviridae, Potomaviridae, Rotaviridae, Papillomaviridae, Rotaviridae, Picornaviridae, Herpesviridae, Picornaviridae, Flaviviridae, Papillomaviridae, Rotaviridae, Potomaviridae, Nairoviridae, Bunyaviridae, Hantaviridae, and unknown group. Though whole viral read pool could not be assembled, the obtained gene reads indicated that closely related virus from respective family exists in the tick population and further investigation is warranted to confirm the species of virus. At conclusion, reverse analysis revealed a wide range of viruses in *Hyalomma* ticks population, including those of zoonotic importance. Genome profiling of the *Hyalomma* ticks has provided the snapshot of viral diversity and is key for understanding the tick ecology in India. The findings would prove for the targeted surveillance of zoonotic viruses in the area which eventually is identifying potential human hazards before spill over to humans. This is the first report providing a glimpse of the viral diversity in *Hyalomma* ticks collected off the cattle in India.

Keywords: HSK, Virus, Cattle, Ticks, Madhya Pradesh.

Elucidation of Effect of El Niño Southern Oscillation (ENSO) on Infectious Diseases provides Clues for Disease Forecasting

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ABSTRACT

Climate change is an inevitable phenomenon profoundly impacting our daily lives. It involves alterations in climatic characteristics such as temperature, humidity, rainfall, wind patterns, and the frequency and severity of natural events over extended periods. The causes of climate change are both natural and anthropogenic. A notable natural phenomenon related to climate change is the El Niño Southern Oscillation (ENSO), which serves as a significant role in driving natural disasters and disease outbreaks. ENSO, which consists of atmospheric and oceanic components, refers to a large-scale climatic pattern involving fluctuating ocean temperatures in the central and eastern equatorial Pacific. The atmospheric component of ENSO is a triphase – warm phase (El Niño), cold phase (La Niña), and neutral phase. ENSO has a profound impact on the dynamics of infectious and zoonotic diseases by influencing regional temperature, precipitation, and humidity. These climatic changes affect the distributions of disease transmission and prevalence. Historical data show that ENSO acts as a harbinger linked to various diseases outbreaks worldwide. For example, ENSO has been associated with H5N1 and H7N9 influenza outbreaks in North America, Mexico, Europe, and Latin America in South America, Rift Valley fever and H5N1 in Africa, H5N1 and H7N9 in Asia, and Leptospirosis and H5N1 in Europe. Furthermore, zoonotic diseases are reported to be influenced by climate change events driven by ENSO. Climate change also has indirect effects, such as triggering floods, droughts, fires, and insect bites, which further impact public health. The food outcomes of ENSO are influenced by interactions with local climate phenomena, such as the Indian Ocean Dipole. Various reviews can evaluate ENSO effects, leading to more severe Super El Niño event with increased impact. Temporal and spatial trend analyses suggest that forecasting models could be utilized to predict ENSO events, potentially saving millions in terms of disease burden. In conclusion, the relationship between climatic variables like ENSO and infectious diseases remains partially understood, presenting opportunities for further research. Given that climate change affects human health directly, adopting a “One Health” approach is essential to mitigate anthropogenic impacts and pursue sustainable progress.

Keywords: ENSO, Climate change, Infectious diseases

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