



Proceedings of

72nd ANNUAL SCIENTIFIC SESSIONS

3rd and 5th July 2020

Webinar

at; Main Auditorium
Faculty of Veterinary Medicine and Animal Sciences
University of Peradeniya.

Sri Lanka Veterinary Association





72nd Annual Scientific Sessions of the Sri Lanka Veterinary Association

Programme and Abstracts of the
Annual Scientific Sessions 2020

3rd and 5th July 2020
Webinar

Programme – 3rd July 2020

08:00 – 08:50	Registration
08:50 – 09:00	Arrival of the Guests
09:00 – 09:05	National Anthem and Lighting of the Oil Lamp
09:05 – 09:15	Welcome Address by Dr. D.D.N. de Silva, President, Sri Lanka Veterinary Association
09:15 – 09:45	Keynote Address by Dr. Diwakar Vyas, Assistant Professor, Department of Animal Sciences, University of Florida, USA
09:45 – 09:55	Vote of Thanks – Dr. K.G.J.S. Disnaka, Secretary, Sri Lanka Veterinary Association
10:00 – 10:15	Theme Seminar by Prof. Masahiro Okumura, Professor in Veterinary Surgery, Faculty of Veterinary Medicine, Hokkaido University Sapporo, Hokkaido, Japan
10:15 – 12:45	Technical Session I - Clinical
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13:30 – 15:15	Technical Session II – Public Health
15:30 – 15:45	Theme Seminar by Dr. B.A.D.S Jayawardana, Wildlife Veterinarian, Department of Wildlife Conservation, Battaramulla, Sri Lanka
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Programme – 5th July 2020

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Dr. J.M.K.J.K. Premarathne	Dr. W.W. Abeyguranardhane	

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A Multifaceted Approach for Improving Dairy Production in Sri Lanka

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It is my honor and privilege to be a keynote speaker for Annual Scientific Sessions-2020 of Sri Lanka Veterinary Association. I thank members of the organizing committee for inviting me to speak with my fellow veterinarians. I have been trained as veterinarian; however, as a keynote speaker, I will be sharing my experiences of working as dairy nutritionist in Sri Lanka. Sri Lanka has enjoyed increasing economic growth and enhanced incomes and purchasing power for many of its citizens in past decade. During this phase of economic development, the government has placed a renewed emphasis on strengthening the dairy sector to reduce the demand for imported dry milk powder as consumers begin to increase their demand for dairy products. Dairy is the most important sub-sector in the Sri Lankan livestock industry, due to the need to address a growing demand for fresh milk and milk products, and because of its potential influence on the rural economy. The Government of Sri Lanka's vision set a nationwide goal of becoming self-sufficient in dairy and Sri Lanka's dairy sector has responded to growing demand by increasing milk production from 202 million L in 2007 to 467 million L in 2018. However, Sri Lanka is still importing 53% of total domestic supply of milk and milk products (excluding butter). For self-sufficiency more concentrated efforts targeted at addressing the main barriers to sustainable dairy sector development, including not only milk production, but also milk quality and safety, particularly at the local level, are needed. While the potential of growth in dairy sector is immense in Sri Lanka, the prospects are curtailed by significant challenges that dairy sector is facing today. Assessment of the dairy value chain in 2018 identified a lack of good quality and quantity of feed, along with poor dairy management practices and ineffective extension services as major constraints in improving dairy productivity in Sri Lanka. In addition, a lack of national milk quality standards that are consistent with international benchmarks and inadequate cooling facilities are significant challenges to improving milk quality. The nutritional status of cows is not suitable for optimal reproductive performance, compromising the success of artificial insemination in Sri Lanka. Based on these findings dairy assessment tool was developed providing a comprehensive training sessions targeting extension agents, veterinarians, and farmers to promote best practices in dairy management. Beyond training, however, industry support for standardization and monitoring of milk and feed quality are needed; providing opportunities for private investment to support the dairy industry. Similar opportunities are available for forage production and delivery to producers. The Market-oriented Dairy project in Sri Lanka is working towards addressing these challenges in order to reduce Sri Lanka's dependency on imported milk and contribute towards the goal of a safe, self-sufficient fresh milk supply. In conclusion, I would like to reiterate that the dairy sector in Sri Lanka has huge growth potential and the efforts currently are being directed towards addressing pressing challenges hampering the growth of this sector. However, for sustainable growth and development, concerted effort will be required from experts like veterinarians, university researchers, and extension agents along with public-private collaborative partnership to achieve greater and sustainable impact in dairy sector in shorter period of time.

Management of Joint Diseases in Animals; Where Are We Now?

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Fractures and instability of structures in the joint are a group of very common pathologies we face at veterinary clinic. Reestablishment of complete continuity of the surface and stability of the joint are believed to be the important target to restore the function. In contrast, joint surface can be easily cut and leave it open without concern when trochleoplasty is applied for the treatment of medial patellar luxation in dogs. The joint is responsible to provide very important function to deliver forces in the entire body. Its surface of the end of bone is covered by articular cartilage where we find very low, means less than skate blade on the ice, coefficient of friction. The articular “hyaline” cartilage is composed by massive extracellular matrix and small number of chondrocytes, in which water is trapped up to 80% in its total amount. Small population of functional cells in the cartilage is maintained by low nutrients and hypoxic condition via synovial fluid filtered from plasma, then healing capability of this structure is relatively limited. Inflammatory reaction in the joint would be raised from synovial “reaction”. One of triggers of inflammation in synovium is metabolites and break down products of extracellular matrix. The goal of the treatment of joint injuries is slow down of the process to establish symptomatic osteoarthritic changes. This process has surely started once the frail structure or stability of the joint is injured. Surgical and non-surgical methodologies are applied for this purpose. The options include surgical reestablishment of the structure or stability of malfunctioned joints with maximum care of restoration of articular cartilage. Choice of disease modifying osteoarthritis drugs would be a promised way to suppressive to the inflammatory reactions. Otherwise variety of nutraceuticals are preferable for clinicians for the same purpose, while scientific evidence of the use of these compounds are limited. The feature of veterinary patients is also an important point of consideration. Its lifespan, purpose of feeding, limb-walking or other factors should be taken account for decision making on the treatment. Surgical intervention should be more auriculate and non-surgical approaches need more scientific evidence on its mechanism of action and clinical efficacy. We should surely be more careful on the prognosis of entire joint fitness to optimize the methodology of the treatment.

Fundamentals of Rabies Eradication

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Rabies is of significant interest to Sri Lanka due to its endemic status and high socio-economic impact. Although being a small island and well placed to be the first in Asia to eradicate the disease; there have been significant roadblocks. The issue is also overshadowed by the fearful response to the disease among the public, administrators and at times even professionals. Obstacles to eradication include conflict between human and veterinary health sectors, the high cost of effective eradication and resultant strong political will and knowledgeable support required to scale up to national level. Of major constraint, are the widespread opinions and misconceptions about the methodology of rabies elimination. The principals are straightforward. As veterinarians we should all have a clear and thorough understanding of these, so we can speak or lobby with one voice. So that we take actions that lead in one unified direction: towards eradication. The first premise is that Rabies elimination is feasible. Next, a fundamental paradigm shift which needs broad acceptance is that rabies eradication must focus on disease elimination in the reservoir host: the domestic dog. The third misunderstanding that must be recognized and accepted is that wildlife rabies is **NOT** of importance in rabies elimination. The fourth principal of rabies elimination is that rabies spread is not dependent on the density (number) of the dog populations. To clarify the relationship between dog density and disease transmission, the concept of basic reproduction ratio – R_0 must be understood. R_0 is the number of new individuals infected by one rabid dog during its entire infectious period, in a population which is fully susceptible. Reducing R_0 below 1 is what we aim for in our elimination campaigns. For canine rabies, the R_0 value is consistently between 1-2 in dog populations across the world, despite wide variation in dog population densities and demographic characteristics (urban vs rural). In addition, studies have shown that canine rabies can circulate where densities are as low as 1.36 dogs/km². Behaviorally dogs are social animals and they seek out conspecifics even where density is low. Thus, reduction of dog populations to below these thresholds are not practically achievable or even useful. Thus, the role of dog population control efforts in Rabies eradication programs is not focused on dog population density reduction but rather an attempt to **reduce population turnover** (new unvaccinated dogs entering the population) and thus the vaccination effort required to maintain herd immunity. The final concept that needs to be clearly understood is that of herd immunity. Once these underlying principles are understood, the fundamental elements for planning effective rabies elimination are straight forward and well established. The focus of rabies elimination must be vaccination campaigns. Evidence clearly shows that herd immunity for rabies is achieved with 70% vaccination cover of all dogs, owned, and roaming.

So, what does it take to conduct a good rabies vaccination campaign?

- a) The first principle is to reach and maintain 70% vaccine cover. For this it is essential to have an accurate population count. If you do not know your initial population, you cannot calculate the percentage vaccine coverage.
- b) The dogs that are most important to vaccinate (highest impact on reducing R_0) are those with the highest chance of encountering a rabid dog. This is primarily roaming dogs. In addition, the vaccinated roaming dogs serve as a first line of defense and a barrier between the invading rabid animal and pet dogs. Thus, reducing potential human exposures. To maintain herd immunity and

gain maximum benefit from the vaccination effort, these vaccinated animals should not be culled or removed.

- c) The next important principle is that ad-hoc and scattered vaccination programs are of no value (the same principal applies to the sterilization effort). Data has shown that elimination is dependent on high level of **contiguous vaccination** and even **small pockets of low coverage can cause a significant delay in progress**.
- d) Vaccination quality is critical. Internationally recognized, WHO recommended rabies vaccine is of extraordinary efficacy and with US Federal Drug Administration certification of 3-year DOI. The key is that these vaccines provide a high anamnestic response even with a low serum antibody or infrequent boosters. This is of enormous benefit in large scale vaccination efforts (labor, cost, and time intensive) and significantly impacts achievement and maintenance of herd immunity.
- e) A barrier to achieving and maintaining herd immunity is high turnover of dog populations. Thus, the role of sterilization in rabies control is not focused on density reduction. Instead it's an attempt to reduce population turnover and in turn the vaccination effort required to maintain herd immunity. Sterilization programs aimed at stabilizing populations also impact the nuisance aspect, which if not effectively addressed, will often result in government officials removing vaccinated roaming dogs, undermining herd immunity and rabies control efforts. It must also be remembered that 70% contiguous target for female dog sterilization coverage is required. Ad hoc programs are of high cost and little value for rabies or population control. Though the individual animal welfare benefit is clear. To minimize population turnover and maintain required herd immunity, it is important to keep the vaccinated and sterilized dogs alive as long as possible.
- f) Effective surveillance is a fundamental component of any disease eradication campaign. A recent proposal by FAO, OIE and WHO is the concept of integrated bite case management. Increasing the number and location of diagnostic laboratory facilities and testing methodologies is important.
- g) For effective eradication, the public must be engaged, informed and supportive of rabies eradication efforts.

The economics of rabies control programs have been looked at in more detail recently. A meticulously planned, well implemented and integrated multi stakeholder program, fundamental to ensuring real progress towards rabies eradication, requires significant and well distributed resource allocation and funding. However, this expenditure will not see immediate returns, but rather long term economic and social gains. Thus, strong and concerted political will, combined with adequate financial investment, is required if rabies control is to become a reality in Sri Lanka. Although challenging, it is an opportunity to place Sri Lanka in a lead position in the current global effort towards rabies control in developing regions.

Human-Leopard Conflict and Veterinary Intervention for Leopard Conservation in Sri Lanka

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Sri Lankan Leopard (*Panthera pardus kotiya*) is considered as the island's apex terrestrial predator. This sub species was first described by Dr. P.E.P.Deraniyagala in year 1956. There are seven more sub species of leopards distributed in Africa, Middle East, Russia and Asia. As other wild cats, it is pragmatic in its choice of diet, which includes small mammals, birds, reptiles as well as larger animals. Spotted deer (*Axis axis*) and Wild boar make up the majority of it's pray. The leopard also preys on Sambur deer, Barking deer, Pangolin, Porcupine, Monkeys and Langurs. The Leopards have historically been found in all climatic zones of the island. There is a species variation in coat colour, density of fur etc. among montane and dry zone individuals. The conflict between human and Leopard exists for decades and has two facets in dry and wet climatic zones of the country according to the data available. The common resource of the conflicting parties in the dry zone is domestic cattle and buffalo. The common cause of Leopard mortality in dry zone is poisoning. In the wet zone the common resource of the conflicting parties are wild boar, sambur deer, barking deer, pangolins, mouse deer and other "bush meat". The common cause of death is of wet zone leopards is "Snaring". The poisoning of the Leopard occur when the livestock owners, who are illegally trespassing Leopard habitat, add poison to the remaining parts of the "Leopard attacked" livestock carcasses. In contrast, the wet zone Leopards trespass human habitations, and has a territory sometimes over 50 km from wildlife or forest reserve and frequently be reported to the authorities. The wildlife veterinary service is distinguished by its holistic approach within the ecosystem paradigm as well as the professional expertise, high enthusiasm and much dedication. Emergency Wildlife Veterinary assistance is requested if the snared Leopard is alive. Measures are taken together with other authorities to minimise the disturbances caused by the public. Observations must be done with a pair of binoculars. The safety of the veterinarians, supportive staff and the public should be assured before approaching the animal. Tranquilization should be made in step up method or gradual increase of dose. The combination of ketamine (10%) and xylazine (10%) or ketamine alone is used. Atropine (1-3mg) can be added to this combination. Each dose should have 30-40 minute interval. The eyes must be covered by a cloth and covering with a strong nylon net will prevent sudden attack from the partially sedated animal. Low snarling and hissing sound are made when approached. If the paw movements are not violent and not well coordinated, low snarling, hissing sounds and slight lifting of the head can be neglected. Additional doses of tranquilizers should not be administered to an exhausted leopard. Translocation cage should be slightly larger than the animal and be covered all the time. Intravenous or sub cutaneous saline drip and supportive therapy is recommended. Respiratory rate, tranquilizer recovery status and the body temperature should be monitored intermittently. Translocation and Release of the carnivore should also follow strict safety measures. A conscious leopard is released within or in the vicinity of its territory. Wild orphan Leopard cubs are seldom found. DWC staff is strictly advised to make sure that the cub is a real orphan or displaced from mothers hide out. Measures should be taken to reunite the cub with the leopardess. If failed, attempts are made to rehabilitate back to wild. If rehabilitation attempts are not successful *Ex-Situ* conservation approach is implemented. Wildlife veterinarians serve Leopard conservation research and monitoring, emergency rescue, *Ex-Situ* treatment and rehabilitation of displaced cubs. Together with other conservation measures wildlife veterinary sector with novel advancements and broader infrastructure facilities will enhance the conservation efforts of the Sri Lankan Leopard.

The U.S. Soy Sustainability Assurance Protocol (SSAP)

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U.S. soybean production is based on a national system of sustainability and conservation laws and regulations combined with careful implementation of best production practices by the nation's 279,110 soybean farms. In addition, most U.S. soybean producers participate in certified and audited voluntary sustainability and conservation programs. The U.S. Soy Sustainability Assurance Protocol (SSAP) is a certified aggregate approach audited by third parties that demonstrates sustainable soybean production at a national scale. The U.S. approach is quantifiable, and results driven with mass balance international certification available. The U.S. Soy Sustainability Assurance Protocol describes the regulations, processes and management practices that ensure sustainable soybean production. This Sustainability Protocol is one part of the overall U.S. soybean producer sustainability program which includes a national measurement system of the positive environmental outcomes by producers.

Protocol directives

The protocol has four key directives in this quantifiable and results-driven approach to sustainable U.S. soy production.

1. Biodiversity and High Carbon Stock Production Control Measures and Regulations, which considers wetlands, grasslands, forests and migratory birds
2. Production Practices, Control Measures and Regulations, such as conservation tillage, crop rotation, precision farming and other technologies
3. Public and Labor Health and Welfare Control Measures and Regulations, protecting people's health and safety in compliance with U.S. regulations
4. Continuous Improvement of Production Practices and Environmental Protection Control Measures and Regulations, which includes conservation programs, information sharing, and technology training

Audit procedures

Audit procedures include annual internal audits by producers and third-party independent audits of producers. To ensure the accuracy of internal audits made by producers, third-party audits are conducted annually by the U.S. Department of Agriculture (USDA) with inspection agents in over 2,800 offices in agricultural production areas.

International certification

Soy Export Sustainability, LLC will provide shipment-specific recordkeeping and documentation information for U.S. soy, and ensure proper accounting of mass balance of U.S. soy compliant with this Protocol up to the point where certificates are issued for batches of compliant soybeans and soy products at point of export. The SES advisory council consists of individuals representing a broad cross-section of the soy industry to assure that the efforts of SES are in line with the goals of the stakeholders' organizations. Please visit www.ussec.org/ssap for additional information on sustainable U.S. soy production and web links.

The Importance of Poultry Health Management in the Context of COVID-19 Pandemic

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The Covid-19 pandemic impacted our lives in many ways and it would not be any different with poultry industry. In Asian countries, the first and probably the most visible impact was the sharp decrease on the demand of poultry products with consequent reduction of production. However, this crisis brought difficulties to producers that are not so obvious. Road barriers created problems to transport feed to the farms and chickens to slaughter houses, the movement restrictions imposed by some governments created unprecedented complications as workers could not reach hatcheries or farms and there were valid concerns that reduction of flights could affect the replacement of GP flocks with long term consequences to the industry. Not surprisingly, the whole poultry industry has been deeply affected and its profitability remains under pressure. Within this context, producers are forced to reduce costs and they might be tempted to cut expenses related to diseases' prevention such as biosecurity and vaccination. However, this approach can be extremely dangerous as outbreaks can cause enormous economic losses to companies and even to their image. On the other hand, crises always bring opportunities for improvement. In this case, instead of only considering the use of cheaper vaccines, it is wiser to optimize the vaccination programs without compromising the desired safety and efficacy. For example; for broilers, using vaccines that are applied in the hatcheries can decrease the need of vaccination in the farms. For long-lived birds, such as layers and breeders, applying vaccines that induce long lasting protection or adopting vaccines that contain several valences reduce the need of revaccinations in the farms. In short, the Covid-19 pandemic has brought huge challenges to producers, but also provided chances to improve the health management. It is certainly time to seize the opportunities.

Pancreatitis in 28 Dogs: Clinical Signs, Definitive Diagnosis Using a Pet-side Test Kit and Successful Management in Early Diagnosed Patients

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Pancreatitis is inflammation of the pancreas and the clinical signs of pancreatitis are nonspecific often leading to misdiagnosis. Improper diagnosis and management of pancreatitis may be life threatening as it can lead to severe inflammatory reaction due to acinar cell injury, systemic inflammatory response syndrome (SIRS) and multi organ dysfunction syndrome (MODS). Diagnosis is usually made with combinations of compatible signalment (obesity, middle to old age), history of feeding a high fat diet, clinical signs (hunched back, severe abdominal pain, vomiting), laboratory findings (high amylase and lipase levels) and ultrasound findings. However, none of these criteria are specific for pancreatitis and not helpful to arrive at a definitive diagnosis. Histological examination of pancreatic biopsies is the gold standard test to diagnose pancreatitis. IDEXX SNAP cPL is a pet side ELISA specific for canine pancreatic lipase (cPL), which is only produced subsequent to pancreatic inflammation. Prognosis primarily depends on early diagnosis, clinical condition of the patient at the time of admission and proper medical management. The current study includes 28 confirmed canine pancreatitis cases presented to Rover veterinary hospital from August 2018 to February 2020. All were middle to old aged and had been fed on diets with high fat contents. Of the 28 dogs with abnormal cPL levels, 13 (46.4%) recovered while 15 (53.5%) died during hospitalization. In addition to abnormal cPL, 23 (82.1%) dogs had increased amylase and lipase levels while 5 (17.9%) dogs had normal amylase and lipase levels. Ten dogs were recumbent, severely vomiting and vocalizing during admission. These dogs were diagnosed to have septicemia, MODS and died within 2-3 days of hospitalization. Additionally, one senior dog was diagnosed to have severe hepatic impairment. In 16 (57.1%) dogs abnormal cPL levels did not associate with dysfunction of other systems. Thirteen of them (86.6%) recovered following appropriate medical and nutritional management, and two very senior dogs and one obese dog died. These patients could be diagnosed with acute pancreatitis because of the sudden onset of the abdominal pain. Treatment consists of restoring fluid and electrolyte imbalance with normal saline, Lactated ringer's solution and dextrose according to the calculated fluid and energy requirement, pain medication with tramadol (2mg/kg, bid), anti-emetics ondansetron (0.5mg/kg, bid), gut resting at least for 24 hours to reduce pancreatic enzyme secretions and nutritional management with low fat diet. The cases were followed-up for 2 weeks until the cPL level, amylase and lipase levels were normal. Severe pancreatic inflammation can lead to SIRS later MODS hence increase higher levels of morbidity and mortality. Present case series demonstrate the importance of early diagnosis of the diseases increases chances of survival.

Surgical Management of Humeral Diaphyseal Fractures Using Dynamic Compression Plate

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Fractures of the humeral diaphysis are amongst the most common type of broken bone seen in dogs after fall from a height or road traffic accident. Numerous methods have been described for repair of humeral diaphyseal fractures. The primary goal of fracture treatment is to achieve a healed fracture with normal bone alignment and promote immediate function of the affected limb without bending, rotating and luxation. The Dynamic compression plate (DCP) is a special plate developed by the Association for the study of internal fixation (AO) and it is the standard plate type for many decades in the veterinary profession. Present report describes twelve cases of humeral diaphyseal fracture correction using DCP plate and screws in dogs and their management. Twelve cases of humeral diaphyseal fractures were diagnosed in Citypet Animal Hospital, Athurugiriya, from January 2018 to February 2020. Six indigenous male dogs, three indigenous female dogs and three German Shepard male dogs were included in this study. The age range of the patients participated in the study was six months to three years. Road traffic accident and fall from height were the most common mode of injury. General clinical examinations followed by physical examination revealed presence of swelling, lameness, pain, and crepitus. Confirmative diagnoses of humeral diaphyseal fracture were made by radiography. Open reduction and internal fixation with DCP were decided for all cases. DCP plate with AO standard (2.7 mm 8 holes) and 2.7 mm self-tapping cortical screws were selected. Atropine sulphate at 0.005mg/kg body weight was administered subcutaneously prior to sedation with xylazine HCL (1mg/kg, intra muscular injection). The induction of anesthesia was achieved using propofol (2mg/kg) intravenously followed by intermittent administration of IV propofol. A skin incision was made from the cranial border of the tubercle of the humerus to the lateral epicondyle. To expose the proximal and central humeral shaft, the brachiocephalicus and superficial pectoral muscles were reflected cranially and brachialis muscle was retracted caudally. To expose the humeral shaft, brachialis muscle was reflected cranially and the lateral triceps muscle was reflected caudally. DCP plate was placed on the aligned fracture fragments of the humerus. The bone was drilled using 2.00mm drill bit. The depth was measured using depth gauge and screws were applied. The brachial fascia, subcutaneous tissues and skin were sutured. Post-operative medication included ceftriaxone 30mg/kg, metronidazole 20mg/kg, ranitidine 2mg/kg IV for 5 days, meloxicam 0.2mg/kg SC for 3 days and single dose of Tetanus toxoid IM. Patients were discharged after 5 days of treatment and the owners were advised to restrict their movement for 10 days. The skin sutures were removed 10 days post operatively. The patients were walking normally from the day two, post-operatively. Radiographic examinations revealed complete recovery of the fractures with no complications. Surgical repair of humeral diaphysis fractures using DCP plate has demonstrated the benefits of early mobilization and rigid fixation, thus an effective method of managing humeral diaphyseal fractures. Further, it offers remarkable improvement in the limb function, with good fracture stability till the completion of the bone healing.

Femoral Head and Neck Osteotomy in Dogs with Disorders of Coxofemoral Joint

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Disorders of coxofemoral joint usually manifest as severe pain and discomfort during hind leg motion. Canine hip dysplasia is the most common disorder of coxofemoral joint; a polygenic and multifactorial developmental disorder characterized by coxofemoral joint laxity, degeneration, and osteoarthritis. Affected joint develops varying degrees of synovial inflammation, articular cartilage damage, osteophytes, subchondral bone sclerosis and remodeling thus causing pain during locomotion. Femoral Head and neck Osteotomy (FHNO) is indicated as a salvage procedure to relieve pain in coxofemoral joint disorders such as hip dysplasia, femoral neck fractures, femoral head dislocation and necrosis. This case study presents effective use of FHNO, allowing the development of pseudoarthrosis to obtain pain free movement in treatment and clinical management of patients with disorder of coxofemoral joint. The study included seven male dogs. Case history, clinical signs and radiographs were evaluated in all dogs. In five dogs radiographic diagnosis of hip dysplasia with significant subluxation was made. In all hip dysplasia cases there was < 50 % dorsal acetabular rim coverage of femoral head of both coxofemoral joints. One dog had femoral dislocation and one dog had femoral neck fracture. Ages ranged from 10 months to 2 years and weight from 13 to 35 kg. Breeds included two Labradors, two German shepherds, one Rottweiler and two mongrels. Medical management for hip dysplasia included painkillers, with/without chondro-protectives, balanced nutrition, weight control and controlled exercise. However due to continued severity of the clinical signs and significant limp, owners elected surgical procedure. All dogs were pre-medicated with combination of morphine (0.5mg/kg) and Medetomidine (10ug/kg). Anesthesia was induced with Propofol (3-6mg/kg) and maintained with Isoflurane in oxygen. Cefuroxime (10mg/kg) intravenous was given 30 minutes prior to the surgery. Meloxicam (0.2mg/kg) was administered in surgery. The coxofemoral joint was approached cranio-laterally. In all cases osteotomy was performed from the medial aspect of the greater trochanter to the proximal aspect of the lesser trochanter and smoothed with a rasp. The joint capsule was closed using monofilament absorbable sutures. The surrounding muscles, subcutaneous tissue and skin were closed routinely. Post-surgical radiographs were taken after the surgery to assure complete excision. Post-operative care included pain management with morphine injections every 4 hourly as needed, one-week course of Cephalexin 20mg/kg and Meloxicam 0.1mg/kg orally. Dogs were walked on leash soon after the recovery, gradually increasing the frequency until they were able to bear weight. Owners were given written instructions for passive range of motion exercise under supervision (three months).

Foreign Body Obstructions in Gastrointestinal Tract of Dogs: A Retrospective Study

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Foreign body (FB) obstruction of the gastrointestinal tract (GIT) occurs when pets swallow objects or materials that will not readily pass through their GIT. The aims of the present communication are to report the presenting signs, predilection sites, types of objects recovered and assess the efficacy of the imaging techniques to diagnose the FB. This study was carried out on 13 dogs of different breeds admitted to Veterinary Teaching Hospital, Peradeniya with different clinical signs including acute vomiting, absence of faeces, abdominal pain, enlarged abdomen and anorexia. Diagnosis was made based on clinical signs and results of radiography (8/13), ultrasonography (1/13), endoscopy (1/13), and exploratory laparotomy (4/13). In this study the FB salvage was carried out surgically in 76.9% (10/13) and non-surgically in 23.0% (3/13). Complete obstructions were identified in 46.1% (6/13) of cases while partial obstruction was in 53.8% (7/13). The obstructions were found in the oesophagus (23%), small intestine (61.5%), pylorus (7.6%) and colon (7.6%). Clinical signs encountered were regurgitation and/or vomiting (53.8%), anorexia (61.5%), enlarged abdomen (46.1%), pain on abdominal palpation (15.4%), absence of faeces or presence of scanty faeces (46.15%), hyper salivation (15.4%) and lethargic behaviour (61.5%). History revealed that six out of 13 patients had scavenging behaviour. Pathological alterations such as ulcerations, necrosis and inflammations were found in and about the areas of the FB. Isolated FBs were stones, vent weight of a pressure cooker, hair band, rubber toy elements, nails, bony parts, metal parts, fabric, fruit seeds, and rubber objects. Radiographic and ultrasonographic examinations were efficient and 69.2 % of the studied cases were diagnosed successfully by performing the test independently or by combining the findings. Current study showed 61.5% (8/13) of overall survival rate and prompt presentation, early diagnosis and surgical intervention could improve the outcome and overall survival rate of patients with FB obstruction in GIT.

Lingual Calcinosis Circumscripta in a Young Dog

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Calcinosis circumscripta is an uncommon disorder characterized by calcium deposits in soft tissue. Deposition of calcium in oral cavity occurs very rarely in dogs and cats. The disease occurs more commonly in large breeds namely German shepherd, Rottweiler and Labrador retriever and young dogs under two years of age. Prompt diagnosis is essential as this condition is surgically curable. This case report describes the diagnosis and management of a lingual calcinosis circumscripta case. A one-year-old intact, male, Rottweiler was presented for whitish masses on the dorsal and ventral side of the tongue since two weeks. The dog had been fed with a commercial diet. The appetite of the patient and general state of health was unaltered and the vaccination status was current. Complete blood count, Blood Urea Nitrogen and creatinine were within normal ranges. The differential diagnoses included abscess, foreign body, oral candidiasis, calcinosis circumscripta, eosinophilic granuloma, uremic ulceration, chronic inflammation of unknown etiology and neoplasia. A wedge-shaped incisional biopsy of the lesion was obtained from the ventral side the tongue, fixed immediately in 10% neutral buffered formalin and processed following the routine protocol for H & E staining. Histological examination revealed a normal stratified squamous epithelium with underlying submucosa containing multifocal amorphous calcifications without tissue reaction. The appearances were consistent with calcinosis circumscripta. The precise cause of calcification could not be determined. However, enzymes and minerals related to calcium metabolism including Creatine Phosphokinase (CPK) were within normal limits suggesting nutritional cause is unlikely. Considering the age, inflammation and previous injury are likely causes in this case. These lesions may mimic neoplastic growths and gross pathological differentiation from benign tumor is difficult. Therefore, it is important to do histopathological evaluation for definitive diagnosis. This condition is surgically curable if cuff of healthy tissue is removed with the lesion and recurrence is rare. In this case surgical excision of all the lesions were done and wounds were healed within two weeks. No recurrence was noted in six months follow up. This case might contain valuable information to veterinary practitioners likely to encounter cases of calcium deposition in dogs.

An Outbreak of Porcine Reproductive and Respiratory Syndrome in Two Breeder Farms: Clinical Presentation, Diagnosis and Control Strategies

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Porcine Reproductive and Respiratory Syndrome (PRRS) is a disease caused by a RNA virus of the family *Arteriviridae*. Two variants of the virus named as European and North American strains have been identified. Concurrent infections with pathogens such as *Mycoplasma hyopneumoniae*, *Haemophilus parasuis* and *Pasteurella multocida* are common in PRRS. The outbreak occurred in 2019 in two breeding herds (herd A, n = 499 and herd B, n = 952) of pigs of different ages and mixed breeds. Clinical signs include pyrexia (40°C), anorexia, lethargy, purulent mucoid discharge from nostrils, respiratory distress, reddening of the skin and incoordination. A significantly high rate of abortions (A-89.55% and B-100%) and pre-weaning mortality (A-28.20% and B-22.18%) were detected in affected herds. Despite antimicrobial (Benacillin®, Tylosin tartrate) and anti-inflammatory (five-FLUNIXIN®) treatments, deaths occurred. High morbidity (100%) reported in all age categories and all breeds within first two weeks of the outbreak. Overall mortality rates in herd A and B were 37% and 24.53% respectively. Deaths occurred within 30 days of onset of clinical signs. Necropsy revealed mottled and tan lungs, swollen lymph nodes and endometritis in sows. Differential diagnoses include PRRS, African swine fever, classical swine fever and swine influenza. Laboratory investigations confirmed the submitted tissue samples (lungs, respiratory tract, tonsils and spleen) were positive for North American strain of PRRS virus by RT-PCR. Symptomatic treatments with antibiotics (Benacillin®, Tylosin tartrate), five-FLUNIXIN®, vitamin supplementation (Catosal®, an appetite stimulant; E and Se to enhance the immunity), adequate hydration, assisted feeding and enrichment programs improved the recovery rate. Intranasal administration of extracts of *Alternanthera sessilis* (Mukunuwenna) was shown to be effective in clearing purulent mucoid nasal discharges from the affected animals. Prophylactic use of 95% Tylosine phosphate (2kg/metric ton; MT) and citric acid (2kg/MT) via feed for 3 weeks for the animals in contact with affected animals reduced the incidences of clinical disease. Strict biosecurity measures enabled controlling this outbreak within a month. PRRS had been first reported in Sri Lanka in 2000 and the outbreak occurred in 2019 is the second incidence. Immunization of all swine herds in Sri Lanka, (including the affected herds) using a modified-live virus PRRS vaccine was initiated as a preventive measure.

Caesarean Section in Swine: Two Cases of Dystocia due to Foeto-maternal Disproportion

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Dystocia is relatively uncommon in swine species. Birth canal obstruction and uterine inertia are the most common causes of dystocia in swine. Caesarean section (CS) is rarely attempted in delivering obstructed foetuses in dystocia cases in swine in field. This abstract describes two CS performed to deliver obstructed foetuses in a primi (Duroc) and a multiparous animals (Landrace) in the swine nucleus herd in the Horrakelley farm of National Livestock Development Board. Clinical examinations revealed that dystocia in both cases were caused by foeto-maternal disproportion. Surgery was performed under general anaesthesia induced by ketamine (11-30mg/kg) and xylazine (2mg/kg) combination together with lignocaine (2%, 5 to 10 ml) infiltration along the incision line. The anaesthetised animals were kept on right lateral recumbency with a 30° angle facing head downward to reach the uterus easily avoiding the pressure from other internal organs. It is crucial to monitor breathing and to maintain clear nasal passage for uninterrupted breathing. A long acting antibiotic (procaine and benzathine penicillin) and Flunixin meglumine were given intramuscularly prior to the surgery. Surgical site was prepared by shaving and applying povidone iodine and isopropyl alcohol. A vertical incision was made in the lower part of the left flank where subcutaneous fat content is high to minimise the bleeding along the incision. A longitudinal incision was made after exteriorization of the uterus and the length of the incision was determined according to the size of the foetus. All foetuses in both horns were removed through the same incision by inserting gloved hand. Two dead and two live piglets were removed from the gilt and the sow respectively. Uterine incision was closed with monofilament Chromic cat gut (1G) using a tapered needle in a continuous lambert pattern. Whereas, nylon was used for the peritoneum, muscle layers and subcutaneous tissues (simple interrupted) and skin (ford interlocking). Abdominal cavity was infiltrated with long acting antibiotic prior to closure. Daily wound dressing and antibiotics and NSAIDs were administered as post-operative management. Vitamin E and Se supplementation was administered parenterally to enhance the immunity. Prognosis was good and both animals recovered after the surgery. There is no record of CS been carried out in swine in Sri Lanka and authors are confident that CS can be successfully applied in cases where per vaginal delivery could not be undertaken due to foeto-maternal disproportion to save the dam and foetuses.

Traumatic Abomasitis and Perforated Ulceration Associated with Foreign Body Ingestion in a Pregnant Cow

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Disorders of the forestomach by ingestion of foreign bodies are common in cattle due to their indiscriminate prehension pattern. Traumatic reticuloperitonitis (TRP) is the most common clinical presentation, which results piercing of the reticulum wall by ingested sharp foreign objects. This paper describes a rare case of traumatic abomasitis in a four-year-old, eight-month pregnant Holstein Friesian cow. The history of presentation was included that the animal was anorexic, had signs of depression and was pyretic for 3 days, and had aborted on the third day. The cow had been treated with diminazene aceturate by the farmer with no improvement. Two days later, the cow was died and a detailed postmortem examination was performed. External examination revealed the evidences of severe dehydration and pale mucous membranes. There was severe abomasitis and perforation of the abomasum. The peritoneal cavity contained deep brown serous fluid that had leaked from the abomasum. Diffuse fibrous thickening and multifocal ecchymotic and paint-brush hemorrhages were evident on the omentum. The point of abomasal perforation was linear (6cm). Further, the abomasal wall was thickened and the mucosa was discoloured to black (necrotic) with multifocal abomasal erosions and ulcerations, together with multifocal ecchymotic hemorrhages. At the area around the perforation, there was a locally extensive ulceration (about 8cm in diameter) of the abomasal mucosae. Multifocal ecchymotic haemorrhages were observed on the omasal mucosae. A metal wire (6cm long, 2mm in thickness) was found at the pylorus-cranial duodenum and it had penetrated into the peritoneal cavity through the wall. Interestingly, the rumen and reticulum were morphologically normal. The findings of this paper describes a rare case of traumatic abomasitis in cattle. Given the orientation of the reticulo-omasal orifice and the anatomy of the omasum it is difficult to imagine how the foreign object detected at postmortem, reached the pylorus. The pregnancy and the progressively increased space occupation by the growing fetus within the peritoneal cavity are likely to have contributed to the pathogenesis of the disease process. Traumatic abomasitis is indeed a rare condition and the diagnosis of this clinical entity can be challenging, especially under field condition. In a case reported in the literature, diagnostic imaging has been useful in detecting foreign bodies in the abomasum and surgical intervention has been successful.

Primary Leiomyosarcoma of the Genital Tract in Dogs: A Report of Two Cases

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Primary leiomyosarcomas of the genital tract are a rare form of slow growing but locally invasive neoplasms with remote chances of metastasis. Two female Labrador Retriever dogs, one of six years (Patient 1) and the other of thirteen-year (Patient 2) were presented to the Veterinary Teaching Hospital, University of Peradeniya for investigation of vaginal bleeding and general dullness. Thickened uterine and vaginal walls in Patient 1 and large abdominal mass and perineal masses including numerous cystic areas were visualized in Patient 2 on physical and ultra-sonographic examinations. Exploratory laparotomy of Patient 1 revealed a uterine mass, which was removed by ovariohysterectomy and sent for histopathological examination. Histopathology revealed hyperplastic endometrial glands with proliferating short spindle shaped neoplastic cells. Cellular nuclear atypia was observed with a moderate mitotic index and cystic endometrial hyperplasia confirming leiomyosarcoma in Patient 1. Lobulated perineal masses were surgically excised in Patient 2 and confirmed as leiomyosarcoma by histopathology. Even though the clinical and radiographic examinations did not reveal any evidence of metastasis two years post operatively (PO) in Patient 1, recurrence was encountered in Patient 2, three times at one-year lapse. Chemotherapy with (cyclophosphamide 50mg/m² e.o.d, prednisolone 40mg/m² sid, vincristine sulphate 0.05mg/m² q7days) and antibiotics (cefuroxime 20mg/kg bid) were used in Patient 2. Clinical and ultrasonographic examinations, seven weeks PO of the last encounter with Patient 2, revealed severe hepatomegaly with anechoic and hyper echoic lobular masses. Patient 2 was euthanized upon the request of the client as the condition was deteriorating. Necropsy examination indicated generalized firm foci in the left lung lobe and generalized yellow coloured, firm and lobular lesions in the liver. The perineal region was covered with lobulated masses with the distorted urogenital tract. Histopathological examination of the perineal masses showed proliferating spindle cells with enlarged vesicular nuclei having abundant brisk mitotic activity focally (12/10 high power field); and deeply eosinophilic cytoplasm. Hepatic and pulmonary lesions demonstrated a multi organ metastasis from a poorly differentiated carcinoma but did not confirm as a metastasis from leiomyosarcoma. This holds ambiguity whether there had been any other primary carcinoma elsewhere though not detected during necropsy. Both of these cases hold great value as leiomyosarcomas occur infrequently in dogs. The case of Patient 1 clearly shows the importance of early surgical intervention which could improve the prognosis of a leiomyosarcoma. However, the case of Patient 2 can further be considered significant due to its hepatic and pulmonary carcinomatous lesions where the primary origin is untraceable and, suggesting that both sarcomas and carcinomas can occur concomitantly.

Co-infection of Avian Meta-pneumo Virus and Infectious Bronchitis Virus in a Large-scale Broiler Farm in Sri Lanka: A Case Study

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Avian metapneumovirus (aMPV) also known as Avian Rhinotrachitis virus (ART) belongs to the family Paramyxoviridae, is a causative agent for highly contagious upper respiratory tract infection in many avian species including chicken and turkey. It is associated with swollen head syndrome (SHS) in broilers and broiler breeders. The aMPV infection in Sri Lanka has not been studied much. This case study describes a most likely co infection of aMPV and infectious bronchitis virus (IBV) in a large-scale, multistage broiler farm in North Western Province in Sri Lanka. A broiler farm rearing 32,000 birds per closed house reported that increased mortality starting from 26 days of age extending up to 8% mortality at the age of 35 days, accompanied by severe respiratory signs and swollen heads. Birds had been vaccinated against infectious bursal disease (IBD) and IBV at the age of day one. History and clinical signs were recorded. Necropsies were performed, and the lesions were documented. Acute and convalescent serology was performed (8-9 days apart) by ELISA for IBV, aMPV, Newcastle disease virus (NDV) and Avian Influenza virus (AIV) to determine the level of seroconversion. Samples from tracheal mucosa, spleen, kidneys, cecal tonsils and choanal cleft were subjected to molecular detections. PCR was performed for all differential diagnoses including IBV, NDV, AIV, aMPV, *Mycoplasma gallisepticum* and *Mycoplasma synoviae*. Samples were tested for IBV and aMPV by RT-PCR. Sequencing for IBV was done according to established protocols. At necropsy, the most prominent lesions observed were subcutaneous edema in the head region. Further, deposits of sero-fibrinous exudates under the skin around wattle, severe hemorrhagic tracheitis, conjunctivitis, severe air sacculitis, fibrinous perihepatitis and pericarditis were evident. No significant level of seroconversion for NDV or AIV antibody titers observed in paired ELISA. There was a significant level of seroconversion observed in IBV and aMPV antibody titers. It was observed that, in acute and convalescent serology, IBV ELISA titer (GMT=1285 to GMT=7601) increased by 6 folds (2.6 log₂) and for aMPV, ELISA titer (GMT=235 to GMT=1285) increased by 5.5 folds (2.4 log₂). RT-PCR was positive for IBV and negative for aMPV. Phylogenetic analysis of 377bp long nucleotide sequence (763-1140bp) of the S1 gene of IBV resulted, three variants belonging to 793B genotype and another IBV strain closely related to Massachusetts type H120 vaccine strain. According to the phylogenetic analysis, all IBV strains showed close relationship to vaccine strains currently being widely used in the field. Based on clinical signs, necropsy, serology and molecular detection tentative diagnoses were made as co infection of IBV and aMPV. The significant level of seroconversion observed in acute and convalescent serology, strongly suggest that both IBV and aMPV are involved though aMPV was not detected in RT-PCR. Detection of aMPV by RT-PCR may have failed as the virus lasts only 6 to 7 days maximum in the sinuses and turbinates and it completes replication cycle before severe clinical signs appear. Presence of IBV too may have interfered with RT-PCR detection of aMPV. This also suggests that serology as a good alternative tool to diagnose aMPV. Effectiveness of the IBV vaccination was doubtful, as it was being done in the farm using non standardized spray equipment and technique. Poor vaccination doesn't properly protect birds, predisposing the birds get challenged by IBV and subsequently get other infections including aMPV.

Detection of *Mycobacterium bovis* among Slaughtered Cattle in Selected Abattoirs in Western and North Central Provinces of Sri Lanka

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Bovine tuberculosis (BTB) caused by *Mycobacterium bovis*, affects all mammals. Most human infections are from the consumption of unpasteurized milk. However, contaminated meat is a risk of infection for meat industry workers and consumers. The disease was previously reported in Central and North Western provinces of Sri Lanka. Abattoir monitoring is a major surveillance technique for BTB in endemic countries. Objective of the current study was to assess the incidence of BTB among slaughtered cattle sampled from abattoirs located in Western Province (WP) and North Central Province (NCP) of Sri Lanka. The abattoir in WP receives cattle from the entire country, while the abattoir in NCP receives cattle mainly from NCP. Selection of abattoirs was based on convenience, daily slaughter capacity and to represent provinces without BTB surveillance data. Hundred and fifteen (115) lung samples (n= 45 in WP; n = 70 in NCP) were collected from September to November 2019. Samples were transported to the laboratory on ice, decontaminated with 4% NaOH and cultured on Lowenstein Jensen media and incubated at 37°C for 8-10 weeks. Ziehl-Neelsen stained impression smears and formalin fixed hematoxylin and eosin stained histopathological slides were examined at 1000x under light microscope. DNA was extracted using a commercial kit and PCR was performed to detect mycobacterial regions of deletion 4 and 9 (RD4 & RD9) according to published protocols. All samples were negative for acid fast bacilli in impression smears. No *M. bovis* or *M. tuberculosis* complex cultures were recovered after 8 weeks. However, 5.2% (6/115) of the samples [4.45% (2/45) in WP and 5.7% (4/70) in NCP] were positive for *M. bovis* by PCR. Only one (0.87% of total) PCR positive sample from NCP had a granuloma. Similar findings have been recorded from countries with endemic BTB, possibly due to higher sensitivity of PCR than conventional diagnostic tests in detecting early stages of the disease. Further investigations including periodic testing of lung tissue samples from abattoirs and establishing proper meat inspection procedures within the country are vital to ensure consumer and abattoir workers' safety.

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Animal Bite Incidences Reported in Year 2017 and 2018 in Mahiyanganaya

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Mahiyanganaya Divisional Secretariat Area in Uva province has a 75776 human population in which Anti rabies vaccines had been administered to 8614 and 8356 dogs and cats in 2017 and in 2018, respectively. The objective of the study was to find out the factors related to the animal bites in the area and plan the community awareness programmes accordingly. The associations among the factors were measured using the Pearson Chi Square test. A total of 979 and 983 human patients (1962 in total) had received rabies post exposure treatment (either anti serum or vaccine) due to animal bites in 2017 and 2018, respectively from Mahiyanganaya base hospital. Anti-serum against rabies had been administered to 376 (19.2%) victims because they were major exposures while the remaining 1586 (80.6%) were administered only with post exposure treatment. The cause for exposure had been bites or scratches from dogs in 1359 (69.3%) incidents and cats in 523 (26.7%) while the remaining had been due to wild animals 80 (4.0%). However, the cause had been due to a stray or wild animals in 626 (31.9%) while 1336 (68.1%) had been domestic animals. Out of the exposed, 1177 (60.0%) were adults above 16 years and 785 (40.0%) were children less than 16 years of age. The male: female ratio among the victims was 1046:916 or 53:47. A total of 312 (15.9%) incidents had been reported from urban areas while 260 (13.3%), 999 (50.9%) and 391 (19.9%) had been reported from sub urban, villages and remote areas respectively. Out of checked association among the variables; ownership of the animal with age of the victim ($P= 0.026$), ownership of the animal with gender of the victim ($P=0.000$), ownership of the animal with species of the animal ($P=0.000$), species of the animal with gender of the victim ($P=0.000$), degree of the urbanization with age of the victim ($P=0.021$), degree of the urbanization with ownership of the animal ($P=0.039$), severity of the exposure with species of the bitten animal ($P=0.000$) and severity of the exposure with ownership of the animal ($P=0.000$) had manifested significant associations for the Pearson Chi Square test.

Insight into Canine Leptospirosis in Kandy Area, Sri Lanka: Seroepidemiology and Environmental Contamination

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Canine leptospirosis is a globally important zoonotic bacterial disease. Dogs act as the maintenance host for *Leptospira interrogans* serovar Canicola and incidental host for several other serovars. Chronic carriers are asymptomatic and excrete pathogenic leptospires in their urine intermittently resulting in environmental contamination and is a source of infection for humans. Several studies have confirmed the presence of leptospirosis in livestock, wildlife and peridomestic rats in Sri Lanka. Scanty information is available on the status of the disease in dogs or their potential role as a carrier of the etiological agent. Thus, the current study was aimed to understand the status of canine leptospirosis among owned dogs in Kandy area. Blood and urine samples were collected from 178 clinically healthy dogs brought to Government Veterinary Hospital, Peradeniya. Microscopic Agglutination Test (MAT) was carried out using the serum samples with a panel of 14 *Leptospira* strains belonging to 13 serogroups. The urine samples were used to collect pellets by ultracentrifugation. DNA in the pellets were extracted from 133 urine samples and were subjected to a PCR assay targeting the *flaB* gene specific to pathogenic leptospires. All PCR positive samples with leptospiral DNA were sequenced and a phylogenetic tree was constructed including 25 reference strains. Out of the 96 serum samples obtained from unvaccinated dogs, 15 (15.6%) were positive for MAT. The positive serogroups included Sejroe (11.5%), Canicola (2.1%), Icterohaemorrhagiae (1.0%), and Javanica (1.0%). Amongst the 82 serum samples obtained from properly vaccinated dogs, only one sample was positive for the serogroup Sejroe. Fourteen out of the 73 (19.2%) urine samples collected from unvaccinated dogs and 13 out of the 60 (21.7%) urine samples collected from properly vaccinated dogs were positive for DNA of pathogenic leptospires confirming the excretion of the organisms in their urine. DNA sequencing revealed that the positive animals were infected with *L. interrogans*, *L.kmetyi*, *L. borgpetersenii* and *L.weilii* which belong to *Leptospira* P1 subclade. A considerable proportion of vaccinated and unvaccinated dogs were infected with a variety of pathogenic leptospires. Both groups excreted pathogenic leptospires in urine posing a considerable public health risk.

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Determination of Viability of Starter Culture in Commercial Yoghurt in Kandy City Area

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Yoghurt is a fermented value added dairy product, which is fermented using lactic acid bacteria (LAB). LAB are popular probiotic species, which give health reimbursements to consumers when LAB are consumed alive. Therefore the viable LAB count at the time of consumption is an important factor. International Dairy Federation proposes that the minimum limit of the LAB count should be 10^6 CFU/g to achieve this health benefit. The objective of this study was to determine the viable LAB counts of different commercial yoghurts retailing in Kandy city area. Sixty yoghurt samples were collected randomly during the period of three months from October to December 2019 from super markets in the Kandy city. Samples were transported within an hour to the laboratory in a cooling box at 4°C and total viable cell counts in yoghurt were determined immediately according to the method used in SLS 1558-4:2017, ISO 7889:2003(E) and IDF 117:2003(E). Enumeration of bacteria was done according to the standard spread plate method using MRS (DE Man, Rogosa and Sharpe) agar as the culture media. The culture plates were incubated at 37°C for 24-36 hours anaerobically. The pH value of each sample was measured at the time of culturing using a pH meter. Out of the 60 yoghurt samples, 37 samples (61.7%) had total viable bacterial counts higher than 10^6 CFU/g whereas 6 samples (10%) had counts lower than that. Seventeen samples (28.3%) hadn't any viable bacterial count. This may be due to improper storage conditions, longer transportation time, or low quality starter culture. When considering the results 61.7% of yoghurts had the recommended level of total live bacterial count (10^6 CFU/g), whereas 23 samples (38.3%) were substandard. This diverts the attention to the possibility of adding adulterants for curd formation of yoghurt. The pH values of all samples ranged between 4.09-4.34, which is in the normal range for yoghurt. Therefore, this study can be expanded to see the quality of the yoghurts available in different commercial sales centers such as groceries, canteens etc. and then compare with the shelf life, compare among the different brands and see the possible adulterants in substandard yoghurts as well as to determine the factors affecting the viability of probiotics thereby improving the health benefits of yoghurt.

Antimicrobial Resistance among *E. coli* Isolates from Dogs Presented with Urinary Tract Infections to a Veterinary Teaching Hospital

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Antimicrobial resistance (AMR) is a major global health concern. Close contact of companion animals with humans favours interspecies transmission of AMR bacteria. Thus, knowledge on AMR in companion animals is important to combat AMR holistically. Urinary tract infection (UTI) is a common canine condition requiring antimicrobial therapy. *E. coli* is one of the most common organisms isolated from canine UTI. This study aimed to identify the AMR patterns of *E. coli* isolates from canine UTI presented to the Veterinary Teaching Hospital, University of Peradeniya. Urine samples were collected aseptically by catheterization from 95 dogs diagnosed with UTI based on clinical signs and complete urine analysis. Isolation and identification of *E. coli* were performed by standard culture methods. Antibacterial susceptibility testing was carried out by the disk diffusion method following Clinical and Laboratory Standards Institute (CLSI) guidelines for clinically relevant antimicrobials. *E. coli* was isolated from 31.6% (30/95) of samples tested. The resistance was most commonly found for sulfamethoxazole-trimethoprim (66.7%), nalidixic acid (63.3%), tetracycline (60.0%), and cefotaxime (46.7%). Use of sulfamethoxazole-trimethoprim and tetracyclines in dogs may be associated with the development of increased resistance to these antibiotics. Resistance against nalidixic acid, rarely used in dogs, was also high. However, resistance to the other quinolone tested, ciprofloxacin, was only 30%. Of the 19 nalidixic acid resistant isolates, 7 were susceptible and 2 were intermediately susceptible to ciprofloxacin, suggesting the presence of a nalidixic acid resistant ciprofloxacin susceptible phenotype. Previous studies suggest that *Enterobacteriaceae* with this phenotype put patients at risk of therapeutic failure due to the acquisition of quinolone resistance during treatment. Between 30% - 47% of *E. coli* were resistant to three, third generation cephalosporins tested. Carbapenems are the drug of choice for treating human infections caused by Gram-negative bacteria with third generation cephalosporin-resistance or multidrug resistance (MDR; resistance to three or more antimicrobial classes) and should be reserved for human use. In this context, an alarming finding was the resistance observed in 6.7% of *E. coli* isolates against imipenem. Further, 63.3% of *E. coli* showed MDR against 14 antibiotic combinations. In conclusion, this study revealed the AMR patterns and occurrence of MDR in *E. coli* isolates from canine UTI cases towards commonly and rarely used antibiotics. Therefore, it is essential to establish guidelines for the prudent use of antimicrobials in companion animal practice in Sri Lanka to minimise AMR, MDR and the use of antibiotics protected for human health.

Molecular Detection and Confirmation of the Genus *Salmonella* by Polymerase Chain Reaction (PCR)

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Salmonella is a deadly hazardous bacterial pathogen which causes infections in humans and animals. Foodborne infections in humans have been commonly attributed to contaminated poultry products. Poultry feed can be one of the sources of *Salmonella* at farm level. The standard: ISO 6579:2002, specifies a culture method for detection of *Salmonella spp* in food, animal feed and certain environmental samples. Above method desires at least six days (5 steps) to declare *Salmonella* status and for confirmation biochemical tests and expensive antisera are required. Aim of this study was to establish PCR assays for confirmation and early detection of *Salmonella* when samples are tested with ISO 6579:2002 protocol. Previously characterized two *Salmonella* serovars received from WHO and *Escherichia coli* ATCC 25922 were used as positive and negative controls respectively. Isolates were grown on nutrient agar (NA) and their DNA were extracted by boiling method. Using consensus primers designed targeting the *invA*: a molecular marker for genus *Salmonella*, a conventional PCR (c-PCR) assay was established to identify *Salmonella*. Furthermore, a colony PCR (C-PCR) which can detect *Salmonella* directly from the agar plate was established. Optimized PCR assays were applied to detect *Salmonella* at each step of the ISO 6579:2002 procedure and the earliest step that detected *Salmonella* was selective plating (usually bacteria on XLD agar) which is the third step of the ISO protocol. This was possible by both PCR methods. In the present study, 26 fish meal samples collected from feed distribution points in Kurunegala district were tested for the presence of *Salmonella* utilizing culture method along with two PCR assays established. Similar detection results (four positive samples: 4/26 = 15.36%) were obtained in all methods. Advantage of C-PCR over c-PCR is that the C-PCR does not need DNA extraction reducing the cost for DNA extraction. Importantly, established PCRs can be successfully utilized to issue *Salmonella* results three days in advance to the culture method. This is very important in events such as bioterrorism, *Salmonella* outbreaks and product recalls. In conclusion, established C-PCR is a simple, inexpensive, robust, reproducible and rapid method to detect *Salmonella* and established PCR assays can be utilized to confirm *Salmonella* isolated from any sample avoiding laborious and time-consuming steps.

Occurrence of Aflatoxins in Cow Milk Available in Sri Lankan Market

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Aflatoxins are one of the most powerful toxic substances that occur naturally. Aflatoxins (AFs) of major concern are B1 (AFB1), B2 (AFB2), G1 (AFG1), G2 (AFG2) and M1 (AFM1). AFM1 is found in milk of dairy cattle whom have consumed aflatoxin contaminated feed. The International Agency for Research on Cancer of the World Health Organization has declared above AFs as group-1 carcinogens. The EU has established regulatory limits for AFM1 in milk and infant milk as 0.05µg/kg and 0.025µg/kg respectively. However, Codex Alimentarius Commission has established a maximum limit of 0.5µg/kg for AFM1 in milk. The published information on AFs in milk in Sri Lanka is sparse though the consumption of liquid milk and powdered (spray-dried) milk is high, and therefore, in this ongoing study, the occurrence and levels of five aflatoxins (AFM1, AFB1, AFB2, AFG1 and AFG2) in UHT and powdered milk in the local market were determined. Milk samples (n=70) were drawn from local market in Kandy and Colombo area representing eight popular brands of UHT milk (n=51) and/or powdered milk (n=19). Initially, the milk samples were screened for total AFs using a commercially available ELISA kit and only the milk samples above a total AF level of 0.5 ppb were confirmed with High-Performance Liquid Chromatography with Fluorescence Detection (HPLC-FLD). The HPLC-FLD method was validated using known blank samples (obtained from free grazing cows in Kanthale area) and spiked samples on three different days and method validation parameters for all five analytes met the requirements laid down by the European Union Commission Decision 2002/657/EC. None of the powdered milk samples had AFM1 levels exceeding the Codex limit of 0.5µg/kg. However, 19 (37.3%) out of the 51 UHT milk samples had AFM1 levels above the Codex limit (range = 0.539–5.132µg/kg). AFB1 (7 samples; range = 0.03–0.31µg/kg) and AFB2 (3 samples; range = 0.03–0.067µg/kg) were also detected in some of the above 19 samples making them further unsafe, while AFG1 and AFG2 were not detected in any of the samples. This study provides evidence on occurrence of AFM1 in milk, as result of feeding of AF contaminated feed to dairy cattle, which is being consumed by Sri Lankan citizens including young children. Therefore, immediate attention should be drawn to include a maximum limit for AFM1 in milk in national food regulations and carry out surveillance activities to monitor milk and milk products in the country to protect consumers.

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Renal Adenocarcinoma in a Common Krait (*Bungarus caeruleus*)

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Neoplasia have been commonly encountered in reptiles. Of these, renal adenocarcinomas have been reported in various snake species such as Asiatic cobra (*Naja naja*), yellow rat snake (*Elaphe obsoleta quadrivittata*), Cape coral snake (*Aspidelaps lubricus*), etc. This report focuses on diagnosis, surgical treatment, and post-operative care of a renal adenocarcinoma in a common krait (*Bungarus caeruleus*) at National Zoological Gardens, Dehiwala (Dehiwala Zoo). Common krait is a highly venomous snake species found in Sri Lanka. In Dehiwala Zoo, 10-year-old common krait was observed with anorexia for three weeks, constipation and coelomic swelling 5cm cranial to the cloaca, on 07.11.2019. Ultrasound scanning revealed a highly vascularized hyperechoic mass with multifocal anechoic areas. Therefore, an exploratory laparotomy was performed. On 11.11.2019, krait (body weight 0.7kg) was anaesthetized with Ketamine 45mg/kg and Diazepam 0.4mg/kg (intramuscular) and maintained with 2% Isoflurane in oxygen. Tramadol 5mg/kg intramuscular was given as an analgesic. The snake was placed in dorsal-recumbency and an incision was made between the first and second scale rows lateral to the ventral scutes over the mass. When the coelomic cavity was exposed a highly vascularized, irregular surfaced mass measuring 3cm by 2cm with multifocal calcified areas was observed originating from the caudal pole of left kidney. Right kidney appeared normal. Affected kidney lobes were excised after ligating the renal vessels using 4-0 monofilament polygalactin 910. Muscle layer was closed with simple continuous suture pattern and skin with horizontal mattress pattern, with 4-0 and 3-0 monofilament polygalactin 910 respectively. Surgical procedure was carried out for thirty-eight minutes. A Smooth recovery was observed. Exogenous heat was provided by an infrared heat lamp, during and post-surgically for twenty-four hours. Further, 20ml/kg subcutaneous normal saline (0.9%) was administered, followed by intramuscular post-surgical antibiotics (Enrofloxacin 10mg/kg) for a week and analgesic (Tramadol) for three days. An osmotic laxative was inserted per-cloacal twenty-four hours after the surgery to facilitate defecation. Snake displayed normal clinical activities two days following the surgery. Histopathological examination revealed a renal adenocarcinoma composed of proliferating ductules lined by columnar epithelium, and cells showed nuclear pleomorphism and few mitoses. Unfortunately, the snake died due to an unrelated cause after eight weeks, therefore further monitoring on metastasis could not be done. Remaining kidney lobes and the right kidney appeared normal in the post-mortem examination. Enlargement of caudal coelomic cavity in snakes can be due to egg retention, abscesses, uric acid colonoliths or neoplasia. Regular physical examinations and radiography or ultrasonography aid to identify and distinguish these conditions. Metastasis of renal adenocarcinomas are reported to be uncommon in reptiles. Therefore, surgical excision is the recommended treatment of choice.

Venipuncture for Blood Sampling using Medial Saphenous Vein in Captive Elephants

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Blood sample collection from elephants is essential for various research, clinical, and management purposes. The method and the location of blood sampling depend on the temperament and restraint techniques which vary on the site of venipuncture. This document describes an uncommon approach for venipuncture in elephants which has been used in Pinnawala Elephant Orphanage (PEO). In general, auricular, cephalic, tail and medial saphenous veins are used for venipuncture in elephants though the most commonly used had been auricular vein. The prohibitive risk in restraint, specially their head and trunk, in captive elephants has always been a problem. On the contrary, restraint of legs is easier, commonly done and therefore, the risk is less in venipuncture using the medial saphenous vein. Further, approaching a well restrained elephant from behind is safer compared to from the front. It is described that the saphenous vein runs moderately deep, thus it has to be accessed perpendicularly 1 inch (3cm) deep from the skin surface in an adult elephant. However, saphenous vein can not be perpendicularly approached easily unless hind legs are safely tied and fully extended. At PEO, in more than 30 occasions including relatively aggressive captive elephants on standing position, venipuncture had been performed successfully by inserting an 18 Gauge needle at a 45 degree angle to its full length (3.8cm), after visually locating the medial saphenous vein. The complications encountered were difficulties in locating the vein in obese animals and in calves and the need for extra ropes and several experienced keepers with knotting skills. Though finding extra ropes is not much of a problem, having several experienced keepers can be difficult when it comes to privately owned captive elephants which are normally managed as individuals.

A Retrospective Study on Dead Specimens Presented to Dehiwala Zoo for Forensic Investigations

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Veterinarians play an important role in providing scientific evidence for wildlife related law enforcement. Dehiwala Zoo performs forensic investigations for legal references. A study was conducted to determine the frequency of commonly submitted dead specimens to the Dehiwala Zoo for species identification. Case records of the Zoo Hospital were retrospectively analyzed for five years (2014-2018) using simple descriptive frequency statistics for the study. All samples were compared with known specimens after morphological (gross and light microscopic) examination and unidentifiable samples were referred to Veterinary Research Institute (VRI) or National Aquatic Resources Research and Development Agency (NARA) for molecular based identification. Dead specimens included meat, skin, tooth, portion of tusk, tusk, horn, egg, reptile shell, nail and carcass samples. Out of 275 total specimens, frequency of meat, skin and carcass samples were 183(66.5%), 19(6.9%) and 16(5.8%) respectively. Meat samples identified to the species level (125/183) represented Spotted deer (*Axis axis*), Sambar (*Cervus unicolor*), Wild boar (*Sus scrofa*), Indian crested porcupine (*Hystrix indika*), Common Indian monitor (*Varanus bengalensis*), Dugong (*Dugong dugong*), Indian pangolin (*Manis crassicaudata*), Sri Lanka mouse deer (*Moschiola meminna*), Grey langur (*Semnopithecus priam*), Ring-tail civet (*Viverricula indica*), Palm civet (*Paradoxurus hermaphroditus*), Giant squirrel (*Ratupa macroura*), Parker's black turtle (*Melanochelys trijuga*), Green sea turtle (*Chelonia mydas*) and Oliver Ridley sea turtle (*Lepidochelys olivacea*). Remaining fifty-eight meat samples were identified only to the family level. Skin samples constituted Spotted deer, Sambar, Sri Lankan leopard (*Panthera pardus kotiya*), Black-naped hare (*Lepus nigricolis*) and Indian crested porcupine. Tooth samples represented Sri Lankan elephant (*Elephas maximus maximus*), Sri Lankan leopard and Sloth bear (*Melursus ursinus*). Egg samples included Common Indian monitor, Little tern (*Sternula albifrons*), Indian peafowl (*Pavo cristatus*), Parker's black turtle and Hawksbill sea turtle (*Eretmochelys imbricata*). Reptile shell samples included Green sea turtle and Oliver Ridley sea turtle. Total cases per year were 48, 54, 57, 50 and 66 respectively while specimens of meat, part of tusk, tusk and egg samples were reported annually. Year 2018 recorded the highest number of meat samples of wild boar, spotted deer and Sambar. Out of identified thirty-two species, nine species, Sambar, Dugong, Indian pangolin, Sri Lankan leopard, Sloth bear, Parker's black turtle, Green sea turtle, Oliver Ridley sea turtle, Hawksbill sea turtle are strictly protected mammals and reptiles under the Fauna and Flora Protection Act of Sri Lanka. Findings of the study nominate a set of species under threat while depicting a preliminary picture of illegal wildlife trade in Sri Lanka.

**Phylogenetic Relationship of Sri Lankan Native Black-naped Hare
(*Lepus nigricollis*) and Three European Hare Species
as Determined by Mitochondrial DNA D-loop Sequence Variation**

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Black-naped hare (*Lepus nigricollis*) is a small mammal species mainly found in South Asian countries including India, Sri Lanka, Nepal, Bangladesh and Pakistan. The phylogenetic relationship of Black-naped hare native to Sri Lanka has not been determined yet. In this study, 494bp fragment of mitochondrial DNA D-loop sequences obtained from three Black-naped hare muscle tissue samples submitted for forensic analysis are compared with 13 sequences of three European Rabbit species using maximum likelihood (ML) method. All three Sri Lankan samples were from the southern province of the country. DNA extraction was done from muscle tissue of hare with slightly modified Chelex protocol. Mammalian control region primers L15997 5'- CACCATTAGCACCCAAAGCT- 3' and H16498 5'-CCTGAAGTAGGAACCGATG- 3' were used to amplify the partial mitochondrial DNA D-loop region. For the PCR 10 µL of total volume was used including 1µL of buffer (1.5 mM MgCl₂), 1.6 µl dNTP (1.25 mM of A, C, G, T, respectively), 0.5 µl of each primer (10 pmol/µl), 0.1 µl Taq polymerase, 9 µl of distilled water to and 1 µl template DNA (40–60 ng/µl). PCR cycling conditions were applied as 94°C for 3 min initial denaturation, followed by 35 cycles of 94°C for 30 s, 50°C for 40 s and 72°C for 60 s and a final extension step of 72°C for 7 min. BigDye terminator chemistry was used for sequencing. The sequences obtained in this study were checked and assembled using BioEdit 7.0.9.0 and compared to those available in the GenBank database using the BLAST algorithm. Thirteen gene sequence (GenBank accession numbers: AY422311, AY422310, AY 422312, KY 211023, AY466828, AY466812, AY 466811, HM233230, HM233231, AY745098, HM233226, AY745100 and HM233223) representing three European hare species (*Lepus europeans*, *Lepus hainanus* and *Lepus timidus*) downloaded from NCBI were included in the final dataset for ML analysis. ML analysis was performed using RaxmlGUI v.0.9b2 with the General Time Reversible plus gamma distribution as the best-fit evelotary model. The phylogeny between the Sri Lankan and European sequences showed a distinct genetic relationship with a common ancestor. All three Black-naped hare sequences formed a strongly supported monophyletic clade sister to the three European species confirming distinct evolutionary history for the Sri Lankan samples. All three Black-naped hare sequences were unique haplotypes and possibly indicate high genetic diversity in the southern population within the genospecies of Black-naped hare population in Sri Lanka. Phylogenetic tree also suggest that the common ancestor of modern hare species diverged into Asian and European lineages rouhly at the same time. The present study is believed as the first discovery of the maternal origin in the native Sri Lankan wild rabbit populations. Yet futher studies with other Black-naped hare populations in South Asian countries are required to determine the phylogenetic positon and complete evolutionary history of this taxon.

Urolithiasis and Cystotomy in an Adopted Rabbit (*Oryctolagus cuniculus*)

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Urolithiasis has become a common condition encountered in rabbits of all breeds, age and sex which can be life threatening. Nutritional imbalance: excess calcium and vitamin D in diet, obesity, infection or inflammation, poor hydration, genetics are identified as predisposing factors. The objectives of this clinical case report are to highlight the combination of diagnostic aids used to confirm the presence of urinary bladder stone and to highlight the method of anesthesia and surgical procedure used in cystotomy. A five year old male rabbit (*Oryctolagus cuniculus*) was presented to the hospital showing typical clinical signs related to the urinary tract disease such as hematuria, stranguria, dysuria, and hunched posture, lethargy, anorexia, urinary incontinence which were non-specific clinical signs. History revealed that his diet consisted of free choice of hay, variety of vitamin C containing vegetables and fruits and water. On clinical examination firm mass was felt at the caudo-ventral abdomen and pain was elicited on abdominal palpation. Abdomen was tense when touched. Urinalysis revealed hematuria. On ultrasound scanning hyperechoic round mass was seen in the urinary bladder with distal acoustic shadowing. Plain radiographs were taken and presence of radiopaque round urolith confirmed urolith in the urinary bladder. Rabbit was stabilized with adequate fluid therapy (Fluid requirement calculated as for rehydration, fluid volume l = hydration deficit x body weight (kg) x 1000, for maintenance fluid rate-100ml/kg/day) and sufficient analgesia was given prior to the surgery. General anaesthesia was given using Ketamine, 50mg/kg BW and Midazolam 1mg/kg BW intramuscularly and multiple administrations were given in-order to maintain the anaesthesia throughout the surgery. Urinary catheterization was done using a 3.5 Fr tomcat catheter after anaesthetising the rabbit. Rabbit was placed in dorsal recumbency and the same routine cystotomy procedure was followed. Four stay sutures were placed on the bladder wall for easy manipulation of the bladder once laparotomy is done. Urolith (size 26mm x27mm, 5.273 grams) was removed, urethral patency was checked and the bladder was checked for any other remaining stones. Bladder wall was closed using absorbable suture material (3/0 Monocryl) in two layers and the body wall and skin were closed separately using 3/0 nylon. Proper hydration, analgesia (Meloxicam 0.5mg/kg bd), antibiotics (Enrofloxacin 5mg/kg bd) and prokinetic bowel stimulants (Metoclopramide 0.5mg/kg bd) were given 5 days post surgically and the rabbit was recovered successfully. Stone analysis revealed that the composition was 50% ammonium magnesium phosphate hexahydrate, 40% amorphous carbonated calcium phosphate and 10% calcium oxalate dehydrate, and uroliths found in rabbits are commonly composed of calcium carbonate or oxalate dehydrate. As a prophylactic measure it is important to minimize the dietary calcium and vitamin D intake in rabbits and to feed them with hay varieties of low calcium levels. Moreover, adding Vitamin C, citrate based products, liquid magnesium and urine acidifiers help to maintain lower urinary pH hence preventing development of uroliths.

Preliminary Investigation of Caprine Sub-Clinical Mastitis in Selected Farms in the Dompe Veterinary Range, Western Province, Sri Lanka

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Little information is available on the prevalence and antimicrobial sensitivity of bacterial pathogens causing mastitis in goats in Sri Lanka. Therefore, the present study was carried out to identify the bacterial organisms causing subclinical mastitis in goats in selected farms in Dompe Veterinary range, Western Province, Sri Lanka. Occurrence of subclinical mastitis was detected using California mastitis test (CMT) in five farms comprising 111 milking animals. Bacteria from CMT positive cases were isolated and identified using conventional microbiological methods. Antimicrobial sensitivity testing was carried out following CLSI guidelines. Total 29 (26%) samples were CMT positive and all positive for bacterial growth. Among positive samples, 22 (76%) had single bacterial species, whereas 7 (24%) had mixed isolates. Coagulase negative staphylococci (CNS) had the highest occurrence (56%) followed by *Staphylococcus aureus* (19%) *Klebsiella* species (14%), *Pseudomonas* species (6%) and *Streptococcus* species (5%). These findings are similar to epidemiology of caprine mastitis in most developing countries. All CNS isolates were sensitive to tetracycline, cefuroxime ciprofloxacin, and cotrimoxazole followed by ampicillin (85%, 17/20) gentamicin (80%, 16/20) amoxicillin clavulanate (65%, 13/20) cefotaxime (60%, 12/20) and ceftazidime (35%, 7/20). In contrast, all *S. aureus* isolates were resistant to ampicillin and ceftazidime. Amoxicillin-clavulanate and cefotaxime sensitivity of *S. aureus* was 12.5% (1/7). Further, 57.1% (4/7) of the *S. aureus* isolates showed methicillin resistance. However, 85.7% (6/7) of *S. aureus* isolates were sensitive to cotrimoxazole, followed by cefuroxime (71.4%) (5/7). All five *Klebsiella* and two *Pseudomonas* isolates were resistant to ampicillin while sensitive to gentamicin, tetracycline, cefuroxime and ciprofloxacin. Additionally, all *Pseudomonas* and three of *Klebsiella* isolates were resistant to amoxicillin clavulanate. All five *Klebsiella* isolates and one of *Pseudomonas* isolates were sensitive to cotrimoxazole while three of *Klebsiella* and one *Pseudomonas* isolates were sensitive to cefotaxime. Two *Streptococcus* isolates were sensitive to ampicillin, amoxicillin clavulanate, cefotaxime, ceftazidime, cefuroxime, ciprofloxacin and cotrimoxazole while only one isolate was sensitive to gentamicin and tetracycline. Despite the low sample number, a considerable number of antimicrobial resistant organisms were identified among bacterial pathogens causing caprine mastitis.

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Perineal Herniation in Dogs: A Retrospective Study

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Perineal hernia occurs when separation of the pelvic diaphragm muscles allows caudal displacement of pelvic or abdominal organs, or lateral deviation (diverticulum, dilatation or sacculation) of the rectum into the perineum. In this condition unilateral or bilateral subcutaneous bulging occurs lateral or ventrolateral to the anus. Objective of the current study was to review the common breeds, mean age and mean weight of dogs affected, clinical signs, additional clinical procedures, diagnostic aids, postoperative complications and synthetic herniorrhaphy to aid in the successful outcome. The prevalence of PH in dogs presented is relatively low especially among females. Thirty-nine male dogs and one female dog with perineal hernia were seen at Veterinary Teaching Hospital, University of Peradeniya over a period of three years from March of 2017 to 2020 February. Crossbred dogs were most commonly affected; German shepherd and Boxers were also over-presented in comparison with the general clinic population. The age range of affected dogs was from 3 to 11 years (mean 8.125, S.D. 2.29) years and the body weight varied from 6.5 to 38 kg (mean 16.6, S.D. 7.4). Main clinical signs were perineal swelling 40/40 (100%), tenesmus 14/40 (35%), constipation 8/40 (20%), stranguria 6/40 (15%), absence of feces 4/40 (10%) and anuria 3/40 (7.5%), bleeding from anus 2/40 (5%), lethargy 2/40 (5%), reduced appetite 2/40 (5%), dark coloured urine 2/40 (5%), hind limb incoordination 2/40 (5%), hematuria 1/40 (2.5%), pain on palpation 1/40 (2.5%), arching back 1/40 (2.5%) and protruded penis 1/40 (2.5%). There were nine bilateral and 31 unilateral hernias. The results of present study revealed that the perineal hernia could be accurately diagnosed by clinical signs, physical examination, minor clinical procedures and; ultrasonographic and radiographic assessments. All forty dogs underwent standard herniorrhaphy; and polypropylene meshes were used for 88.8% cases during 2018-2020. A recurrence rate of 27.5% was found in 11 dogs followed up for more than two months. Apart from recurrence, the major post-operative complications were wound infections (10%), constipation (17.5%) complications associated with urinary tract (15%) including cystitis, stranguria, hematuria and anuria or suture dehiscence. Additionally, five dogs have died after the surgery of which four of them were with complications associated with urinary system.

Detection of Haemotropic Mycoplasma in Imported Boer Goats in Sri Lanka

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Haemotropic mycoplasmosis is a common disease in goat and sheep. It has not been previously reported in Sri Lanka. It is caused by *Mycoplasma ovis* or *Candidatus Mycoplasma haemovis*, which is the same organism with two different copies of 16S rRNA. It commonly causes subclinical infection in small ruminants. Haemolytic anaemia, reduced appetite, poor weight gain, icterus, lethargy and infertility are manifested in acute infection. Boer goats were recently imported from Australia and quarantined at the Goat Breeding Centre of Department of Animal Production and Health in Matale. The animals were dewormed and treated with ectoparasiticides before shipping. The quarantine sheds were depopulated and rested nearly one year before restocking. Imported goats were never sent for grazing and fed with preserved grass. There was an outbreak of haemolytic anaemia soon after arrival in this herd resulted in the loss of 10% animals. Sick animals had mucous nasal discharges or nasal bleeding with low PCV and slightly higher total WBC counts. The plasma haemoglobin, copper and glutamate dehydrogenase levels were normal. Icteric subcutaneous tissue, bloody faeces in small intestines, dark urine in bladder, lung congestion and emphysema were observed at necropsy. Affected goats didn't have signs of heavy worm burden. The objective of this study was to investigate the occurrence of haemotropic mycoplasma in healthy goats in this herd as *M. ovis* infection is endemic in Australia. Blood samples were randomly collected from 20 healthy goats. Giemsa stained smears were scored using published protocols. Whole blood DNA was extracted with QIAGEN[®]DNeasy blood and tissue kit. PCR was performed using primers specific for *Mycoplasma ovis*/ *Candidatus Mycoplasma haemovis* targeting 16S rRNA gene using published protocols. PCR fragments were sequenced commercially using Sanger method. Five smears were highly positive for haemotropic mycoplasma by light microscopy while two were slight to moderate positive, three were suspected and ten were negative. No other blood parasites were detected. PCR revealed 15% (3/20) of the samples were positive for *Mycoplasma ovis*/ *Candidatus Mycoplasma haemovis*. Sequencing of the 172bp fragment revealed 97.5% identity to *Mycoplasma ovis*/ *Candidatus Mycoplasma haemovis*. Further phylogenetic studies are necessary to determine the origin of infection.

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A Higher Likelihood of Developing Pyometra in Bitches Administered Medroxyprogesterone Acetate as a Contraceptive

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Medroxyprogesterone acetate (MPA) is a contraceptive approved for human use and is freely available throughout the country which is being abused mostly by non-veterinary personnel as a cheap alternative for surgical sterilization of adult female dogs. Although certain drug compendia/formularies have indicated the use MPA in dogs to control estrus, cystic endometrial hyperplasia and pyometra are listed among the side effects. This investigation on the probability of developing pyometra due to administration of MPA to adult female dogs was conducted in parallel to a rabies control program conducted in Puttalam district by the Department of Animal Production and Health of the Northwestern Province. A total of 297 female animals above one year of age were included in the study and the history of the animals were gathered from the owners including previously adopted birth control measures. Once surgically removed, the uteri of the animals were examined for gross pathological changes suggestive of pyometra and samples of uteri (body and horns) were collected in 10% neutral buffered formalin for histopathological confirmation. Based on pathological findings, 154 (51.9%) dogs were confirmed as pyometra cases. The gross pathological changes of the uteri included various degree of enlargement, serosal vascular congestion, corrugation and small to large cyst-like structures in the uterine mucosae. Out of those animals with pyometra, 140 (90.9%) had closed uterine cervixes and a profuse sanguino-purulent/purulent discharge accumulated in the thickened uterine horns. The histopathological changes of the uterine wall included glandular hyperplasia, infiltration of neutrophils and macrophages. Out of the 154 (51.9%) animals with pyometra, 148 (96.1%) had a history of administering MPA while out of the 143 animals without pyometra, only 34 (23.8%) had received MPA. About 61% of the animals took part in the study had been exposed to MPA, of which over 80% had pyometra. Therefore, administration of MPA or any other progestin should be restricted to bitches in anestrus or early proestrus as bitches in late proestrus, estrus or dioestrus may show an abnormal stimulation of the reproductive tract giving rise to pathological changes due to presence of high progesterone levels. Hence, ovariohysterectomy can be considered as the most safe and effective method of controlling the community dog population in the country. In conclusion, pyometra was 15.2 times more likely to occur in animals exposed to at least one dose of MPA as a contraceptive compared to the animals which have not been exposed to MPA.

Characterization of Normal Microflora in the External Ear Canals of Healthy Dogs Presented to a Government Veterinary Hospital, Peradeniya

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The normal microflora in external ear canals of healthy dogs is an important factor in the pathophysiology of infectious otitis externa. Composition of normal microflora in external ear canals of healthy dogs is known mainly from the studies conducted in temperate countries. Therefore, this study was undertaken to characterize the normal microflora in external ear canals of healthy dogs presented to Government Veterinary Hospital, Getambe. Fifty dogs were (one swab per each ear) sampled from July to August, 2018. Bacteria were isolated on blood agar incubated at 37°C for 24 hours under aerobic conditions and identified using standard biochemical methods. Mycological isolations were done on Sabouraud dextrose agar with 0.5% chloramphenicol with and without lipid supplementation, incubated at room temperature for 10 days. A dog was considered positive when at least one isolate was recovered from any of the two swabs. Cefoxitin susceptibility test was performed for all *Staphylococcus* isolates according to CLSI guidelines. Out of the 50 dogs, majority were crossbreds (n=29), followed by German Shepherds (n=7), Doberman Pinscher (n=4), Labrador Retriever (n=3), Rottweiler (n=3), and one each Rhodesian Ridge Back, Terrier, Pomeranian, and Bull Mastiff. There were 31 males and 19 females, aged from 5 months to 10 years. There were 47 culture positive dogs. Microflora comprised predominately of *Staphylococcus* species (68%; 32/47), followed by *Bacillus* species (38%; 18/47), and *Malassezia pachydermatis* (10.6%; 5/47). Equal number of dogs (40.4%; 19/47) had either a single bacterial species or two bacterial species. Remaining dogs (17%; 8/47) had three bacterial species. *M. pachydermatis* was isolated only from dogs that had at least one *Staphylococcus* species. Most of the *Staphylococcus* species (51.2%; 21/41) were coagulase negative staphylococci (CNS). Majority of the coagulase positive staphylococci were *S. intermedius* group (80%; 16/20) followed by 10% (2/20) each *S. schleiferi coagulans* and *S. aureus*. These findings are comparable with the composition of normal microflora of external ear canals from healthy dogs in temperate countries. No association was observed between the breed, sex or age of the dogs and composition of normal flora. There were 12.2% (5/41) methicillin resistant isolates, which were all CNS.

Serological Detection of Antibodies Against *Anaplasma marginale* in Dry Cows in the Ridiyagama Dairy Farm, Hambantota

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Bovine anaplasmosis is a vector borne, infectious but non-contagious disease caused by hemoparasite *Anaplasma marginale*. Cattle of any age can be susceptible to the infection with *A. marginale*, but the severity of disease increases with age. Once an animal recovers from the disease, either naturally or with normal therapy, it will usually remain a carrier of the disease for life. Present study investigated the carriers of *A. marginale* in the Ridiyagama Farm, Sri Lanka. The infection was generally diagnosed by serologic demonstration of antibodies with confirmation by Enzyme Linked Immunosorbent Assay (ELISA) along with conventional diagnostic method of microscopic examination. Random blood smears and whole blood samples were collected from a total of 47 apparently healthy adult cattle of a free grazing dry herd. A commercially available *A. marginale*-Ab ELISA kit was used to analyze the samples. Results of the ELISA revealed 9 of the 47 samples were positive for antibodies against *A. marginale*. Peripheral blood smears were examined under light microscope (10x100) for the identification of *Anaplasma* spp and all those were negative for the organism. The seropositive prevalence was analyzed with age and parity of sampled animals. In the age group <48 months, the prevalence was 0 (0/9), age group between > 48 and 72 months it is was 22.85 % (8/35). The occurrence of seropositive animals >72 months was 25% (1/4). Therefore, with the results analyzed it showed the occurrence of seropositive animals was highest in the age group >72 months. When compared the prevalence with parity, it showed that the highest seropositive prevalence occurred in second and third parity. No animal in first parity or fourth parity was detected seropositive for *A. marginale*. Out of tested animals, 25% (6/24) of animals in second parity and 20% (3/15) animals in third parity were detected seropositive for *A. marginale*. In addition to that, seropositive prevalence in the breeds were 17.24% (5/29) in Cross Bred and 22.2% (4/18) in Jersey. Results indicates that animals of age group > 72 months were highly vulnerable to the infection and remain as carriers. Since the animals of this age group is having higher reproduction rates they can be subjected to the infection and they can remain as lifelong carriers. According to the literature, subclinical carrier stages can have an effect on reproductive performances such as abortions, infertility, still births and long calving intervals. Presently, subclinical infection of *A. marginale* is not considered as an important factor in differential diagnosis of reproductive diseases. These findings make worthwhile to compare the reproductive disorders of unknown etiology in Ridiyagama farm for possible *A. marginale* connection. Although the smears were not positive for organism due to low parasitemia, they can remain as carriers due to chronic infections. They can be detected and quantified by DNA in blood samples of cattle by real-time PCR. Also, it would be beneficial if this serological analysis can be conducted in the farm to screen all the animals.

The Role of the Microbiome in Oyster Health Demonstrated Using an Experimental *Ostreid herpesvirus-1* (OsHV-1) Infection in Pacific Oysters (*Crassostrea gigas*)

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Mass mortality disease outbreaks have caused severe economic losses in the Pacific oyster industry in many parts of the world. Although *Ostreid herpesvirus-1* (OsHV-1) has emerged as an important cause of disease outbreaks, the oyster microbiome is thought to play a role resulting in the polymicrobial pathogenesis of this, and other diseases. The environment influences the microbiome of oysters owing to their filter-feeding behaviour. This study considered the oyster microbiome as a risk factor for disease susceptibility by evaluating the microbiome of Pacific oysters: (1) from a common hatchery but grown in different estuaries; and (2) in response to OsHV-1 infection. Pacific oysters (n=348) from a single hatchery that were grown in three distinct estuaries were recruited to the laboratory and challenged with OsHV-1. Samples were collected: before (A) and soon after OsHV-1 challenge (B); from moribund oysters (C) or survivors of OsHV-1 (D); and OsHV-1 negative control oysters (E), for microbiome analysis. Total bacterial, OsHV-1 and *Vibrio* genomic DNA were quantified using real-time PCR assays. The microbiome in oysters was identified by sequencing the bacterial 16S rRNA gene (V1-V3) and the alpha and beta diversity was calculated. The initial bacterial diversity was different for oysters grown in the three estuaries and changed further after OsHV-1 injection ($p < 0.05$). Mortality after OsHV-1 challenge was varied depending on estuary of origin. The oysters with the highest mortality also had the highest quantity of OsHV-1 and *Vibrio* ($p < 0.05$). This group also had higher initial bacterial diversity which decreased in the moribund oysters ($p < 0.05$). The diversity of the microbiome of surviving and control oysters from two locations did not change compared to pre-challenge. A strong correlation was observed between OsHV-1 and *Vibrio* quantity in OsHV-1 infected oysters ($r = 0.6$; $p < 0.001$). In conclusion, the different microbiome for oysters grown in different locations also had a differential response to OsHV-1 challenge. Further, the higher *Vibrio* load in oysters with increased quantities of OsHV-1 and higher mortality suggested a role of *Vibrio* in the pathogenesis of this disease. This study indicates the potential for different estuarine environments to influence the oyster microbiome and how this can subsequently alter disease outcomes.

Significance of Pathological Findings in Diagnosis of Inclusion Body Hepatitis (IBH) and Hydropericardium Syndrome (HPS) in Poultry

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The present study reports the significance of pathological findings in diagnosis of inclusion body hepatitis (IBH) and hydropericardium syndrome (HPS) in poultry. As a source of material used 4571 poultry dead birds brought for necropsy at the department of Veterinary Pathology, college of Veterinary Science, Punjab Agricultural University / Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India during the period from August 2005 – March 2006. After examination of 3629 necropsy total of 35 cases of IBH and HPS were diagnosed, as 27 cases of IBH and 8 cases of HPS. Tentative diagnosis was based on necropsy findings, whereas the final diagnosis was based on histopathological examination, PCR, bacterial isolation and demonstration of causative agents by special stains. In necropsy, swollen livers with mottled pale and fatty, pinpoint to ecchymotic sub-serosal haemorrhages and rounded borders, with occasional multiple necrotic foci were grossly observed. Also, in few cases of IBH, liver appeared fatty and jaundiced with linear haemorrhagic patches on the surface and in hydropericardium syndrome accumulation of clear or straw-colored fluid in the pericardium sac was noticed. Microscopically, affected livers revealed degeneration, vacuolation, fatty change and necrosis of hepatocytes along with infiltration of mononuclear cells, presence of basophilic and occasionally eosinophilic inclusion bodies and hyperchromatic nuclei in many cases. Degeneration, oedema and focal mononuclear cell infiltration were observed in myocardium. Mild to moderate lymphocyte depletion was observed in lymphoid organs, the bursa of Fabricius, spleen, thymus, harderian gland caecal tonsils and payer's patches. A special feature of the study was the observation of marked degeneration and necrosis in harderian gland whereas hyperplasia in harderian gland was observed in few cases of IBH and HPS. There was no mentioning of data on harderian gland in cases of IBH and HPS in published literature. Degenerative changes with mononuclear cell infiltration were also observed in non-lymphoid organs like kidneys, lungs, thyroid gland, adrenal gland, pancreas and proventriculus. Gross and the histopathologic lesions of IBH and HPS observed in present study were in agreement with earlier reports, therefore, the gross and histopathology make significance findings in diagnosis of IBH and HPS which help in quick diagnosis or differential diagnosis at field in an outbreaks.

Goat Diseases and Their Association with the Rainfall Pattern in the Maruthankerny Veterinary Range of the Jaffna Peninsula

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Maruthankerny veterinary range covers a long stretch in Jaffna District of Sri Lanka extending from Point-pedro to Chundikulam forest reserve. Animal husbandry in the area is dominated by local breeds of goats and cattle that are kept under extensive management system. Disease is one of the major constraints to this production system, especially parasitic and infectious diseases, which show seasonal occurrence. Therefore, this study was conducted to determine common diseases of goats in Maruthankerny veterinary range, and to find out whether the prevalence of these diseases show a pattern associated with the rainfall in the region. The case records maintained at the Maruthankerny Government Veterinary Office for the last five-year period (2014-2018) were considered for this study. Monthly rainfall records for the study period were obtained from the Department of Meteorology, Sri Lanka. Descriptive data analysis was conducted to understand the prevalence of the diseases, and the correlation analysis was performed to explore the association between monthly rainfall and the different diseases reported during the study period. The order of the reported diseases from the most frequent to the least frequent is cerebrospinal nematodiasis (CSN), bite injuries (animal bites), contagious pustular dermatitis (CPD), parasitic diseases, respiratory diseases, diarrhea, tetanus and rabies. CSN, CPD, parasitic diseases and diarrhea had significantly ($p \leq 0.01$) positive association with monthly rainfall, indicating an increasing trend of these diseases during the rainy season. Respiratory diseases and tetanus had significantly ($p \leq 0.01$) negative association with monthly rainfall where the abundance of the diseases substantially increased during the dry season. These findings would be helpful to develop and implement a season-specific disease management strategy for goat production system in this region.

Fermentation Quality, Chemical Composition and *In-Vitro* Digestibility of Silages Prepared by Using Different Ratios of Pumpkin and Rice Straw

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Agricultural by products and leftover vegetables can be used as cattle feed to minimize the feed scarcity, but storing of such, especially surplus vegetables, is a problem. Therefore, the objectives of this study were to evaluate ensiling characteristics, nutritive values and *in-vitro* digestibility of silages prepared using different composition of Pumpkin (*Curcubita maxima*) and Rice Straw (*Oryza sativa*). Mature Pumpkins were harvested, chopped (1 inch) and wilted (48h). Five treatments were prepared on dry matter basis in the ratio of rice straw to pumpkin as: S₁, 45:55, S₂, 40:60, S₃, 35:65, S₄,30-70 and S₅, 25-75 respectively (3 replicates per treatment). Pumpkins and Rice Straw were arranged as layers and each layer was added with 50g/kg of molasses. After allowing for 30 days maturation, silages were harvested and 100g sub sample of from each treatment obtained for analysis of sensory, proximate composition, fermentation quality, organic matter digestibility (OMD) and Metabolizable energy (ME). Data analyzed as CRDB design using SAS 12th edition. Light amber brown colour and stemy fibrous texture was observed in all the treatments. In addition, sour vinegar smell was observed in S₁ whilst S₃, S₄ and S₅ given sweet, fruity alcoholic aroma depicts the enhance fermentation quality of silage with increased proportion of pumpkin. All silages were free from molds. Dry matter (DM) content of the silages increased (p<0.05) with increasing amount of rice straw as S₁ and S₂ had average DM of 53.0%, which gradually declined to the lowest in S₄ and S₅ (Averaged 41.0%). In contrary, inclusion of higher amounts of Pumpkin increased (p<0.05) crude protein (CP) content of the silages, as S₄ and S₅ had average CP of 10.6% compared to the lowest CP contents recorded for S₁ and S₂ (Averaged 7.2%). The crude fiber (CF) contents of silages declined gradually (p<0.05) with increasing amount of Pumpkin, which were averaged 29.2% for S₁ and S₂ and 20.6% for S₄ and S₅ respectively. Lowest (p<0.05) fat contents were observed in S₁ and S₂ (Averaged 1.7%), whilst S₃, S₄ and S₅ recorded the highest (Averaged 2.5%). Ash content increased from S₅, (16.4%) to S₁, (17.6%) with increasing amount of rice straw. Highest (p<0.05) water soluble carbohydrates (WSC) content recorded in S₅ whilst that of other treatments were similar. Contents of lactic acid (LA) and pH among silages were varying, with highest (p<0.05) LA content (8.7%) and the lowest pH (4.7) recorded in S₅ compared to the other treatments. The NH₃-N concentrations were negligible in all the treatments, reflecting that the aerobic fermentation has not occurred. Increasing content of Pumpkin across treatments increased (p<0.05) both OMD (%) and ME (MJ/kg/DM); (OMD 40.5 in S₁ to 51.8 in S₅ and ME 5.81 in S₁ to 8.12 in S₅). Considering the appropriate physical and chemical properties (Acceptable DM content, higher CP, low CF, higher WSC, LA and lower pH) the silage S₅ can be recommended as the best combination of silage to be made from Pumpkin and Rice Straw.

Breeding Value Estimation for Dairy Cattle Using Birth Weights of Calves Born in Kandy and Ratnapura Districts

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Genetic selection is essential for making any genetic improvement in the local cattle population. A study was carried out to estimate genetic parameters and breeding values (BV) of AI sires with respect to calf birth weight (CWT) in Kandy and Ratnapura districts. All imported and local Friesian (Fr), Jersey (Jy), Sahiwal (Sh) and Australian Friesian Sahiwal (AFS) sires used in the two districts from 2016 to 2018 were included in the analysis. The dams were a random group from all (12) veterinary ranges of Kandy (N=587) and all (18) ranges in Ratnapura (N=624) based on availability of reliable records. The herds were typically small scale with semi intensive management. The selected dams were in their first 12 parities and predominantly crossbreds with varying admixtures of exotic and local genetic compositions. After quality control, there were 1211 CWT records from progeny of 20 AI sires. The Mixed Model procedure (*PROC Mixed* in *SAS*), which included District, Veterinary Range (nested within District) and Parity as fixed effects and AI Sire as the random effect, provided the variance component estimates and heritability (h^2). With no pedigree information available, estimated BV of sires were calculated based on the phenotypic superiority of the progeny of a sire ($P_{\text{sire}} - \text{Population mean}$) weighted by $2nh^2/[4+(n-1)h^2]$ where n = no. of offspring. The estimates for sire, error, additive genetic and phenotypic variance components (kg^2) were 0.9482, 15.0773, 3.7928, and 16.0256, respectively yielding a direct heritability estimate of 0.237. Most heavily used sires were Jy-282 ($n=334$), Jy-288 ($n=250$) and Fr-442 ($n=160$). The sires ranked as top four according to mean CWT (Fr-416, Fr-3009, Fr-3002 and Jy-284) unfortunately had only few daughters (<5) receiving smaller weightage to their phenotypic superiority. With a larger number of calves (greater weightage), the fifth ranked F-442 received the highest breeding value (2.06 kg), followed by F-416, F-3009 and J-284, AFS-991 and F-3002 (1.09, 1.06, 0.75, 0.67 and 0.18 kg, respectively). The only Sahiwal sire used (Sh-849) received the 17th rank. Considering the large non-genetic (and phenotypic) variability occurring among many small herds, the moderate heritability value obtained indicates the presence of substantial additive genetic variability among the AI sires. This study also reveals the magnitude of differences present among the AI bulls and importance of breeding value estimation for future breeding programs.

Effect of Stage of Harvest on Agronomic Characters and Dry Matter Content of Hybrid Napier Varieties, Sampoorna (DHN-6) and CO-5

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High yielding cultivars of hybrid Napier varieties of CO3 and CO4 available in Sri Lanka for a while and two new varieties were recently brought from India. Since their agronomical data under Sri Lankan conditions has to be established before released to the farmers, objectives of the current study were to evaluate the agronomical characters and dry matter (DM) content of Napier hybrid Sampoorna (DHN-6-(IPM14188) × Napier line (FD 184) and CO-5 (*Pennisetum glaucum* × *P. purpureum schumach*) under rain fed field conditions at mid country wet zone of Sri Lanka. The experimental design was a factorial arrangement (Two varieties and five harvesting intervals: 4, 6, 8, 10 and 12 weeks respectively) in a complete randomized block design (CRBD) with three replicates. For the fodder establishment, land ploughed, leveled and two stem cuttings of each variety were planted in to a depth of 15 to 20 cm at an angle of 45° in five rows per plot with 1x1 m spacing. Recommended basal fertilizer applied before planting. Plant height and number of tillers per clump were taken prior to each harvest and sub samples (500g) of each variety were obtained during different harvesting intervals for analysis of DM. Data analyzed as CRBD using statistical software Minitab (Version 06). At the 4th week, Sampoorna had the lowest ($p < 0.05$) plant height of 51.0 cm compared to that of 71.6 cm measured in CO5. Plant height of the two varieties did not differ during 6th and 8th weeks, but hybrid Napier variety Sampoorna had higher ($p < 0.05$) plant height than that of CO5 at 10th and 12th weeks (216.5, 276.6 cm and 158.6, 249.0 cm for Sampoorna and CO5 at 10th and 12th weeks respectively). Number of tillers of Sampoorna harvested at the 4th week was less ($p < 0.05$) than that of CO5 (6.8 and 14.4 for Sampoorna and CO5 respectively). Thereafter however, there was no difference ($p > 0.05$) of number of tillers among two varieties. There was no difference ($p > 0.05$) of DM content of two varieties until 10th week of growth, but, DM content of Sampoorna was higher ($p < 0.05$) than that of CO5 at the 12th week (23.0 % and 16.7 % for Sampoorna and CO5 respectively). It is concluded that due to greater plant height (At 10th and 12th weeks of harvest) and higher dry matter content (At 12th week of harvest), Hybrid Napier variety Sampoorna harvested at two and half to three months of age is superior to that of CO5 in terms of agronomical characters and DM content.

A Preliminary Investigation on the Occurrence of Aflatoxins, Ochratoxin-A, and Fumonisin in Compound Poultry Feed and Feed Ingredients in Sri Lanka

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Mycotoxins, a group of toxic secondary metabolites of fungi, are among the most frequently found contaminants in animal feed due to usage of mycotoxin-contaminated raw material in feed production. Numerous studies conducted elsewhere have documented co-occurrence of various mycotoxins in animal feed and raw materials, but such published information are sparse in Sri Lanka, although there is a well-established, technologically advanced animal feed industry in the country. In this ongoing study, we determined the occurrence and levels of three mycotoxin groups; 1) aflatoxins (AFs; AFB1, AFB2, AFG1 and AFG2), 2) ochratoxin A (OTA), and 3) fumonisins (FBs; FB1, FB2 and FB3) in commonly used poultry feed ingredients, namely corn (n= 9), coconut poonac (n= 5), rice polish (n= 6) and soybean meal (n= 7), obtained from self-mixing feed producers in Kurunegala and Puttalam districts, and in compound poultry feed (n = 23) from four major feed producers in the country. Samples were analyzed for AFs, OTA and FBs using accredited (ISO 17025:2017) in-house High-Performance Liquid Chromatography with Fluorescence detection methods (HPLC-FLD). For analysis of AFs, an initial screening was conducted using a commercial ELISA kit, and only the samples with total AF level above 20 µg kg⁻¹ were analyzed with HPLC-FLD. Samples were analyzed once unless mycotoxin levels exceeded regulatory limits. AFs were detected in all feed and ingredient samples. Among the ingredients, AFB1 levels were generally high in corn (range = 10.5–689.4 µg kg⁻¹), coconut poonac (range=25.0–341.7µg kg⁻¹) and rice polish (range = 3.0–116.0 µg kg⁻¹) compared to soybean meal (range = 0.4–1.9 µg kg⁻¹), and 14 out of 20 samples from former three ingredients had AFB1 above the European Union (EU) maximum level of 20 µg kg⁻¹ in feed materials. Three out of 23 compound feed samples also exceeded the EU maximum level of AFB1 (range = 53.0–470.0 µg kg⁻¹). The 17 samples which had AFB1 exceeding the EU limit also had AFB2 (range = 0.7–16.2 µg kg⁻¹), AFG1 (range = 0.4–26.8 µg kg⁻¹) and AFG2 (range = 0.1–0.3 µg kg⁻¹). Although OTA and FBs were detected in 39 samples (range = 0.6–100.6 µg kg⁻¹) and in 41 samples (total FBs range = 0.08–3.37 mgkg⁻¹), respectively out of the 50 samples, their levels were below the EU maximum limits. FB2 and FB3 were detected only in seven corn samples. Our study shows that aflatoxin contamination could be a serious issue particularly in corn, coconut poonac and rice polish and also in compound feeds, highlighting the importance of establishing regulations to monitor mycotoxin contamination. Further, our study provides evidence of co-occurrence of mycotoxins in various matrices, which is an important factor to be considered during monitoring programs and risk profiling.

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Random Regression Test Day Model Approach for Breeding Value Estimation of Dairy Cattle in Three Districts of Sri Lanka

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Breeding value estimation is essential for recommendation of the best AI bulls for various regions of Sri Lanka. A study was conducted in dairy farms in Kurunegala, Anuradhapura and Polonnaruwa districts to estimate genetic parameters and breeding values of AI bulls using random regression (RR) model approach. Test day (TD) yields (kg/day) were collected from all large (Government) and medium scale farms participating in the Government Pedigree and Performance Recording Scheme, by visiting those in 30-day intervals during 2010-2017 period. The herds were managed semi intensively with twice-a-day milking. After editing for missing information, a set of 4723 TD milk records of 386 dairy cows belonged to 13 Jersey sires was used for the analysis. There were 23 fixed test-year month categories (4-month TD groups). Calving age (varied from 22 to 102 months) was classified into 9 fixed groups. Dam breed/cross (random) was comprised of five categories. Three sets of first order Legendre polynomials of days in milk were used as covariates, namely for all data (fixed), within sires (random), and within cows (random) to account for the temporal yield fluctuations within a lactation. Genetic and phenotypic variance components of the RR model were estimated using Restricted Maximum Likelihood approach. Subsequently breeding values of sires and permanent environment (PE) effects of daughters for complete lactations were obtained using Best Linear Unbiased Prediction method. The analysis was repeated by changing lactation length (305-day, 365-day and 455-day) to determine possible changes in heritability estimates and sire rankings. The resulting additive, PE and error components (kg²), and heritability estimates were 90598.4, 315136.8, 599.0 and 0.2672, respectively for 305-day yield; 129482.6, 418262.4, 716.8 and 0.2864 for 365-day yield; and 200976.0, 621063.0, 893.6, and 0.2985 for 455-day yield, respectively. These results indicate substantial genetic variation present at field level for genetic selection. The sire rankings remained constant with changing the lactation length. High PE variance estimates show the large within-cow TD yield variability captured by the RR model. Thus, test-day RR models can be recommended for genetic evaluation of dairy cattle under field conditions in Sri Lanka where no daily recordings available. Due to the highest heritability, 455-day lactations could be a better criterion of selection for yield and persistency.

Development of a Novel Dual-Purpose Poultry Line that Thrives Well in Extensive Backyard Poultry Rearing System of Sri Lanka

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Central Poultry Research Station (CPRS), VRI maintains a poultry breeder line to produce average performance layers for backyard egg production. Although, poultry meat is a main animal protein supplement in the country, commercial chicken is less affordable to rural, low-income families. Yet, no meat type bird that can tolerate extensive management is available in Sri Lanka. Thus, it is a need to develop a dual-purpose poultry line with a rational meat production to survive at extensive back yard system as a solution to the animal protein demand at the rural areas. Therefore, two breeding experiments were conducted to develop a novel dual-purpose poultry line to thrive at the back yard. Naked Neck (NN) line, CPRS layer line and Cobb 500 broiler parent line was selected using a multi-trait selection index, offering marks for meat production traits, egg production traits and survival at extensive rearing traits. Cobb parents has superior meat traits. NN had the best score for survival and average for egg and meat. CPRS scored highest for eggs and then survival. Two breeding experiments conducted: first to improve production traits and the second to improve survival traits. First, had two treatments: 1. CPRS♀XCobb♂ 2. NN♀XCobb♂ and a control, with local lines NN♀XCPRS♂, each replicated four times with six females in each replicate. A total of 16-week-old, 24 females were randomly allocated into individual cages. Artificially inseminated with fresh semen from male birds, six of each Cobb 500 and CPRS. Eggs were separately set and F1 generation was studied for growth performances and survival in terms of mortality, necrotic enteritis, litter quality, for five weeks at a pen with an open run simulating extensive rearing. Cobb crosses with NN and CPRS improved ($P < 0.05$) weight gains at 5 weeks 1600 and 1300g respectively when compared to 300g of NN♀XCPRS♂ offspring. Fertility and hatchability_(TSE) improved ($P < 0.05$) in both F1 generations but had extreme wet-litter and higher necrotic enteritis infection, score averages 3.1, indicating poor survival or pathogen resistance, compared to 0.25 of the offspring of local breeds. In the second experiment, both F1 lines of two Cobb hybrids were cross bred to improve their survival by reducing exotic blood to produce two commercial strains (F2). Females of NNxCobb-F1 and CPRSxCobb-F1 were artificially inseminated with semen from CPRS and NN male grandparent lines respectively; avoiding common ancestors in F2. The experiment followed the previous design without a control. Higher genetic polymorphism observed in F2 generation compared to F1, through ISSR PCR performed with representative samples. The growth traits dropped ($P < 0.05$) from F1 to F2 but the laying performances increased. Both commercial strains started to lay at 20 weeks compared to CPRS and NN lines at 22 weeks. Egg weights and egg shell weights were higher ($P < 0.05$) in commercial strains averages to 51.3g and 6.2g compared to the averages of NN and CPRS 46.1g and 5.8g respectively. Average weights and Feed Conversion Ratio (FCR) of the two F2 generations fed with 22% protein and 3000kcal/kg metabolizable energy feed, at 5 weeks were 598g and 1.8 compared to 270g and 2.2 respectively of average NN and CPRS lines. F2 generations survived well, without welfare issues at the backyard. At 3 weeks 50% NN and 50% CPRS necrotic enteritis scores were 0 and 0.25 respectively. Therefore, the developed two F2 lines are Commercial dual-purpose lines that survive well at extensive backyard. At present CPRS is issuing both F2 lines at a high demand and the birds well thrive at backyard.

Successful Artificial Insemination of a Mare: A Landmark Event of Equine Breeding in Sri Lanka

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Equines in Sri Lanka are comprised of few hundreds of thoroughbreds, a large number of their crosses, and ponies. It is estimated that there are nearly 2500 of equines across the country and these equines are kept mainly for leisure purposes. Except very few, all thoroughbreds are imported horses from overseas at a high cost. Thus, there is a growing demand to develop breeding programs for equines in the country. At present mares are bred exclusively by natural mating. However, there are not enough pedigreed stallions to have a successful breeding program. As such natural mating can spread serious venereal diseases among animals and also there is an element of risk for inbreeding. Artificial insemination is the way forward for breeding mares in Sri Lanka. Therefore, the objective of the study was to establish a technique of artificial insemination (AI) for mares in Sri Lanka. A healthy, three quarter bred, nulliparous mare raised under semi-intensive management, was selected for the study. Estrous induction of the mare was initiated with the injection of prostaglandin F_{2α} (PGF Veyx forte, Germany; PGF_{2α}) at day 1 of the program. This was followed by injection of gonadotrophin releasing hormone (Gonavet Veyx, Germany; GnRH), PGF_{2α}, GnRH, and human chorionic gonadotrophin (OVIDAC-5k, India; hCG, 1500 IU) injections on days 12, 13, 14 and 15, respectively. From the following day of the last injection, the mare was being observed for signs of estrous. On the third and fourth days of the estrous, the diameter of the pre-ovulatory follicle was measured by trans-rectal ultrasonography (Landwind P09, China). The external appearance of the cervix was assessed using a vaginoscope during this period. When the follicular diameter was close to 4 cm and the external os of the cervix was flat and lying on vagina AI was performed using deep-frozen Arabian semen ('Solstar'; Alamo Pintado Equine Medical Centre, California) imported from USA in 2007. The semen straw (5ml) was thawed at 37°C for 40 minutes and forward progressive movements of the sperms were assessed under the microscope (CARL ZEISS, West Germany) prior to insemination. Semen was filled into a 5cc nontoxic syringe and the insemination was done by per-vaginal AI technique using an equine AI pipette. At the end of the AI, the same dose of hCG was injected intravenously. Ultrasound scanning performed three months after AI, confirmed that the mare is pregnant. This is the first record of the successful pregnancy that is resulted from AI in mare in Sri Lanka.

Factors Affecting Birth Weight of AI Born Calves in the Veterinary Ranges of Kandy and Ratnapura Districts

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Birth weight is a key indicator of milk production and longevity of dairy cows. This study was carried out among dairy herds in Kandy and Ratnapura districts to investigate the effects of AI sire breed, parity, veterinary range and district factors on birth weight (kg) of smallholder AI sired crossbred dairy calves (CWT). A set of 1218 calves were selected randomly from the dairy cows inseminated with Friesian, Jersey, Sahiwal or Australian Friesian Sahiwal (AFS) semen from 27 AI sires during 2015-17. The birth records covered all 12 VS ranges in Kandy (N=594) and all 18 ranges in Ratnapura (N=624). The dams belonged to the first 12 parities with about 33.9%, 27.8%, 16.1% and 10.2% of the cows in their first, second, third and fourth parities, respectively. All dams were crossbreds with unknown genetic admixture levels of local and exotic breeds. Chi-square analysis was used to identify differences among percentage use of sire breeds (semen) between the two districts. The ANOVA procedure was carried out treating district, veterinary range (nested within district), sire breed, AI sire (nested within sire breed) and parity of dam as fixed effects with their all possible interactions. Duncan's Multiple range test was used for mean comparison. Both districts predominantly have used Jersey semen. The percent use of Friesian (25.9%), Jersey (65.5%), Sahiwal (4.5%), and AFS (4.08%) semen in Kandy district were significantly different ($P < 0.05$) from those in Ratnapura district (11.0%, 75.4%, 5.8% and 7.8%, respectively). Mean CWT (\pm SE) for all data was 28.99 kg (\pm 0.63). Progeny of Friesian, Jersey, Sahiwal and AFS sires reported mean CWT of 29.92 \pm 1.11), 28.93 \pm 0.87), 28.34 \pm 0.75) and 27.74 \pm 1.05) kg, respectively. However, the means were not significantly different according to ANOVA procedure, partly due to unaccounted dam variability. A significant variation in CWT existed among veterinary ranges within districts leading to a non-significant difference between Kandy (28.58 \pm 0.65) and Ratnapura (28.88 \pm 0.74) districts. Godakawela (Ratnapura), Opanayake (Ratnapura), Yatinuwara (Kandy) and Gampola (Kandy) ranges were ranked as the highest in CWT while Nivithigala (Ratnapura) and Hasalaka (Kandy) reported the lowest means, partly due to climatic and management differences. Though sixth and seventh parity cows reported the highest CWT, the parity differences were not significant. The differences among veterinary ranges with similar climatic conditions and sire usage reveal the potential existing to improve calf weights in both districts through improved management practices.

Importance of Dental Examinations and Routine Dental Floating in Equines

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Equine dentistry is very important, but until recently rather neglected area of equine practice, with many horses suffering from undiagnosed, painful dental disorders. Horse's teeth continuously erupt throughout its life and are subject to attrition. Modern diets of equids have caused reduction in rate of occlusal wear resulting in dental overgrowths. Thorough dental examinations are required to detect equine dental problems. Clinical signs of dental disease are often not specific, such as weight loss, biting issues, quidding, choke, diarrhoea, and colic. Five equids (15-years-old Thoroughbred mare and gelding, 10-year-old gelding, 6 and 3-year old mare pony crosses) presented for dentistry with complaints of biting problems, quidding and recurrent colic episodes. Two Thoroughbreds and 6-year-old pony cross had previous dental work 2 years ago, rest had no prior history of dental work. Complete dental examination performed, including evaluation of head, eyes and nostrils. Sedation with xylazine (1.1mg/kg IV) and acepromazine (0.01mg/kg IV) to facilitate oral examination. Incisor teeth evaluated and jaw manipulated by rostro-caudal and lateral jaw excursion. Full mouth speculum (McPherson type) placed and opened, with oral cavity washed. With aid of head torch, the buccal, occlusal and lingual surfaces were palpated, and dental mirror used to inspect structures. The Modified Triadian system used for equine dental nomenclature. Data of equids and dental abnormalities entered into Pimbury Dental App. In all cases, enamel overgrowths (sharp points) present on buccal aspect of maxillary cheek teeth (CT) and lingual aspect of mandibular CT to varying degrees, although without soft tissue ulceration of buccal mucosa. 3-year-old pony mare had moderate sized hooks on the cranial aspect of 106 and 206, and sharp points on all CT. Additionally, had moderate brachygnathism with buried wolf teeth at 105 and 205. 15-year-old Thoroughbred mare had undulating occlusal surface of CT arcade in rostro-caudal direction (wave mouth) and sharp points of all CT. Additionally, had diagonal incisor malocclusion (slant mouth) with canine tooth at 304. Corrective dental procedure of floating of the sharp enamel points and tall tooth crowns were performed, with use of hand floats. Incisors weren't corrected due to limited equipment and wolf teeth were not removed. Follow-up of the cases showed improvement in riding with bit. Corrective dental floating procedures are performed to relieve discomfort associated with soft tissue injuries caused by sharp points, reduce dental elongations which stress affected teeth and jaws, improve mastication and digestion of feedstuffs, alleviate stresses on abnormally worn teeth and to prevent discomfort and improve performance in the horse wearing a bit and bridle. Therefore, it is recommended that mature, as well as immature horses be checked annually and abnormal wear patterns be corrected. Knowledge of the anatomy of normal dental and associated structures is necessary for the dental practitioner to be able to recognize, diagnose and treat dental disease.

Open Castration of Ponies Under General Anesthesia in the Field Conditions

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Castration is the most common surgical procedure performed in equines. Potential reasons for performing includes desire to reduce or prevent masculine or aggressive behavior, testicular injuries, or inguinal herniation. Open, closed and semi closed techniques are used for castration and may be performed while standing, sedated or recumbency under general anesthesia. The aim of this report is to present the anesthetic protocol for general anesthesia in horses and a simple method of castration. Two stallions (7 years old, $\frac{3}{4}$ pony cross and 10 years old pony) presented to Pet Vet Clinic for purpose the of castration. Preoperatively, ponies underwent physical examination including palpation of the testicles and updated tetanus prophylaxis. Body weight estimated by use of an equine weight tape. A16G cannula was placed in jugular vein adhering to aseptic technique. Premedication with acepromazine 0.02 mg/kg and xylazine HCL 1.1 mg/kg IV. Sedation was deemed adequate and anesthesia induced with ketamine HCL 2.2 mg/kg and midazolam 0.05 mg/kg IV and placed in dorsal recumbency. Anesthetic depth was monitored continuously by heart, respiratory rate and depth and palpebral reflex. Aseptic surgical site preparation was performed using 2% chlorhexidine and 70% isopropyl alcohol. A local anesthetic block at site of incision and intratesticularly using 2% lidocaine HCL. Scrotal skin, tunica dartos and scrotal fascia incised craniocaudally. For the open technique, the parietal tunic of the testis is incised. Testicle is exteriorized and neurovascular cord isolated from the musculofibrous cord by penetration of the mesorchium. Two circumferential and one transfixing ligature using polydioxanone 0-0 absorbable suture material was placed on both cords. The cords resected and hemostatic forceps were removed and ligature security assessed by inspecting for hemorrhage. Procedure was repeated on the other testicle. Incision healing allowed by second intention. Flunixin meglumine (1.1 mg/kg) administered for analgesia and anti-inflammatory. Recovery was monitored by observing limb movements and standing was assisted; both recovered uneventfully from anesthesia. Post-operatively, owners are advised to exercise the geldings for a minimum of 20 minutes, monitor temperature and the surgical site daily. No post-operative wound care is necessary with this procedure. Moderate scrotal swelling was observed in one gelding which resolved with increased exercise and cold hydrotherapy. Advantages with general anesthesia were namely reduced incidence of complications, and breed, species, temperament and height factors were irrelevant in comparison with standing, sedated. Most postoperative complications are mild and resolve with minimal treatment. Thorough knowledge of male reproductive anatomy and physiology combined with good surgical technique helps reduce the rate of complications associated. The procedure described an open technique castration under general anesthesia with the patient placed in dorsal recumbency in field conditions that does not require specialized instruments i.e. emasculators.

Measurement of Tibial Plateau Angle: A Value That Predicts Cranial Cruciate Ligament Rupture

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The main objective of this study was to measure tibial plateau angle of clinically healthy crossbred dogs which can be used as a reference value in the case of dynamic stabilization of cranial cruciate ligament rupture. For a successful application of this surgical procedure, the tibial plateau angle measurement is crucial. Forty stifle joints of 20 clients-owned dog carcasses which were free of diseases were included in this study. Mediolateral radiographs with 90-degree flexion of the stifle and tarsal joint were obtained. Age, sex, body weight, and tibial plateau angle were recorded for each dog. Mean values of tibial plateau angle were calculated. The mean tibial plateau angle was 23.120 ± 3.460 . Repeated-measures ANOVA identified non-significant difference ($p > 0.05$) in tibial plateau angle between left and right limbs (left: 23.570 ± 4.180 ; right: 22.680 ± 3.380). No significant difference ($p > 0.05$) in tibial plateau angle was identified between joints of male and female dogs (male: 23.690 ± 2.830 ; female: 22.660 ± 3.990). The finding of mean tibial plateau angle values of crossbred dogs in Sri Lanka could be used to diagnose cranial cruciate ligament rupture, which is one of the common causes of rear-leg lameness in dogs and a major cause of degenerative joint disease (progressive and permanent deterioration of joint cartilage). Further this finding of tibial plateau angle value can be used in surgical correction of cranial cruciate ligament rupture by tibial plateau levelling osteotomy and tibial tuberosity advancement. In the future, tibial plateau angle measurements may be used to screen dogs suspected of being susceptible to cranial cruciate ligament rupture injury.

Suspected *Mycoplasma*-Induced Arthritis in an Elephant at the Pinnawala Elephant Orphanage

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An 18-year-old male elephant (*Elephas maximus maximus*), approximately 4,000 kg in weight, at Pinnawala elephant orphanage was limping on his right forelimb in December 2016. Close examination did not reveal signs of penetrative wounds or any obvious muscular condition. There was also no change in the white blood cell count or differential cell count. Based on these observations, the condition was suspected to be traumatic arthritis. Treatment included intramuscular 15,000 mg of amoxicillin (AMOXYJECT-15% LA, Special T Product LTD, Liverpool, UK) once a day at 3-day intervals for two days, and 15,000 mg of Analgin administered daily (Vetalgin[®], Intervet India Pvt. Ltd, India) for seven consecutive days. On Day 8, a swelling started from the elbow of the affected leg and spread up to the shoulder and down to the foot. Bending the carpal joint was painful and difficult, though the joint was not warm. Furthermore, the elephant had a reduced appetite. Since there was no response to the aforementioned treatment, 14 g of Ceftriaxone (Rocephin[®], Hoffmann-La Roche Ltd, Keiseragust, Switzerland) was intravenously administered along with intramuscular injections of 80 mg dexamethasone (Cipdex[®], Cipla Ltd, India) and 15,000 mg Analgin (Vetalgin[®], Intervet India Pvt.Ltd, India), all once daily for 10 consecutive days, again with no improvement in the condition. The repeated blood tests did not reveal any sign of systemic infection or any blood parasite. Radiographs, though poor quality, were not suggestive of a fracture. Subsequent daily cryotherapy with ice cubes around the carpal joint for 20 minutes until Day 25 for a possible hemarthrosis also showed no improvement. On Days 25 and 36, fresh blood samples were sent to a commercial medical laboratory to check for antibodies against *Mycoplasma pneumoniae* while the swelling in the brachium remained. The first sample was negative while the second sample indicated an elevated antibody titre (1:40) for *Mycoplasma pneumoniae*. This prompted to treat the animal with 48,000 mg of Tylosin (TYLOSIN 20% INJ, Dutch Farm Veterinary Pharmaceuticals, Nederhost den Berg, Holland) administered daily by intramuscular route for 10 consecutive days. Edema gradually subsided and disappeared when the injections were complete and did not reappear until this report was written. *Mycoplasma* causes autoimmune reactions in joints in animals and the arthritic response is a delayed-type hypersensitivity reaction against the organism. The swelling may be an immunological reaction against *Mycoplasma* organism within the elbow joint and suggests consideration of this as a potential cause of arthritis in elephants.

Aortic Vegetative Valvular Endocarditis in a Dog: A Case Report

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Endocarditis is defined as inflammation of the endocardium and the most frequent lesion present on the endocardial surface in dogs is the occurrence of proliferative growths or valvular endocarditis. The mitral and aortic valves are frequently affected while the tricuspid and pulmonic valves are very rarely involved. The most commonly affected breeds include German Shepherds or its crosses, Golden Retrievers and Labrador Retrievers. Patients are most commonly presented because they appear systemically ill. They are often depressed, weak and lameness is commonly observed. “Cookie”, a 7-year-old female cross bred German Shepherd dog, was presented to the Veterinary Teaching Hospital, University of Peradeniya, with a history of intermittent fever, lameness in right hind limb, reduced appetite and lethargy of more than 3 months duration. On presentation, the animal was recumbent, pyrexia (40.5°C), the pulse was fair (neither weak nor normal) and the mucous membranes were pink. The dehydration was 8%. In addition, mild bilateral serous ocular discharges and the presence of arrhythmic heart sounds and wheezing were noted on auscultation. Ultrasound scanning (US) revealed a hyperechoic vegetative growth on the right coronary cusp of aortic valve (approximately 1.45cm in diameter). Increased size of the left atrium and ventricle, turbulence during aortic out flow and regurgitation at the level of the aortic valve during diastole was identified with colour Doppler echocardiography. On blood work, only a mild leukocytosis and a mild thrombocytopenia were noted. Bacterial growth was negative on blood culture. Treatment on initial consult included Amoxicillin (20mg/kg, bid), Ciprofloxacin (10mg/kg, sid) (later changed to Norfloxacin, 10mg/kg sid), Serratiopeptidase (15mg tabs, 2 tabs bid) and other supportive treatments such as analgesics and aminoglycoside (Carti RD tabs) for joint pain, IV fluids such as normal saline, Ringer’s lactate solution for rehydration. Use of synergistic antibiotic combination is a better way to optimise the therapy. In addition, serratiopeptidase was used since it has the potential to enhance the effectiveness of antibiotics. This treatment protocol was continued for about 3 months. During this period animal was closely monitored (follow up US were done every 2 weeks). The haematological parameters were unremarkable after three months. Significant reduction of valve thickness (from 1.45cm to about 0.7cm) was observed on echocardiography. Animal completely recovered from the condition at the end of three months. It became active, appetite was restored, and body temperature, pink mucous membranes and lameness reduced to a greater extent.

Correction of Mandibular Luxation in the Cat Creating a Fulcrum

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Temporomandibular joint (TMJ) luxation is a common condition associated with maxillofacial injuries in cats. In this communication we describe a successful method to correct TMJ luxation in cats. Two cats with TMJ luxation were presented to The Veterinary Hospital with the inability to close the mouth completely. We conducted a complete oral examination of the presented cats under general anaesthesia. Mandibles and maxillae were carefully palpated while attempting to open and close the mouth. The diagnostic imaging revealed rostradorsal luxation of the mandible and ruled out other maxillofacial injuries. Once the rostradorsal luxation was confirmed, anaesthetised patient was placed on sternal recumbence. A wooden pencil was placed between the maxillary 4th premolar and the mandibular 1st molar to create a fulcrum. The rostral mandibles and maxillae are gently closed with manual pressure. The pencil was gently turned to force the mandible rostrally, thereby releasing the mandibular condyle from the articular eminence. The pencil was gently rolled in the opposite direction to direct the mandibular condyle into the mandibular fossa. A radiograph was taken to confirm the reduction of luxation. Meloxicam (7.5mg/ml) was administered at the rate of 0.3mg/kg subcutaneously as a presumptive analgesic before surgery anticipating painless recovery. Jaw movements were restricted using a tape muzzle. As relaxation was not observed the temporary tape muzzle was removed after 3 days. A soft diet was given for two weeks to minimise masticatory efforts. To prevent any secondary bacterial infections an antibiotic was given intravenously along with supportive treatments. After two weeks the patient was fully recovered and started prehension and mastication in the usual manner without any complications. This method is a successful and easy way of correcting TMJ luxation and promise of recovery of TMJ luxation with a good prognosis.

An Outbreak of Acute Fowl Cholera in a Turkey Breeder Farm in Sri Lanka: Early Diagnosis and Successful Control Strategies in the Field Condition

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Fowl cholera or pasteurellosis (PT) is a contagious disease among turkey caused by the bacterium *Pasteurella multocida* leading to sudden deaths and death rate can go up to 60-68% subsequently substantial economic losses. Turkey industry is not popular compared to chicken and a limited number of small scale turkey farms are located in Sri Lanka. Turkey unit at Siringapatha farm of the National Livestock Development Board maintains a flock of 1200 birds in multi-age groups, reported acute deaths resulting 16.5% mortality rate within two-week period. However, the birds were not vaccinated against *P. multocida* previously. The clinical symptoms were mucoid discharge from the mouth and nostrils, respiratory distress, cyanosis of the head, yellow to green diarrhoea and anorexia. Gross pathological findings were dominated by general septicemic lesions which reflected by the haemorrhages in the abdominal and coronary fat, vascular changes in the trachea, spleen, ovaries and proventriculus, enteritis, peritonitis, multifocal necrosis in the liver, pneumonic changes in the lungs, congested heart and exudative fluid in the pericardial cavity with fibrin. Bi-polar organisms were demonstrated in liver imprints and heart blood smears stained with Leishman's stain under a light microscope, which is the most rapid identification method available at field level and accepted method for the definitive diagnosis in the acute PT. Later, the microbiological investigation confirmed the disease as PT. Prompt treatment is crucial and the total flock was given intramuscular injections of Benacillin® (1ml/10kg containing procaine, benzathine penicillin and procaine hydrochloride) off-label usage due to its long-acting effect along with oral amoxicillin 50% powder (1g/3L) and an acidifier via drinking water. Three treatment cycles (4-5 days apart) were carried out until full recovery. Finally, the total flock was administered fowl cholera inactivated vaccine (Gallimune Cholera®) and the condition could be controlled successfully within three weeks. Proper disinfection, replacement of the litter, strict biosecurity measures and regular vaccination of future flocks against *P. multocida* are important measures to minimize future losses. Authors are confident that the prompt investigation, early diagnosis and correct treatment regime offer better prognosis and mortality rate can be reduced significantly despite the virulence of *P. multocida* in acute cases.

Prevalance of *Anaplasma* spp in Anemic Dogs Presented to a Veterinary Hospital in Kalutara

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Canine anaplasmosis is a zoonotic disease caused by *Anaplasma phagocytophilum* and *Anaplasma platys* and transmitted by *Rhipicephalus sanguineus* ticks. Canine Anaplasmosis results in either clinical or sub clinical disease. Canine Anaplasmosis has been reported in Sri Lanka, however, only few studies are available as this disease is often neglected in clinical practice due to the non-specificity of clinical signs. There is no proper study on clinical manifestation of canine anaplasmosis in Sri Lanka. This study was carried out to study the clinical manifestation, clinical signs and symptom variation, to find out a successful treatment schedule to treat Anaplasmosis and to detect the seasonal pattern, regional distribution of Anaplasmosis in Sri Lanka. The study was done at the Suwana pet Care Animal Hospital, 4th Lane, Nagoda, Kalutara South, Sri Lanka during the period of 01/07/2018 to 27/02/2020 involving 540 dogs presented with clinical signs of anemia, fever, lethargy and emaciation. These dogs were either negative for Babesiosis diagnostic tests or not responded to Babesiosis treatments. Dogs were tested with IDEXX SNAP 4D plus rapid ELISA test to detect *Ehrlichia Canis* and Anaplasmosis (*A. phatys* and *A.phagocytophilum*). Randomly selected *Anaplasma* positive 60 samples were sent for PCR confirmation. Out of 540 samples tested, 173 samples were positive for either *Anaplasma* spp., *E.canis* or both. 44 samples became positive only for Anaplasmosis and 81 samples became positive only for *E.canis*. 48 samples became positive for both *E.cains* and *Anaplasma* spp. Altogether 92 dogs were positive for *Anaplasma* spp. (17.037%) and 129 dogs were positive for *E.canis* (23.8%). PCR results also confirmed *Anaplasma* spp. Several clinical signs and clinical stages found – subclinical, clinical and severe clinical condition with or without coinfections with *E.canis*. Nervous signs were present in severely affected dogs. Treatment schedule and recovery rate varied according to clinical stage. Canine Anapalsmosis was reported from Kalutara, Colombo, Gampaha and Galle Districts. Anaplasmosis is more prevalent in costal areas of Western Province with 59.7%. All commonly available breeds over 5 months were affected. Incidence of Anaplasmosis increased with the end of South West monsoon season. The present study identified various clinical pictures, a successful treatment schedule for Anaplasmosis and provided evidence for seasonal pattern and distribution of disease in Western Province of Sri Lanka.

First Identification of Qx Like Infectious Bronchitis Virus in Sri Lanka from a Large-Scale Broiler Farm: A Case Study

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Infectious bronchitis virus (IBV) is gamma corona virus that causes highly contagious disease in chickens. Being a single stranded RNA virus, IBV are highly susceptible to spontaneous mutations and genetic recombination leading to antigenic shift and drift which most likely to result in the emergence of new variants. IBV has worldwide distribution, wide and variable tissue tropism, thus disease has diverse clinical manifestations. IBV is primarily epitheliotropic and has higher affinity to respiratory tract, while some strains of IBV, QX like variant strains emerged from China have a strong affinity for the kidney of young chickens causing high mortality, and problems in the reproductive tract of chickens. Many protection studies done in worldwide have shown that the currently available Massachusetts type vaccine provided inadequate protection against these variant viruses. A large-scale broiler farm rearing 112,000 at a time reported approximately 6-12 % mortality with severe performance losses due to poor average live weight (ALW) ranging 1.59 to 1.68kg and poor feed conversion ratio (FCR) averaging 1.77 at 35 days of age. Chickens showed severe respiratory symptoms such as conjunctivitis, audible respiratory rales, coughing, depression followed by prostration and death. Birds had been vaccinated only against Infectious Bursal Disease (IBD) with immune complex IBD strain "W2512" at one day old as a sub cutaneous injection. The objective of this study was to conclusively diagnose and demonstrate the involvement of QX like IBV in respiratory diseases in broilers in Sri Lanka. Necropsy was performed, and the lesions were documented. Flock performance data were recorded, and means were compared with performance of succeeding flocks that control measures are applied, using Minitab 17. Acute and convalescent serology (09 days apart) was determined by using a commercial ELISA kit (Biochek®). Tissue samples obtained from kidneys (age at 12 days) were mounted on Whatman® FTA® cards for molecular detections. Samples were tested for IBV and Avian nephritis virus by RT-PCR followed by sequencing for IBV was done according to the methodology described by Capua in 1999. Severe hemorrhagic tracheitis, caseous exudative air sacculitis, inflamed and hemorrhagic cecal tonsils, caseous exudative pericarditis and perihepatitis, severe inflammatory lesions in the kidneys characterized by swelling and urolithiasis were observed at necropsy. Significant level of seroconversion was observed in IBV antibody titers between acute phase (25-days of age) and convalescent phase (34-days of age). IBV ELISA mean titer (1221, CV=33 to 2088, CV = 76) increased by 2.3 folds (1.2 log₂) and maximum ELISA titer (1317 to 5244) has been increased 4 folds (2 log₂). RT PCR was positive for IBV and 377 base pairs long (763-1140 bp) nucleotide sequence analysis of the S1 gene of IBV and phylogenetic analysis of the sequence information used for strain identification resulted QX like IBV. RT-PCR given negative for Avian nephritis virus. Based on the clinical signs, necropsy findings and serological and molecular techniques it is concluded that birds have been challenged with QX like IBV. According to the phylogenetic analysis, the QX like IBV detected in Sri Lanka showed a close relationship to QX like viruses isolated from China. It has been demonstrated that vaccination with two antigenically distinct live-attenuated IBV vaccines can exert a broad cross protection against many different IBV types including QX like strains. Vaccination with Massachusetts (H120) and variant type (1/96 strain) IBV vaccines at hatchery at day of age at the hatchery as a coarse spray for succeeding chick inputs was successful in minimizing the economic losses resulting significant improvement in mortality; came down to 3%-3.5 % (p= 0.009), ALW; improved up to 1.9 kg – 1.95 (p=0.001) kg and FCR improved up to 1.55-1.65 (p=0.052) were noted at the average age of 35 days.

Canine Fungal Rhinitis: A Case Report

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Fungal rhinitis and sinusitis in dogs are quite common reasons for chronic nasal discharge. *Aspergillus fumigatus*, *Aspergillus flavus*, *Aspergillus niger*, *Aspergillus nidulans* and *Penicillium*spp. are the most important causative organisms. The frequent signs of fungal rhinitis are chronic seropurulent or mucopurulent discharges, intermittent epistaxis, nasal pain, prolonged sneezing, ulceration and depigmentation of the nostrils. A one year and four month old, male, entire, crossbred dog weighing 12.5kg was presented with the complaint of yellowish, profuse nasal discharge from the right nostril for one month. The patient had been treated for the above condition with oral antibiotics, steroids and vitamins, but had not responded well. General clinical examination revealed hyperthermia tachypnoea, enlargement of right submandibular lymph node, hyperaemic conjunctiva, considerable ocular discharges, and pain upon palpation of the rostrum. Furthermore, dyspnoea, occasional open-mouth breathing and obstructive breathing pattern were also observed. Complete obstruction of the right nostril was identified by the fog test. The condition was diagnosed as fungal rhinitis due to the presence of *Aspergillus* hyphae in the Leishman stained and wet mount smears made from nasal swabs. Fruiting heads of the *Aspergillus* hyphae was observed under oil immersion. Sterile nasal swab sample was sent for culture and specific fungal growth was not identified in the laboratory and they suggest that it was due to non specific culture media, growth of *Staphylococcus* spp was present in the culture medium and it was possible due to secondary bacterial infections. Patient was prescribed with Itraconazole as an antifungal drug, Doxycycline as an antibiotic against secondary bacterial infection, an antihistamine (Piriton), nasal decongestant (oxymetazoline nasal drop), vitamin supplements (Polybion syrup). Ciplox eye drop was prescribed for eye lesions, hyperemic right eye and excess ocular discharge. The patient showed a good prognosis with improved patency of the right nostril after one week and the complete resolution of the conditions with complete patency of the right nostril was observed after continuation of treatments for one month. In conclusion it is important to diagnose the disease with the aid of history, clinical signs and cytology examination. Fungal rhinitis can cause for intermittent epistaxis therefore drugs should be prescribed to prevent epistaxis as well. Canine fungal rhinitis is a curable disease with the aids of long-term medical therapy. Therefore, supportive treatments, balanced diet, proper patient care should be follow until complete recovery.

Clinical Presentation of Feline Immunodeficiency Virus in Sri Lankan Cats: A Case Study

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Feline immunodeficiency virus (FIV) is a retrovirus, closely related to human immunodeficiency virus (HIV). It attacks cats' immune system causing immunosuppression and facilitating secondary infections. Spreading occurs by direct contact of infected cats. FIV has been recorded worldwide including Asia. However, in Sri Lanka there is no recorded data about clinical presentation and prevalence of FIV. Therefore, we have conducted this case study to assess the clinical presentation of FIV based on 6 different confirmed cases that were presented to Pet Vet animal hospital during one-year period. FIV/FeLV combined SNAP test was used for diagnosis which is an ELISA screening test with a superior diagnostic accuracy. It detects specific antibodies to feline immunodeficiency virus (FIV) in feline serum, plasma or anticoagulated whole blood. All 6 cats have presented with multiple disease conditions, but collectively they had either gastro-intestinal tract diseases or respiratory related problems. Two cats were presented with anorexia, vomiting and dehydration, which both came from multi cat owners. First one had normal White Blood Cell (WBC) counts, but with increasing serum creatinine (SC) levels with anaemia. Later the cat developed profuse watery diarrhoea. The second one only had elevated WBC counts, and cat was improved with treatment. Another cat was presented with reduced appetite and pyrexia with severe dehydration. Having high WBC count, cat developed persistent high fever and severe respiratory distress with recurrent pleural effusion, which was euthanized at the end. Three cats had respiratory signs; wheezing, tracheal sounds, breathing difficulties, mucopurulent nasal discharges combined with anorexia, weight loss, dehydration and high temperature. Two of them were anaemic, while one of them had high WBC count with band neutrophils. One cat has developed bloody diarrhoea and vomiting at later stage while other two had developed Urinary Tract Infections (UTI) with increase SC levels. Even though, there was little similarity among clinical presentations, it can have variations. Therefore, it is better to have FIV as a differential in cases with persistent disease conditions. Two of the recorded cases are still alive and managing with good quality of life, therefore early diagnosis might be helpful factor in this type of situations. The only treatment modality is symptomatic and supportive therapy with good nursing care. Presenting complaint and health condition varies among each cat, but early diagnosis and management can increase cat's quality of life.

Surgical Intervention for the Management of Chronic Sinusitis in a Mixed Breed Horse

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The equine sinuses are air filled inter connected cranial cavities that have evolved to reduce the mass of the head while accommodating a large number of cheek teeth. Sinusitis is a common inflammatory condition in horses. A 9-year-old, mixed breed horse was presented to the Large Animal Teaching Hospital (LATH), University of Peradeniya with the complaint of a swollen facial region of four months duration that had not responded to conservative treatment. On a general clinical examination unilateral purulent nasal discharge, swelling of the left maxillary region, and decreased resonance on percussion were found. Primary left maxillary sinusitis was tentatively diagnosed. Diagnostics that can be used for this condition include radiography, endoscopy, sinoscopy, sinocentesis, computed tomography, and aid in the differentiation of primary from secondary sinusitis. Due to the unavailability of these resources, the condition was tentatively diagnosed by ruling out the other differential diagnoses of lower respiratory tract infection, guttural pouch infection and secondary sinusitis associated with tooth root abscessation based on complete clinical examination. Bilateral nasal discharge is present in infectious respiratory conditions, while unilateral nasal discharge is usually associated with sinusitis and unilateral guttural pouch infection. Drainage of the purulent material via surgical intervention was recommended. General anaesthesia with induced and maintained on ketamine hydrochloride 2mg/kg IV, xylazine hydrochloride 1mg/kg IV and benzodiazepine 10 mg IV. A skin flap was made within the following demarcations; ventrally the facial crest, dorsally a line between the medial canthus and the infra orbital foramen, rostrally a line connecting the infra orbital foramen and the rostral end of the facial crest and caudally a tangential line drawn at the rostral rim of the orbit between the ventral and dorsal limits of the maxillary sinus, and a 5-6 mm diameter hole trephined aseptically through the left maxilla into the sinus with a hand drill. A 16 Fr G Foley catheter was placed into the sinus cavity to facilitate lavage of the sinus. The skin flap was sutured with 3.0 nylon. A sample of the suppurative material was submitted for culture and antimicrobial susceptibility testing (ABST). *Streptococcus spp* was isolated and of the ABST panel tested, only susceptible to enrofloxacin. Enrofloxacin (15 mg/kg IV SID) was administered for seven days while the sinuses were flushed until disappearance of the purulent discharge. Subsequently, absence of purulent nasal discharge and decreased swelling were observed after the fifth day and two weeks of the treatment respectively. Patient was completely recovered and discharged from the LATH after two weeks. This surgical technique is usually performed under sedation and local anaesthesia. Sinusitis in horses is a disease that can be best managed by an early appropriate diagnostic plan, drainage, and the selection of effective antibiotics based on ABST.

An Outbreak of Porcine Cystitis Pyelonephritis Complex Disease in a Breeder Farm: Clinical Presentation, Diagnosis, and Control Strategies

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Porcine cystitis pyelonephritis complex (PCPC) is a disease caused by multitude of bacteria that include *Escherichia coli*, *Trueperella pyogenes*, *Streptococcus* and *Staphylococcus* spp. as well as *Actinobaculum suis*, a specific urinary pathogen responsible for ascending infection. These are opportunistic pathogens in the normal microflora of the urinary tract of pigs that causes severe morbidity and mortality due to compromise of the defence mechanisms in the lower urinary tract. The present disease outbreak occurred in a herd of 280 pigs (mixed breeds and ages) where sudden death occurred in a 9-month old boar, 24 hours post copulation in spite of treatment with a single intramuscular dose of Benacillin® (1ml/20 kg containing procaine, benzathine penicillin and procaine hydrochloride), Enrofloxacin (5mg/kg) and Flunixin meglumine (1.1 mg/kg). The 20-month old mated sow also died three days later despite the same treatment. Clinically, both these animals were pyrexia (42°C), acutely depressed and had cyanosed snout and skin. Two other sows of the same age and one older sow (3 yrs. 2 mo.) and a gilt (9 mo.) died with similar clinical signs; the females also had a blood tinged vaginal discharge and hematuria. All deaths occurred within 30 days. The gross changes at postmortem and histopathology of tissues revealed a severe purulent cystitis with bilateral uteritis and pyelonephritis. Metritis was present in 2 of the dead sows and a gilt. *E.coli* was isolated from the liver, spleen, kidney, axillary and inguinal lymph nodes and vaginal swabs collected at necropsy. Early detection of potentially infected animals by monitoring body temperature three times a day followed by prompt treatment of pyrexia animals with single daily intramuscular dose of Marbofloxacin (2 mg/kg) and Flunixin meglumine (1.1 mg/kg) offered a good prognosis. Additionally, an acidifier (blend of Propionic, Fumaric, Citric and Sorbic acid with Calcium Propionate and Sodium Formate, 2 kg/metric ton; MT) and Vitamin C (99%, 500 g/MT) was provided in the feed to reduced urine alkalinity and 15% Chlorotetracycline (2 kg/MT of feed) was provided prophylactically for two weeks. This control strategy enabled the prevention, and possibly recovery of 29 (80.6%) potentially affected breeding age boars, sows and gilts. This is the first known record of PCPC in Sri Lanka and further studies on the epidemiology of the disease merits investigation.

A Case Report on Canine Generalized Demodicosis and Systemic Lupus Erythematosus

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Demodicosis is an inflammatory disease, which occur due to overpopulation of *Demodex canis* in skin of dogs. Systemic Lupus Erythematosus (SLE) is an auto immune disease involving multi systems. Complete recovery from both conditions is difficult. Concurrent presentation of the 2 diseases in a dog makes the treatment procedure complicated. A 9 months old female 30 kg German shepherd was presented to Veterinary Teaching Hospital, University of Peradeniya, with generalised alopecia, severe pruritus, erythema and erosions and myiasis on face, limbs, tail and ventral abdomen for 2 months. At the presentation, the patient was recumbent, quiet alert responsive, hypothermic (98°F) and showed pain on palpation of joints. Earlier, it was treated with long acting steroid injections as well as with levothyroxin from a private veterinary clinic. Examination of skin scraping revealed severe *Demodex canis* infestation. As well as a regenerative left shift of WBC count, mild elevation of Alanine transaminase (ALT) (176U/L) and tenfold elevation of Alkaline phosphatase (ALP) (1066U/L) were observed in blood biochemical panel. Patient was hospitalised and treatment plan was implemented in 3 stages. First stage with wound cleaning and treatment with an acaricide; Afoxolaner (Nexgard) 65 mg orally (PO), at day 0, 14, 28 and then once in a month until two consecutive smears would be negative for Demodex mite, antibiotic; Cefalexin at (20 mg/kg, PO, bid) anti histamine Chlorpheniramine maleate (4 mg/dog bid, PO) and with essential fatty acids supplements and Chondroitin polysulphate (Carticare) 1 tab, sid, PO given to improve from arthritis condition. After one week of hospitalisation animal was positive for *Babesia gibsoni* infection, In order to treat this subsequent condition, anti-protozoal drug; Imidocarb dipropionate at 6.6 mg/kg two doses were given 14 days apart through subcutaneous injection. Once Demodicosis and Babesiosis conditions became under control, third stage of treatment plan was initiated to treat SLE. ACR (American College of Rheumatology) Criteria were proposed in which the presence of two major signs polyarthritis and dermatological signs. Also minor signs fever from unknown origin and glomerulonephritis or proteinuria. For that steroid; Prednisolone at an anti-inflammatory dose of (0.5mg/kg, PO, bid) was initiated and it increased up to immunosuppressive dose at (1.1mg/kg, PO, bid) with the periodical examination of skin scrapings and peripheral blood smears. Additionally, Acetylcysteine at (10mg/kg, PO, bid) as an antioxidant and Esomeprazole at (1mg/kg, PO, sid) were also started. Regular physiotherapy, hot fomentation, and twice daily hoisting the animal on a harness were also performed. After 1 month of treatment under hospitalization, animal started to walk properly, regained appetite and the skin condition was completely resolved. Treatment plan was implemented in to 3 stages as the patient's condition was complicated with many disease conditions. Primary stage was targeted to control Demodicosis (Afoxolaner treatment) and Babesiosis (Imidocarb treatment). Next stage of treatment plan was to treat SLE condition which requires proper long term immunosuppressive treatments with the steroids while monitoring the condition of the patient. With the steroid therapy gradually animal was started to show improvement from clinical signs of SLE.

Mastitis and Neonatal Mortality in a Breeding Kennel Due to Group B Streptococci and Coliforms

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Mastitis is an infrequently reported life-threatening condition of bitches and the second most common cause of septicaemia and deaths in puppies. Thus, mastitis is identified as an obstetrical emergency. Of many bacteria causing these infections, Group B Streptococcus (*Streptococcus agalactiae*), is one of the commonest cause of postpartum infection and neonatal sepsis. Four Rottweiler bitches aged 2, 3, 4 and 5 years housed at a breeding kennel had whelped healthy puppies after normal gestation and parturition. Within first ten days of birth 10/10, 2/4, 3/5 puppies died in 3 litters after developing anorexia and fever < 24 hours. The caudal pair of teats of the bitches were swollen and red and the secretions were brownish and flaky. Within last three years, 20/50 female Rottweilers including pseudo-pregnant bitches in the kennel had developed similar lesions but no incidences of neonatal or perinatal deaths. Microbiological analysis of milk samples revealed that the three bitches, who lost puppies contained group B Streptococcus and coliforms (Proteus- 2 samples, E. coli - one) in milk while fourth one only containing a Proteus species. Post-mortem examination of two dead puppies revealed hyperaemic internal organs and mottled lung lobes and Streptococcus species and Proteus species were isolated from heart blood. To identify the source of infection, deep vaginal swabs obtained from four bitches and the semen and urine samples collected from male animals were subjected to microbiological examination but no organisms of interest were isolated. Of the 13 antimicrobial drugs tested, Streptococcus species was susceptible to penicillin G, amoxicillin, cefuroxime and cephalexin, but no clinical improvement was seen after treating appropriately with amoxicillin or cephalexin. Lack of clinical response to antimicrobial therapy could be due to the co-infection with the MDR coliforms (resistant to erythromycin, cephalexin, amoxicillin, gentamicin and ciprofloxacin) Once established, it is difficult to eliminate mastitis from intensively managed breeding kennels. To reduce neonatal deaths caused by consuming mastitic milk, repeated examination of mammary gland for signs of inflammation, bacteriological examination of genital tract of bitches and milk before the date of birth and practicing appropriate hygienic measures are necessary.

Analysis of Frozen Fish Imports into Sri Lanka

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There is a debate on extent, and determinants of fish imports which compete with local fish production and capture. After 2016, newly imposed taxes and regulations by the relevant government bodies (11.11.2016 The Extraordinary Gazette notification of Democratic Socialist Republic of Sri Lanka) in fisheries sector led to significant reduction of fish imports. Since then, relatively fixed quantity of frozen fish imports, still compete with the local fish production have been recorded as 27,782 MT, 23,905.75MT and 25,440.214MT in year 2017, 2018 and 2019 respectively. Yellow Fin Fish Tuna, Queen Fish, Sail Fish, Pacific Mackerel, Rainbow Runner, Dorado and Milk Fish are fish varieties which are frequently imported to the country. Such importations are possible under the Animal Disease Act No 59 of 1992, Import and Export Control act no 1 of 1969 and Fisheries and Aquatic Resource act no 02 of 1996. This study explored the pattern of frozen fish imports to Sri Lanka from different countries and the end products of the imported frozen fish and explained the determinants of frozen fish imports to the country. Participants were 37 number of frozen fish importers who imported frozen fish in 2019 to Sri Lanka. The survey included the country of origin of the imported frozen fish, end product of each import, quantity of frozen fish imports in the situation of imposed new laws and regulations by the local government authorities and seasonal availability of fish in the international market. The results suggested that frozen fish were mainly imported from China, Indonesia and Taiwan in proportions of 28%, 16.3%, and 10% respectively in 2019. Rest of the 46.7% was imported from Vietnam, India, Chili, Japan, Iran, Korea, U.S.A and Seychelles in small quantities. Imported frozen fish were used for dry fish production, fish baits, and canned fish production, re-export after processing and supply for the Military Soldiers diet, local market consumption and restaurants in proportions of 29.7%, 25%, 18.3%, 8.1%, 8.1% and 5.4%, 5.4% by the frozen fish importers respectively. Augmented Gravity Model in International Trade was applied to study the determinants of frozen fish imports from China, Indonesia and Taiwan.. The results revealed that Sri Lankan frozen fish imports from China are significantly affected by variables like price of local captured fish, population of China, freight index, tariff, local imposed laws and regulations. Frozen fish imports from Indonesia are affected by populations of Sri Lanka, per capita GDP of Indonesia and seasonal availability of fish. Frozen fish imports from Taiwan are significantly affected by the per capita GDP of Sri Lanka, price of local captured fish. Findings of this study have policy implications to review the Sri Lankan fish industry.

Evaluation of *Mycoplasma bovis* Prevalence in an Upcountry Dairy Farm in Sri Lanka using *M. bovis* IgG Antibody in Milk

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Mycoplasma bovis causes several diseases in cattle, including mastitis, arthritis and pneumonia. The prevalence of *M. bovis* mastitis ranges from 0.5-35% in different countries. Although PCR is rapid and accurate for identifying *M. bovis* in milk, it is influenced by intermittent shedding of the pathogen. Therefore, serological assays are more applicable in screening post exposure animals. The objective of this study was to determine the prevalence of *M. bovis* in an upcountry dairy farm by detecting *M. bovis* IgG antibody in milk using indirect ELISA. Milk based screening assays are cost effective and noninvasive in dairy herds. The recombinant *Mycoplasma* immunogenic lipase A (MilA) based ELISA has 96.5% sensitivity and 94.3% specificity to detect *M. bovis* IgG antibodies in bulk tank milk. Milk samples were collected using systemic random sampling method from 101 milking cows (approximately 50% of milking herd), transported to laboratory on ice and immediately frozen. Recombinant MilA ELISA was performed according to previously published protocols. Briefly, 12µg/ml antigen was adsorbed on Nunc Maxisorp[®] plates overnight at 4°C, blocked with 2% BSA, thawed diluted (1:20) milk were added in duplicates at room temperature for 2h and detected with HRP conjugated anti-bovine sheep IgG (Bethyl laboratories) diluted at 1:2000 using ABTS. Absorbance was measured at 405nm. The antibody titers were calculated using ELISA analysis software (elisaanalysis.com). Samples which had ≥ 105 antibody titers were considered as positive based on published cut off values for MilA ELISA. The point prevalence for *M. bovis* in the tested farm was 14.85% (15/101). This farm had received cattle from Australia in 2014 and several suspected calf deaths resembling atypical pneumonia had occurred among calves born to imported heifers. *M. bovis* mastitis (0.3% point prevalence) was subsequently detected by PCR in the same farm. *M. bovis* is endemic to Australia with 36.5% of their dairy herd positive for *M. bovis* antibodies through bulk tank milk testing. However, further investigations on phylogenetic analysis of circulating *M. bovis* strains in Sri Lanka are required to confirm the *M. bovis* infection observed in this particular farm to be attributed to the imported stock.

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Comparison of the Impacts of Providing Calf Starter Feed vs a Cash Incentive to Farmers Registered in Heifer Calf Rearing Scheme in the Uva Province

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The Department of Animal Production & Health is conducting Heifer Calf Rearing Scheme to enhance the provision of proper nutrition for the heifer calves born as a result of Artificial Inseminations. In order to provide nutrition to the calves an incentive was provided to the farmers before May 2018 and thereafter calf starter has been providing for the period of three months. This study was carried out to find out the impact of providing calf starter against providing an incentive Uva province. Convenience sampling was used for data collection. Total sample size (N) was 1070. Data from Uvaparaganama, Haputhale, Bandarawela and Passara veterinary ranges were collected to represent the up-country of the province. To represent the low-country, data collected from Monaragala, Girandurukotte, Thelulla & Okkampitiya veterinary ranges. Data was analyzed using Poisson rate test. Rate of occurrence of the first insemination at age before 18 months and number of days that takes for the first insemination from birth were considered as the dependent variables for the study. The heifer calves born 1st January 2018 to 30th April 2018 and those who born 1st May 2018 to 31st August 2018 were considered as the two independent groups. Results revealed that, out of 408 calves registered for the cash incentive, 46 (11.27%) were inseminated at age before 18 months and the number for the calf starter group was 36 out of 386 (9.33%) in the up-country. In the low-country, 4 out of 132 were inseminated (3.03%) in cash incentive received group and it was 3 out of 144 (2.08%) for the calves received calf starter. For the two sample Poisson rate test, in up country $P=0.392$ and for low country $P=0.955$. Mean age at first insemination in the up-country was 490.1 days for the cash incentive received group and it was 478.5 days for the calf starter group where the $P=0.250$ for two sample t test. In low-country, the mean age at first insemination for cash incentive group was 481 days and it was 485.7 days for the calf starter group where $P=0.830$ for the two sample t test. Therefore, the study reveals that significant impact could not be observed due to change of cash incentive system to providing the incentive as calf starter during the period considered for the study.

Do ‘Animal Lovers’ Accomplish Stray Dog Welfare by Feeding Them in Public Areas? A Case Study in the Kaduwela Municipal Area

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Stray dogs are abundant in most of the urban areas of Kaduwela Municipal Area. Feeding stray dogs is a ‘fashion’ of certain so called ‘Animal Lovers’. The objective of the present study was to evaluate the impact of activities of these animal lovers. In this study, stray dogs roaming in three walking pathways utilized by urban residence in Kaduwela Municipal area were selected. Though 50 dogs were observed roaming in selected area during feeding time; only 10 dogs were present in the night suggesting that 40 dogs migrate from nearby places only for food. Animal Lovers (8 Nos) who feed the stray dogs, general public who utilize walking paths for exercise, people that work in the area and shop owners nearby (30 Nos) were interviewed verbally focusing on animal and human welfare parameters. During the study, 50 dogs (20 males and 30 females) were assessed for 6 animal welfare parameters [body condition score, availability of food, sanitary conditions (mainly bathing), vaccination against Rabies (having a neck collar), externally visible health conditions and birth control measures (presence of ear notch)] from a distance for safety as they were stray animals. Out of 50 dogs, all were in between 1-3 body condition score (1- severely underweight; 5 – obese). The people interviewed were not willing to provide shelter and sanitary facilities at least bathing for any dog observed. Animal lovers were facilitated to provide treatment for sick dogs (10%), Anti Rabies vaccination (70%) by the Veterinary Department of Kaduwela Municipal Council and birth control (10% bitches out of 30 female) by sterilization with the help of a NGO. Visible health conditions of the dogs observed were skin diseases (82%), wounds (30%), fractures in the legs (10%), nervous symptoms (16%) and external parasites (64%) which were not attended by any person and only 4% dogs appeared to be healthy. Violation of human welfare parameters in the study area had resulted from different kinds of disturbances by stray dogs (20%) and dog bites (24%) as revealed from 30 personnel interviewed. Therefore, it was concluded that animal lovers who feed the animals in urban areas should consider not only animal welfare but also human welfare. Urban stray animal feeding must be controlled by proper rules and regulations to minimize human and stray dog conflicts and accomplish animal welfare by the facilitator.

A Preliminary Study on Microbiological Quality of Fishmeal and Maize used for Formulation of Poultry Feed

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Good quality poultry feed is a key requirement for the development of growing poultry industry in Sri Lanka. Poultry feed requirement of the industry is largely fulfilled by the local feed manufacturers. Fishmeal and maize are the most widely used animal originated and plant originated raw materials respectively, that are used in poultry feed. There is a possibility of bacterial pathogens like *Salmonella* and *E.coli*, enter to the poultry production chain through contaminated feed materials and various programmes have been implemented at many levels of poultry production chain to control Salmonella. However, to assess the microbiological quality of feed or their raw materials microbiological standards or acceptable limits are not available in Sri Lanka. According to European Union (EU) standards, any sample of feed or raw material to be of acceptable quality, Enterobacteriaceae count should be less than 300 colony forming units (cfu)/g and it should be free of Salmonella. Aim of this study was to assess the contamination level of Enterobacteriaceae and presence of Salmonella in fish meal and maize used for formulation of poultry feed locally. Sampling was done from 10 feed distribution points in Kurunegala district who import fish meal and purchase maize locally. At sampling, different brands of the same product sold by the distributor were collected separately and each sample was triplicated by collecting three samples from three places of one bag of one brand. All the bags were stored in room temperature and opened at the time of sampling. Totally 48 fishmeal samples (3x16) and 21 (3x7) maize samples were collected and tested for the presence of Salmonella and Enterobacteriaceae counts using standard ISO and SLS protocols. Among 48 fishmeal samples, two samples (2/48,4.1%) from the same distributor (1/16, 6.25%) were positive for Salmonella and one sample (1/48,2.08%) exceeded 300 cfu/g of Enterobacteriaceae. In maize, three samples (3/21,14.2%) from two distributors (2/7,28.5%) were positive for Salmonella while twelve samples (12/21,57.14%) were exceeding 300 cfu/g of Enterobacteriaceae from four distributors (4/7,57.14%). Therefore, according to EU standards, fishmeal from two distributors and maize from four distributors are not acceptable to use in poultry feeds. It is suggestive to do a source attribution study to find the points of contamination. As self-mixing of feed ingredients is popularly practiced among local farmers, this study emphasizes the importance of raw material quality to produce good quality poultry feed.

Factors Affecting Conception Rate of Cattle Reared under Two Different Management Systems in the Batticaloa District

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Low conception rate (CR) of cattle is a crucial factor that determines calving interval and overall profitability of dairy industry. This study was undertaken to investigate the present status of CR and its associated factors in cattle in Thumbamkerney Government Veterinary range in Batticaloa district of Sri Lanka. Pregnancy diagnosis was carried out during 2017-2018 period on 225 crossbred cows (90 Jersey, 52 Friesian, 60 Sahiwal and 23 Australian Friesian Sahiwal (AFS) crosses) belonging to six parities and reared under semi intensively or intensively managed smallholdings, by performing rectal palpation 3 months after the last service. According to the AI records available, those cows had been inseminated by using semen from Jersey (37.8%), Friesian (18.2%), Sahiwal (8.4%) and AFS (35.6%) bulls. Overall CR was found to be 66.7%. Chi-square analysis showed that CR varied significantly ($P < 0.05$) among cow breeds (35.5%, 86.5%, 86.6%, and 91.3% for Jersey, Friesian, Sahiwal and AFS, respectively), bull breeds (34%, 85.4%, 94.7%, and 100%, respectively), management system (80.7% for intensive and 54.5% for semi intensive) and parity of the cow (3rd and 4th parities showing better CR). Number of services per conception (SC) among the 150 cows conceived varied as 1 (71.3%), 2 (26.0%), and 3 (2.7%) with a mean of 1.42 services. Chi-square analysis found that CS of cows conceived is significantly associated with management system ($P < 0.05$) but not with cow breed, bull breed, or parity. Out of the 84 pregnant cows reared under intensive management system, 79.76% conceived from the first service while 17.86% and 2.38% were conceived with second and third services, respectively with a mean conception rate being 1.22 services per conception. Under semi-intensive system, 60.61% of the 66 pregnant cows conceived in their first service while 30.36% and 3.03% of the pregnant cows conceived in second and third attempts recording a mean CR of 1.30. These findings show that Jersey bulls and their crossbreds have not been able to produce superior CRs in spite of their heavy usage in this area. It also indicates the importance of reproductive management on overall profitability of dairy industry in Batticaloa district.

Perceptions about Radiation Safety among Veterinary Undergraduates of the University of Peradeniya

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Radiation safety is a vital component in a standard veterinary hospital, as radiographs are frequently taken in disease diagnosis. Veterinary undergraduates usually assist in radiological procedures (while taking safety precautions) during their clinical training at the Veterinary Teaching Hospital (VTH), University of Peradeniya. Poor attitude of students noticed during handling of animals for radiographs led to the initiation of this study. Data was collected using a structured questionnaire from 138 veterinary undergraduates where 56 were third year students (3Y) and 82 were fourth year students (4Y) with the overall female: male ratio of 63.76%: 36.23%. Results revealed a significant dearth of knowledge among students on radiation safety and awareness on safety practices in the VTH, students had depended on informal sources such as social media and newspaper for awareness on radiation safety and both groups were not aware of the international standards practiced in the VTH. Quite surprisingly, 80.45% of 4Y had never assisted a radiological procedure and 41.5% had never used lead aprons during their two-week clinical medicine roster. Poor attitudes towards radiation safety and animal welfare were observed among 70.4% of 4Ys and 16.1% of 3Ys who did not agree to hold a patient for a radiological procedure. A clear majority of students from both groups were willing to participate in radiological procedures only during an emergency situation while adhering to the international safety standards but the number dropped significantly had international standards not adhered. Majority of 3Ys could be considered more philanthropic as they were willing to take radiographs irrespective of the condition of the patient. However, 4Ys would take radiographs only if someone was unavailable, even if the situation was life threatening. Special attention should be given for safety practices during handling animals for radiographs as results demonstrate unhealthy practices among students which is presumed to be due to unawareness even after formal lectures in the institute. Poor attitude among students could also be due to the inherent lack of empathy towards animal welfare. Female gender bias would have played a role for the low proportion of students willing to assist radiographs as there is general belief that females are more susceptible to radiation induced malignancies, a claim that is also strongly supported by literature. This study highlights the importance of improving knowledge, practices and attitudes of veterinary undergraduates on radiation safety.

A Survey on Liquid Milk Consumption Pattern in Rathnapura District

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Cow milk is rich in calcium, which is vital for developing strong bones, teeth and muscle growth in humans. At present, Sri Lanka is 40% self-sufficient in milk requirement and the rest being imported, specially spray dried milk. Although liquid milk is considered to be the most popular in the world, the level of fresh milk consumption in Sri Lanka is far below recommended levels. This survey was conducted to understand the consumer behavior and consumption patterns of liquid milk in Rathnapura District during the year 2019. A pre-tested questionnaire was used to gather information from representative from each family. A Multistage Random sampling method was used to identify 1000 respondents/families within Rathnapura district. Firstly, 1% of Grama Niladhari Divisions (GND) were selected from among both rural and urban GNDs: 6 rural and 1 urban GND. From each such selected GND, potential respondents were identified proportionately to the human population percentage in the respective rural and urban GNDs. A total of 1000 questionnaires were distributed and 886 were analyzed and presented in this paper. Seventy nine percent of the respondents consumed milk or milk product while 21% did not consume milk or milk product. Among various dairy product consumers, only 22% consumed liquid milk and others (73.78%) used spray dried milk. Those consumed liquid milk (60.78%) were well aware of its nutritive value. The non-availability of liquid milk was a constraint for considerable population (36.69%) of consumers. Seventy five percent of the respondents were not aware of the recommended volume of milk/day/person as 200ml. In the survey, it was found that improved consumer awareness could increase the liquid milk consumption among consumers. In summary, it is evident that liquid milk consumption is low in Rathnapura District. However, other milk products, specially powdered milk are being used by most respondents. It was clear that this situation has ensued, due to the lack of knowledge on the advantages and quality of liquid milk, and unavailability of liquid milk, indicating the possibility of using successful educational programs to educate the public on the subject. It can also be recommended to commence distribution of milk from home to home via the involvement of government authority.

Design and Manufacture of a Low-cost Rubber Teat for Dairy Calf Feeding using Compression Moulding Technology

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Milk has two major roles in calf development: (i) transfer of passive immunity to the neonatal calf and (ii) provide nutrients to the pre-weaning calf. The synepitheliochorial placentae of cattle are impermeable to the passage of macromolecules such as immunoglobulins compared to haemochorial (e.g. in humans) and endotheliochorial (e.g. in dogs) placentae. Therefore, colostrum feeding is essential for transferring passive immunity to newborn calves. Further, milk acts as the main source of nutrients until calves are weaned at ~2-3 months of age. Feeding the correct volumes of colostrum and milk under hygienic conditions is critical for successful transfer of passive immunity and proper development of the calf. Although seemingly harmless, modern best practices discourage allowing calves to suckle their mothers because (i) udder/teat skin cannot be sterilized (unlike a rubber teat) and (ii) the volume of milk consumed and therefore, the quantity of immunoglobulins and nutrients transferred, cannot be ascertained. In contrast, bottle feeding (using a rubber teat) ensures that the calf ingests the correct amount of colostrum or milk in a hygienic manner ensuring that it receives the recommended amounts of immunoglobulins and nutrients, respectively. Even though many Sri Lankan dairy farmers are aware of the importance of bottle feeding, they are unable to adopt the practice due to the scarcity and expense (Rs. 2500 upwards) of calf feeders (bottle and teat). Further, even if standalone teats (nipples) were available at a lower price, finding a container that fits those teats is nearly impossible. With this background, we designed and manufactured a low-cost rubber teat (70 mm in height and 25 mm in diameter with a 35 mm base) using compression moulding technology [uncured rubber (with ~40% carbon) was heated up inside a custom-made mould cast out of mild-steel]. The cost of production (~Rs. 100/piece) is expected to come down with large-scale production. Since these teats were designed to fit the abundantly available, plastic disposable soft-drink bottles (500 ml – 2 liter ‘Mega’ bottles), the cost of the teat is the only expense to the farmer. As such, this approach provides an economical and eco-friendly solution to a long-standing problem faced by Sri Lanka’s dairy industry. These teats have been successfully used to feed dairy calves aged 2 days - 2 months and are currently being tested for durability and calf performance. These low-cost rubber teats have the potential to popularize bottle feeding among dairy farmers with subsequent positive effects on production, health and reproduction aspects in adult life.

Comparison of Two Oestrus Synchronization Protocols to Overcome Infertility among Repeat Breeding Cows in Pannala Veterinary Range in Sri Lanka

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Oestrus synchronization is an effective reproductive tool that can be used to overcome repeat breeding among dairy cows. A cow is considered as a repeat breeder if it was unable to conceive with three successive insemination performed in normal cycle length of 18 to 24 days. Repeat breeding is a serious reproductive issue in smallholder dairy farmers practicing artificial insemination and fertilization failure and early embryonic death are the two key determinants of repeat breeding in any farming system. The objective of this study was to compare the success of two different synchronization protocols and to identify the best protocol to be used under Sri Lankan climatic conditions. The modification of the OvSynch protocol was used in this study. Farms in the North Western Province in which Jersey and Friesian cross-bred cows are reared under intensive management systems were selected for the study. Disease free, cyclic cows ($n = 84$) with a good body condition score ($BCS > 2.5$) were selected. They were synchronized using either typical OvSynch ($n = 42$) protocol or OvSynch with an intra vaginal progesterone releasing device ($n = 42$, Cumate). OvSynch with Cumate protocol was started with the injection of 2 ml of GnRH (Gonavet Veyx®, 0.05mg/ml solution) intramuscular (IM) route and insertion of progesterone releasing intra vaginal device (Cumate) on day 0. day 7, 2 ml of $PGF_{2\alpha}$ (Cloprostinol sodium, PGF Veyx®, 0.263 mg/ml solution) was given in IM route and Cumate was removed. Two days after removal of Cumate (Day 9) 2 ml GnRH was injected IM route for cows subjected to Ovsynch protocol were injected with GnRH, $PGF_{2\alpha}$ and GnRH exactly the same except insertion of Cumate. All the cows were artificially inseminated 16-20 hours after the second GnRH injection. Sixty days post AI, pregnancy testing was performed by rectal palpation. Results revealed that 30 cows of the 42 cows synchronized using OvSynch with Cumate protocol, (30/42, 71%) were pregnant. Whereas only 18 cows out of the 42 cows synchronized with typical Ovsynch protocol (18/42, 42%) were pregnant. According to the above results significantly ($P < 0.05$, Chi Square test) higher pregnancy rate was observed when cows were synchronized with OvSynch with Cumate than typical OvSynch protocol. Based on the above results it can be concluded that better pregnancy rate can be obtained if repeater breeder cows are inseminated on induce oestrous with OvSynch and Cumate.

Production and Cryopreservation of Transferable Cattle Embryos in Sri Lanka

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Worldwide, over 600,000 cattle embryos are collected from donor cows and transferred to recipient cows annually, using Multiple Ovulation and Embryo Transfer (MOET) technology. The majority of embryo transfers take place locally while some countries export out >10,000 cattle embryos annually. Adopting this technology can benefit Sri Lanka because (i) MOET has been shown to give better conception rates compared to Artificial Insemination (AI) in warm weather conditions, (ii) it can be used to impregnate certain types of infertile cows, (iii) it can be used to proliferate acclimatized cows with high-genetic merit within Sri Lanka and (iv) because exporting embryos can add a novel income stream of foreign exchange to the country. The Department of Farm Animal Production and Health (DFAPH) of the Faculty of Veterinary Medicine and Animal Science of the University of Peradeniya has successfully carried out MOET in goats; however, to-date, MOET has not been done successfully in cattle, in Sri Lanka. This study was carried out to demonstrate the feasibility of multiple ovulation and collection of high-quality, transferrable cattle embryos in Sri Lanka. Three high producing, imported Friesian-Jersey crossbred donor cows from the Veterinary Teaching Farm (VTF) at Uda Peradeniya were subjected to super-ovulation by administering PGF_{2α} [day-1 (500mg) and day-17 (750mg)], FSH [day-15 (72mg), day-16 (54mg), day-17 (36mg) and day-18 (18mg) b.i.d.] and progesterone (1.56g; intravaginal progesterone delivery device; day-8 – day-17). On day-19, upon observation of estrus, the three cows were subjected to AI using conventional (non-sex-sorted) Jersey semen. On day-26 of the program, 30 embryos were recovered using a retrograde flushing technique out of which 13 embryos classified 'Excellent' or 'Good', were cryopreserved to mark the establishment of the first cattle 'Embryo Bank' of Sri Lanka. Post-thaw embryo evaluation of a sub-sample confirmed successful cryopreservation. Steps are underway to transfer these embryos to suitable recipient cows. Upon successful establishment of MOET in Sri Lanka, the technique may be incorporated into the dairy breeding program of Sri Lanka to expedite genetic gain of dairy cows and to drive Sri Lanka towards self-sufficiency in dairy products.

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