THE SRI LANKA VETERINARY JOURNAL

# 68th Annual Convention of the Sri Lanka Veterinary Association

## Programme and Abstracts of the Annual Scientific Sessions - 2016

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**&**
**Earl's Regent, Kandy**

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**Professor Nimal Pathiraja** BVSc, PhD
Keynote Speaker

## Veterinarians' Contributions to Food Safety

This talk briefly reviews the contributions of the veterinarians to Food Safety and discusses why it is becoming even more important in the 21st century.

The earliest contributions of the vets to food safety began with the development of ante-mortem inspection of meat animals and postmortem inspection of carcasses. Since then veterinary contribution to food safety has increased in a wide range of areas, including the risk-based controls applied at different parts of the food chain. Recently the veterinary expertise in zoonotic diseases has proven invaluable on a global scale when considering the diagnosis and management of foodborne diseases. Animal products are a major source of the food safety hazards, both microbiological (salmonella, norovirus etc.) and chemical (antibiotics and beta-agonists). The control of foodborne zoonotic diseases, such as Bovine Spongiform Encephalopathy (BSE) and more recently avian flu, were real examples where veterinary contributions were hugely beneficial to public health.

Another global issue that requires veterinary input is food security. With the increasing world population growth, the demand for food in the next 50 years is predicted to be higher than the amount of food produced during the last millennium. Of the food we need to produce during the next 50 years or so, a major proportion is expected to be animal products. The demand for animal products is increasing not only due to population growth, but also due to rapidly growing middle classes. Most of the increase in food demand is going to come from the Asia Pacific Region.

A number of strategies are due to be used to increase the availability of animal products, such as milk, meat, eggs, and aquatic products, in order to bridge the gap between the current limited supply and estimated increasing demand for these food products. Amongst these strategies, one of the most important is the intensification of animal production using improved genotypes. Intensive animal production systems have been steadily increasing in this region. It is predicted that the need to use of veterinary drugs, particularly antibiotics, in such production systems is going to be amplified. It is also known that farmers in some countries are using unauthorized growth promoters, such as hormones and beta-agonists, to improve lean meat production, particularly in beef cattle and pigs. In general improved genotypes are less resistant to diseases. For example, selection for improved milk yield makes milking animals less resistance to mastitis (a negative genetic correlation). In this way, the veterinarians' expertise will be of extreme importance in producing safe food from intensive farming systems as safe food is absolutely fundamental to food security.

There is ample evidence that many microorganisms (both pathogens and commensals) are developing resistance to antibiotics. Antibiotic use in food animals and in the other areas of veterinary practice contributes to the overall development of antibiotic resistance. There are many published reports to show that foodborne pathogens, such as salmonella and campylobacter, have developed resistance to antibiotics. Moreover animal products have been implicated in the international transfer of resistant bacteria. It has been shown that antibiotic resistance developed in non-pathogenic bacteria in food animals can be transferred to other human pathogens via food of animal origin and exposure of people to food animals. Therefore, this is an important area, both in terms of public health and animal health, for vets to be fully involved with, particularly under the 'one health' agenda.

When we look at food safety risk management, current international guidelines strongly recommend using the Risk Analysis approach to manage risks associated with all food safety hazards. In general, data and guidance on risk assessments are available for most foodborne hazards, including antibiotic resistance development and various resistant pathogens. However, there is no simple linear method to translate the results of scientific risk assessments to real-life risk management decisions. This is due to the fact that risk management policy- and decision-making not only consider the scientific risk assessment of a hazard, but also the economic, political and social factors of the area that the policy applies to. For example, in the current climate where existing regulations in many countries in the region prevent the mandatory restriction of the use of certain antibiotics for animal treatment or production purposes, vets have the controversial and difficult task of balancing public good against private good.

It is argued that vets in this region have to initiate risk communication strategies, also possibly in collaboration with the medical profession under the 'one health' agenda, in order to influence the respective governments to develop appropriate policies to manage this very serious global risk in the coming years.

**Dr. H. P. Premasiri** BVSc, MSc
General Manager,
Pussalla Meat Producers (Pvt) Ltd.

# Present Status of Poultry Industry in Sri Lanka and Challenges for Further Improvement

**Introduction:**

The poultry subsector in Sri Lanka has been developed to a lucrative business venture today which expanded from a back yard farming system within a short span of time. The chicken meal which was a luxury food item in the past, has become the cheapest and readily available animal protein source in the country.

**Contribution to National Economy and Employment Generation:**

The contribution of Agriculture towards the Gross National Domestic Production (GNDP) was 11.2% while that from the livestock was about 2%. However, the contribution of the poultry subsector to the livestock sector was >70% in 2011.

According to available statistics about 75,000 families engage in poultry production directly and about one million are involved in the other support services.

**Growth of the Poultry Industry:**

The annual growth of the broiler industry in Sri Lanka was about 7% in the past ten years, although the growth of the layer industry fluctuated very rapidly. The challenges for further development of poultry industry in Sri Lanka can be divided into following major categories :

1. Factors affecting the economy of the industry:

   Frequent price escalation for poultry feed in the market is a major factor affecting the industry. The cost of poultry feed exceeds >70% of the operational cost. The annual price escalation of feed was 8% during the period of last five years. Non availability of major raw materials required to manufacture poultry feed throughout the year and barriers enforced in importing them also constraints to the feed production.

   Price fluctuations of the end products are not conducive for the industry. Price of product depends on supply and demand, amidst government controlled price on chicken. As the cost of production is comparatively high in Sri Lanka, it is difficult to compete with the international market.

2. Factors pertaining to poultry health:

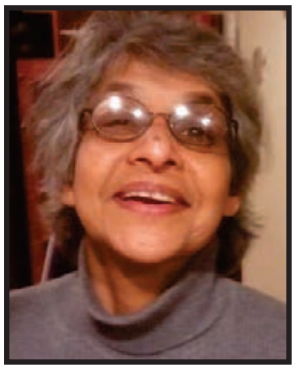
   Certain poultry diseases affected the industry in the recent past. Infectious Bronchitis (IB) caused by variant strains, Infectious Bursal Disease (IBD) caused by the virulent IBD virus, and Mycoplasmosis are some of the diseases which affected the birds. However, zero prevalence of HPAI is a great advantage. Non availability of adequate training facilities in advanced poultry keeping and extension services need to be improved.

3. Social factors which affecting the industry:
    - Social misconceptions on consuming poultry products (eg. Growth hormones in chicken and high cholesterol in eggs) are highly detrimental for the development of the industry.
    - Indiscriminate use of antibiotics and antimicrobials in poultry can lead to antibiotic resistant strains of pathogens causing disastrous health hazards to humans and animals.
    - Although the meat industry has a large impact on the environment, the world food security and preventing extreme hunger have to be achieved at any cost. Of all animal protein production, the poultry industry has the smallest environmental impact.

4. Miscellaneous category:
    - Non availability of resources, such as, capital, land and skilled labour, are limiting factors for new entrepreneurs as well as to expand the prevailing poultry enterprises.
    - The probable competition for grains as food , feed, and for the production of bio fuels.
    - International pressure, especially from European Union, to implement animal welfare measures.

*Appreciation of Services Rendered to the Profession*

**Viranjanie K Gunawardana** BVSc, PhD



Professor Emeritus
Faculty of Veterinary Medicine and Animal Science
University of Peradeniya

Viranjanie Gunawardana, better known as Viru Gunawardana has a very long association with the veterinary profession, having enrolled as a veterinary student in the University of Ceylon in 1964. At the time, the Department of Veterinary Science in the Faculty of Agriculture and Veterinary Science was very much a male domain and four females in the class did raise a few eyebrows. This possibly provided the impetus to do well academically, which resulted in her recruitment as an assistant lecturer in November 1968, shortly after the Final Examination. She is most likely the first female recruited to the academic staff in the Department of Veterinary Science. In 1985, she was appointed Professor followed by an appointment as Senior Professor in 1992.

Professor Gunawardana is a strong advocate of equal rights for women and has been a forthright critic when women in the profession have been needlessly slighted. In 1968, women veterinary surgeons were overlooked for no apparent reason, when government veterinary surgeons were appointed. Professor Gunawardana, then a final year student and Secretary of the Ceylon University Veterinary Students Association protested this injustice, and with the help of a member of the academic staff organized a delegation which met the Minister of Agriculture and succeeded in ensuring that women were not victimized.

During the period 1970 -1973, Professor Gunawardana was a postgraduate student at the Royal Veterinary College, University of London, where she was awarded the degree of PhD. When she returned to Peradeniya in January 1974, the School of Veterinary Science had been established and with it the Department of Preclinical Studies. This new department was responsible for teaching all aspects of anatomy and physiology to veterinary students whereas hitherto most of these components with the exception of gross anatomy and a few physiology lectures, were taught by staff in the medical faculty. The establishment of the School of Veterinary Science seemed a progressive step, except that the Department in its formative stages had minimum staff and no lecture rooms or laboratories all of which had to be shared with the medical school which obviously had first priority. Anatomy dissections were carried out in an abandoned warehouse. It was indeed a chaotic period. To complicate matters further teaching in swabhasha had been introduced and teachers seem to spend more time reading glossaries than textbooks! The academic staff consisted of just three members – Dr. Gunawardana, recently returned from London, a Senior Lecturer who taught comparative physiology and who was also Head of the Department anxiously awaiting the return of Dr. Gunawardana so he could take sabbatical leave, and a recently recruited assistant lecturer in the Tamil medium. The Senior Lecturer had his wish granted and took off on sabbatical leave and Dr. Gunawardana was appointed Head of Department an act which she described at the time as holding a premature baby! From then on, began the arduous task of developing the fledgling department by recruiting dedicated academic staff, getting buildings constructed, equipping laboratories, and training technical staff.

During her forty plus years of service Professor Gunawardana's contribution to the development of the Faculty and its academic programs has been enormous. She was a very frank and outspoken member of the University Senate, the governing academic body of the University, from 1974 until her retirement in 2011. Her tenure as a member of the Senate is perhaps unprecedented. Her input at meetings of the Senate contributed significantly to overcoming opposition that came from certain factions, and

obtaining Senate approval for implementing the development programs of the faculty.

In the course of her academic and professional career Professor Gunawardana has served as a member as well as Chairperson of innumerable committees and sub-committees both within and outside the University. These include two periods of membership totaling eight years in the Editorial Board of the Sri Lanka Veterinary Journal and membership of the Veterinary Council as an elected member. Within the Faculty, the Management Committee of the FAO/UNDP project during the period 1989-1992 and the Curriculum Committee during the same period were noteworthy as they were responsible for formulating and implementing a curriculum that was appropriate and relevant at that time. At a national level, membership in the Working Committee for Health Sciences, followed by membership in the Working Committee for Veterinary Medicine and Animal Science at the National Science Foundation is significant as it was possible to monitor the quality of research and ensure funding.

Professor Gunawardana was an active researcher with numerous publications to her credit in national and international journals. Her early publications on male reproduction in poultry have been cited in text books put out by reputed publishers such as Academic Press and Balliere Tindall. Collaborative research was a highlight of her research career where she was the co-principal investigator/biology in a project sponsored by the World Health Organization on Isolation of Fertility Regulatory Agents from Plants. This project which ran for ten years brought together researchers from the Departments of Botany and Chemistry under the able guidance of Professor K Jayasena, Pharmacologist in the Faculty of Medicine. It provided employment to several young veterinarians and produced several publications. Additionally she has researched on enzyme histochemistry, an interest she developed whilst on sabbatical leave at the University of Kyoto, Japan. A second sabbatical in an Andrology laboratory in Chicago, USA kindled an interest in sperm penetration assays and techniques of improving sperm quality. As a supervisor of young researchers, and with final year projects in particular Professor Gunawardana has strived hard to instill into students, proper research methodology and acceptable ethical practices. This effort has been rewarded at times when students supervised by her have won awards for best paper presented at scientific sessions of SLVA or at the University research sessions.

Professor Gunawardana's long and productive career of forty two years ended with her retirement in 2011, although she still continues to teach whenever the opportunity arises. In recognition of her long and dedicated service, the University of Peradeniya has conferred on her the title Professor Emeritus. It is likely that most if not all practicing veterinary surgeons in Sri Lanka today are her former students. Against this background, the Sri Lanka Veterinary Association is indeed honored to felicitate Professor Viranjanie Gunawardana at its 68$^{th}$ convention.

# 68th Annual Scientific Sessions of the Sri Lanka Veterinary Association

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|---|---|
| ***Session I- Clinical (10.00-11.45am, 15th July 2016)*** | |
| **Chairperson: Dr. D.D.N. De Silva** | |
| 10.00-10.15 | Guest Lecture- *Prof. I.D. Silva* |
| 10.15-10.30 | Effect of early surgical intervention on the recovery of snake envenomed dogs<br>*A.M.R.B. Adhikari, D.D.N. De Silva, M.G.C.M. Jayasinghe, A.M.S.M. Wickramarathne, A. Dangolla, I.D. Silva, E. Rajapaksha, M.R.C.K. Mallawa and I. Gawarammana* |
| 10.30-10.45 | Managing Hypoxia with administration of Oxygen via Nasal Cannula in Dogs<br>*S. De Silva and E.A. Rajapaksha* |
| 10.45-11.00 | Double Pelvic Osteotomy (Pelvectomy): A Novel Surgical Intervention for the Correction of Obstipation in Dogs and Cats<br>D. S. Kodikara and B.S. Abeykoon |
| 11.00-11.15 | Accuracy of diagnostic cytology using impression smears in evaluation of cutaneous and subcutaneous masses from dogs<br>*A.S. Lenagala, H.M.H.S. Ariyarathna and D.D.N. De Silva* |
| 11.15-11.30 | The prognostic significance of blood leukocyte counts at the onset of hemorrhagic diarrhoea in parvo viral enteritis among immunized pups<br>*D.R.A. Dissanayake, I.D. Silva, Y.U. de Silva Senapathi, K.K. Sumanasekara, W.R.B. Kumara, P.M. Dunukearachchi, W.C.R. Fernando, A. S. Lenagala and S. De Silva* |
| 11.30-11.45 | Treatment of exuberant granulation tissue in horses: A case study<br>*V. Sakajamary, M. Majura, Y.H.P.S.N. Kumara, W.M.T.D. Rathnakumara, K. Nizanantha, T.M.S.K. Piyadasa, H.A.P.S. Shashimal, H.K. Fedricks and L.N.A. De Silva* |

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| ***Parallel Session*** | |
| ***Session II- Animal Health (11.45-2.30pm, 15th July2016)*** | |
| **Chairperson: Dr. A. Shivasothy** | |
| 11.45-12.00 | A longitudinal study of *Babesia* and *Theileria* infections in cattle in Polonnaruwa and Nuwara Eliya districts, Sri Lanka<br>*T. Sivakumar, H. Kothalawala, K.M.S.G. Weerasooriya, S.S.P. Silva, S. Puvanendiran, S. A. Meewewa, S. Sukumar, K. Kuleswarakumar and N. Yokoyama* |
| 12.00-12.15 | Antibiotic resistance of *Escherichia coli* isolated from broiler, layer and backyard chickens in Sri Lanka<br>*M.D.N. Jayaweera, W.M.P. Bandara and J.K.H. Ubeyratne* |
| 12.15-12.30 | Distribution of Staphylococcus species isolated from canine pyoderma<br>*M.N.R. Somasiri, M.A. Salgadu, H. Ariyarathne and R. Jinadasa* |
| 12.30-1.30 | **LUNCH & POSTER SESSION** |
| ***Parallel Session*** | |
| ***Session II-Animal Health (continued)*** | |
| 1.30-1.45 | Molecular detection of *Theileria orientalis* Type 1 in cattle in Galle and Rathgama Veterinary Ranges<br>*M.L.W.P. De Silva, N.K. Jayasekara, S.S. Iddamaldeniya and K.H.D.T. Kasagala* |
| 1.45-2.00 | Colonization of Methicillin-resistant *Staphylococcus aureus* in dogs and dog handlers<br>*K.A.N. Wijayawardhane, D.R.A. Dissanayake, U.G.V.S Kumara, J.Y.C. Dharmasuriya, C. W.R. Fernando and V. P. P. Jayapani* |
| 2.00-2.15 | A molecular epidemiological survey of bovine *Babesia*, *Theileria*, and *Trypanosoma* in cattle and water buffalo in Vietnam<br>*K.M.S.G. Weerasooriya, T. Sivakumar, D.T.B. Lan, P.T. Long, H. Kothalawala, S.S.P. Silva and N.Yokoyama* |
| 2.15-2.30 | Validation and use of Infrared Thermography to detect wounds on limbs of dairy cattle<br>*S. Ekanayake, E. Rajapaksha, T. S. Samarakone, J. B. Y Dhrmasooriya and M.P.B. Wijayagunawardane* |
| 2.30 – 3.00 | **TEA** |

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|---|---|
| ***Parallel sessions*** | |
| ***Session III- Wildlife and Aquatic Animal Health (11.45-2.45pm,15th July2016)*** | |
| **Chairperson: Prof. A. Dangolla** | |
| 11.45-12.00 | First evidence of the presence of Koi Sleepy Disease caused by Carp Edema Virus in koi carps (*Cyprinus carpio koi*) in Sri Lanka<br>*S.S.S. De S. Jagoda, R.A.D.S. Ranatunga, D.M.S.G. Dissanayaka, W.P. Chandrarathna, T.P.M.S.D. Bandara, W.R. Jayaweera and A. Arulkanthan* |
| 12.00-12.15 | Use of Infrared Thermography in Captive and Wild Elephants<br>*E. Rajapaksha, S. Ekanayake, T. S. Samarakone, B.V.P. Perera, A. Dangolla and M.P.B. Wijayagunawardane* |
| 12.15-12.30 | Faecal corticosteroid metabolites as indicators of stress of elephant calves during rehabilitation and reintroduction to the wild.<br>*B.V.P Perera, J. L. Brown, C. Thitaram, R.P.V. J. Rajapakse and A. Silva-Fletcher* |
| **12.30-01.30** | **LUNCH & POSTER SESSION** |
| ***Parallel sessions*** | |
| ***Session III- Wildlife and Aquatic Animal Health(continue)*** | |
| 1.30-1.45 | First isolation of exotic bacterial pathogen *Edwardsiella ictaluri* in Sri Lanka from an imported stock of catfish (*Pangasius sutchi*)<br>*S.S.S. De S. Jagoda, R.A.D.S. Ranatunga, D.M.S.G. Dissanayaka, T.P.M.S.D. Bandara, W.R. Jayaweera, G.S.P.de S. Gunawardena and A. Arulkanthan* |
| 1.45-2.00 | Assessment of lying behavior in captive Asian elephant calves and evaluation of data loggers to characterize the behavior<br>*T. Calloway, D. de Silva, B.V.P. Perera, W. Smith and E. Rajapaksha* |
| 2.00-2.15 | Seroevidence for Hantavirus Infection among Rats in urban habitat of Kandy, Sri Lanka<br>*Chandika D. Gamage, Kumiko Yoshimatsu, Yomani Sarathkumara, N.A.Y. Wasantha Kumara, Kanae Shiokawa, Thilankanjali Gamage, R.P.V. Jayanthe Rajapakse and Jiro Arikawa* |
| 2.15-2.30 | Health conditions of pet rabbits presented to the Veterinary Teaching Hospital (VTH), University of Peradeniya.<br>*K.K. Sumanasekera, M.G.C.M. Jayasinghe, K.G. Indika, R.E.H. Perera and D.D.N. De Silva* |
| 2.30-2.45 | An episode of acute enteritis in a captive population of guanaco (*Lama guanicoe*).<br>*M.G.C.M. Jayasinghe, H.M.H.S. Ariyarathna, K.K. Sumanasekera, T.M.S.K. Piyadasa, K.W.K.I. Kamathewtta, T.P.M.S.D. Bandara , R.C. Rajapaksha, J. Pushpakumara, D.D. Dassanayake, D. Sonnadara, D.M. Nambuge and I.D. Silva* |
| 2.45-3.00 | **TEA** |
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| ***Session IV-Animal Production (3.00-4.15pm, 15th July 2015)*** | |
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| **Chairperson: Prof. Basil Alexander** | |
| 3.00-3.15 | Lesson Learned in Dairy Management from New Zealand<br>*K.K. Jagath* |
| 3.15-3.30 | Preliminary study on reproductive performance of dairy cows inseminated with either sex sorted or conventional semen<br>*P.G.A. Pushpakumara, A. Shakthevale and K. Nizanantha* |
| 3.30-3.45 | Polymorphism of casein cluster genes in Ayrshire and Holstein Friesian dairy herds in Sri Lanka<br>*Ruwini K. Rupasinghe and Saumya Wickramasinghe* |
| 3.45-4.00 | The effect of improved local fishmeal compared to imported fishmeal in broiler chicken diets on their growth performance, meat quality parameters and necrotic enteritis exposure<br>*M.W.C.D. Palliyeguru, T.D. Liyanage, W.M.C.G. Wijerathne, T. S. Samarakone, W.A.D. Nayananjalie and K.H.D.T. Kasagala* |
| 4.00-4.15 | Detection of Irido virus infection in seawater reared Asian sea bass (*Lates calcarifer*) in Sri Lanka<br>*V. Sakajamary and M.N.M. Fouzi* |

| ***Poster Session(12.30-1.30, 15th July 2016)*** | |
|---|---|
| 01 | Use of Bees' honey and cinnamon-oil combination in treating necrotic wound in dogs and cats.<br>*S. De Silva, E.A. Rajapaksha, A.S. Lenagala and E.L. Cebuliak* |
| 02 | Significance of the deep skin scraping in the diagnosis of severe generalized canine demodicosis; a review of sixteen cases.<br>*U.G.V.S.S. Kumara, A.M.S.M. Wickramarathne, K.G. Indika, M.A.Y. Chathurangani, D.V.S.M. Samarasinghe, J. Y. C. Dharmasooriya, M.P. Kumara, K.K. Sumanasekara, M.A.H.K. Munasinghe, M.G.C.M. Jayasinghe, D.D.N. De Siva and H.M.H.S. Ariyarathna* |
| 03 | Effects of a broiler starter-based feed on rumen papillae development in pre-weaned calves<br>*Roshan Kahatapitiya, Devinda Rathnakumara, Wimal Kumara, Harshana Warusamana, Harsha Ariyarathne, M. L. A. N. R. Deepani and Chanaka Rabel* |
| 04 | A preliminary study on the rates and correlates of stress in veterinarians in the Colombo city<br>*Piyanjali de Zoysa, Mayuri Thammitiyagodage, Sureka Chackrewarthy and Senuri Gunawardena* |
| 05 | Profiling of bacterial public health hazards associated with elephants participating in the "Eslaperahera"<br>*G.D.B.N. Kulasooriya, P.P. Jayasekara, J.M.S.M. Wijayarathna, M.K.U.T. Amarasiri, B.C.G. Mendis, A. Siribaddana, A. Dangolla, R.S. Kalupahana and B.R. Fernando* |
| 06 | Surgical Correction of Hip Luxation of Canines using a Toggle<br>*J.Y.C. Dharmasuriya and G.S. Pemachandra* |
| 07 | Masticatory muscle myositis (MMM) in a Doberman pinscher dog: A rare clinical case<br>*T.N. Haththotuwa and D.D.N. de Silva* |

**Professor Indira D. Silva** BVSc, PhD

Guest Speaker

Veterinary Teaching Hospital, Department of Veterinary Clinical Sciences, Faculty of Veterinary Medicine and Animal Sciences, University of Peradeniya.

## An update on vaccinations of the dog and cat

During my tenure as the President of the 67th Executive Committee of the SLVA 2014/2015, a free nation-wide Anti-Rabies vaccination campaign was initiated following a seminar titled "Together Against Rabies for a Rabies Free Sri Lanka 2020" on 26th September 2014, co-sponsored by the DAPH and the OIE. This activity was preceded by two meetings at Peradeniya and Colombo organized by the "Veterinary Teaching Hospital Outreach Activity" program to design a vaccination schedule for dogs in Sri Lanka with the participation of small animal practitioners, DAPH, the Ministry of Health, SLVA members & well-wishers. The schedule agreed upon at those meetings was widely circulated among the government and private veterinary practitioners.

Subsequently, in January 2016, the Journal of Small Animal Practice published "Guidelines for the vaccination of dogs and cats" compiled by the Vaccination Guidelines Group (VGG) of the World Small Animal Veterinary Association (WSAVA) which is a comprehensive 45 page document (JSAP, Vol 57, Pp E1-E45, Jan 2016) with new updates which are very applicable and useful for Sri Lankan small animal practitioners. In April 2016, I attended the 3rd Forum on Canine and Feline Vaccination for Southeast Asia and the Indian Sub-Continent held in Kuala Lumpur in which the Chairman of the above VGG delivered comprehensive seminars on the topic as well. The above informations were not communicated to Sri Lanka, probably due to a lapse in communication with the WSAVA in the past. Thereafter, in May 2016 a group of senior academics of the VTH, the Director General and a delegation of Administrators from the DAPH met and discussed the proposed new vaccination schedule for household dogs in Sri Lanka which I will be presenting to the membership. I suggest SLVA, being the only professional body functioning for all registered veterinarians in Sri Lankan, or alternatively a subcommittee/chapter of the SLVA, to develop a link with the global veterinary community so that relevant scientific information may be shared and exchanged by all small animal practitioners in Sri Lanka, may they be private or government. I will be presenting also the vaccination schedule recommended by the VGG of the WSAVA for dogs and cats in shelter environments. Furthermore, this presentation discusses the types of vaccines, facts on core vaccines for dogs and cats, together with frequently asked questions and answers useful for the practitioner. The new vaccination guidelines are attached for your convenience.

## Dog vaccination protocol for Sri Lanka 2016

(Numbers represent age of dogs in weeks)

| Immunized Mother | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Vaccine** | **Dose** | | **1st** | **2nd** | **3rd** | **4th** | **5th** | **6th** | **boosters** |
| CPV | | | 8 | 11 | | 14 | | 52 | 3y |
| DHL | | | 8 | 11 | | | | | |
| DH | | | | | | 14 | 17 | 52 | 3 y |
| ARV | | | | | 12 | 14 | | 52 | annual |

| Non-immunized Mother | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Vaccine** | **Dose** | **1st** | **2nd** | **3rd** | **4th** | **5th** | **6th** | **7th** | **8th** | **boosters** |
| ARV | First visit | | | | | 12 | 14 | | 52 | annual |
| CPV | | | 7 ( ≥4) | | 11 | | 14 | 17 | 52 | 3y |
| DHL | | | | 8 | 11 | | | | | |
| DH | | | | | | | 14 | 17 | 52 | 3y |

**ARV post exposure vaccination for dogs**

**If victim properly immunized - one booster ARV**

**If victim unvaccinated - WHO Recommendations - No ARV given. Observe dog for six months for signs of Rabies. If negative vaccinate at six months**

Schedule suggested for ARV vaccination of ownerless or free-ranging dogs in vaccination campaigns

| 1st dose | 2nd dose | Subsequent doses | |
|---|---|---|---|
| Puppy - First encounter | 2 – 4 weeks later | If possible 16 wks | Annual booster |
| Adult 16 ≤ wks - First encounter | | | Annual booster |

WSAVA Guidelines on Canine Vaccination for the Shelter Environment

Ref: JSAP, Vol 57, January 2016

| Vaccine | Puppies or kittens | Adults |
|---|---|---|
| CDV + CAV-2 +CPV-2 (MLV) or FPV, FHV-1, FCV | 1st dose prior to or immediately on admission, as early as 4 weeks of age | 1st dose prior to or immediately on admission |
| | Repeat dose – at 2 week interval until 20 weeks of age, if still in the facility | Repeat dose – at 2 week |
| ARV | Follow the schedule for pups of non-immunized mothers, since Rabies is endemic. | |

# EFFECT OF EARLY SURGICAL INTERVENTION ON THE RECOVERY OF SNAKE ENVENOMED DOGS.

**A.M.R. B. Adhikari[1], D.D.N. de Silva[1], M.G.C.M. Jayasinghe[1], A.M.S.M. Wickramarathne[1], A. Dangolla[1], I.D. Silva[1], E. Rajapaksha[1], M.R.C.K. Mallawa[1] and I. Gawarammana[2]**

**[1]Veterinary Teaching Hospital, Department of Veterinary Clinical Sciences, Faculty of Veterinary Medicine & Animal Science, University of Peradeniya, Sri Lanka.**
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The venom of Cobra *(Naja naja)* cause severe localized tissue necrosis, pain and swelling in envenomed victims in addition to causing cardiotoxicity, myotoxicity, and neurotoxicity. Hump nosed viper (*Hypnale hypnale)* venom also cause haemorrhagic and extensive necrotic lesions.

In order to improve the quality of life of such patients, surgical excision of necrotic tissue is recommended in human patients. The objective of this study was to determine the outcome of two different methods of managing necrotic wounds in cobra and hump-nosed viper envenomed dogs presented to the Veterinary Teaching Hospital during 2012 to 2016. All cobra envenomations were treated specifically with Indian polyvalent antivenom and auxiliary treatment, while hump nosed viper envenomations were treated only with auxiliary treatments.

Group 1 dogs (G1) (7 cobra and 1 viper bites) that developed bite site necrosis underwent medical management followed by surgical intervention several days later and wound management included IV antibiotics with daily wound toileting. Once the WBC counts dropped to a clinically acceptable level (from 29-77$\times10^3$/ml to 4-22$\times10^3$/ml) they were considered clinically fit for surgical intervention to excise necrotic tissue of 0.3- 4% of body surface area under general anesthesia. In one patient the hind limb had to be amputated and all other dogs developed permanent scars at the incision sites.

The Group2 dogs (G2) (2 cobra and 2 viper bites) whose WBC counts were between 27–49$\times10^3$/ml on admission show hemorrhagic blisters, tissue discoloration and early signs of necrosis at the site of bite were subjected to early surgical intervention after stabilizing the envenomation crisis. Fasciotomy and myotomy were done to avert further necrosis followed by complete or partial closure, and post-operative care was adopted. The extent of tissue lost reduced to 0.2-0.4 % of body surface area.

This study revealed that the time taken for surgical intervention in G 1 ranged from 4- 26 (mean 12.5) days while it was as short as 4 – 12 mean (4.25) hours in G 2. The hospital stay for the G 1 was 6 -56 (mean 23) days while for G 2 it was 2-6 (mean 4.5) days. The results indicate that antivenom treatment with auxiliary treatment combined with early surgical intervention helps early recovery, with the envenomed dogs attaining good quality of life.

# MANAGING HYPOXIA WITH ADMINISTRATION OF OXYGEN VIA NASAL CANNULA IN DOGS.

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It is reported that lower respiratory tract diseases such as pleural space disease and pulmonary parenchymal disorders in dogs are common cause of dyspnoea. These conditions result in reduced perfusion in the lung parenchyma and subsequent generalized hypoxia. Oxygen supplementation is the cornerstone therapy in patient care for dyspneic dogs.

Intranasal oxygen supplementation can be achieved effectively in a clinical set up with limited resources. A nasal catheter can increase the inspired oxygen levels up to 40-65% in patients with severe lung pathology. This method provides more oxygen to the lungs compared to the traditional flow-by oxygen, oxygen mask or oxygen chamber. This method requires minimal restraint and, as most patients are willing to tolerate the catheter is comparatively less stressful for the patients. It also avoids the risks of deep sedation and anesthesia required to perform endotracheal intubation, tracheostomy or mechanical ventilation required to supply oxygen.

An inexpensive rubber urinary catheter or an infant feeding tube size 5, 8 or 10 can be used as a nasal oxygen cannula and is passed along the ventromedial commissure of the nostril into the ventral nasal meatus, reach the level of the nasopharynx. The external part of the tube is secured by suturing to the skin caudal to the nasal planum and at the level of the frontal sinus between the eyes. A 1cc syringe can be used to anchor the oxygen hose of the humidifier setup to the nasal cannula. Oxygen is administered at a rate of 40-50 ml/kg/min to a maximum of 4-5 liters/min and this can be adjusted depending on the level of hypoxia. Low dose sedation using acepromazine (0.01mg/Kg IM) is recommended in severely excited or fractious patients.

Nasal oxygen cannulation was performed in two patients that were presented to the Veterinary Teaching Hospital (VTH); one with dyspnea secondary to pulmonary hemorrhage (P1) and the second due to severe bacterial pneumonia (P2). In these patients the initial oxygen saturation (SpO2) was 80% (P1) and 74% (P2), respectively. With oxygen masks alone, the increase in SpO2 was only up to 82% (P1) and 77% (P2) respectively. In comparison, nasal oxygen cannulation increased the SpO2 to 94% (P1) and 87% (P2). Thus this method can be utilized effectively to deliver oxygen in hypoxic patients without causing much stress.

# DOUBLE PELVIC OSTEOTOMY (PELVECTOMY): A NOVEL SURGICAL INTERVENTION FOR THE CORRECTION OF OBSTIPATION IN DOGS AND CATS

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This abstract describes a novel surgical intervention performed on four clinical cases (three domestic cats; aged 8 months, 2 years and 3 years, and a 1.5 years old female dog) presented for treatment with the history of recurrent obstipation following road traffic accidents. Clinical and radiographical examination on all four cases revealed malunion of the pelvic fractures and colonic distension with faeces confirming obstipation.

As a preoperative measure, faecal matter was removed manually from the colon and rectum and multiple enemas were given for several days under general anaesthesia. A surgical intervention was performed in all the cases. Ketamine-xylazine, 2:1 SC injection was used for premedication and anaesthesia in cats, while the IV thiopentone sodium, 10-12 mg/kg was used to induce anaesthesia in dogs. The subject was kept on dorsal recumbancy, following a skin incision on pubic symohysis region, a deeper incision in subpelvic tendon through pubic symphysiotomy was made up to the adductor muscle and gracillis muscle aponeurosis. In order to facilitate osteotomy of ischium and pubic, adductor, gracillis and internal obturator muscles were elevated. Osteotomy sites on both pelvic bones were made parallel to the distal ends of the illium and also to the outer margin of the obturator foramen. Ischiotomy was made parallel to the illeum and outer margin of the obturaor foramen up to the ischio ramus. After removing both pubic and ischium bones, surgical site was closed by suturing the pubic tendon, adductor to adductor, gacillis to gracillis and internal obturator to internal obturator muscles of either side together followed by skin closure. As a measure of post-operative care, rear legs were hobbled together using an adhesive tape for two weeks to restrict abduction until healed or power of adduction is resumed. After 24 hours animals recovered and mobile. Oral laxatives were given for 2-3 months.

This novel method may be successful for the correction of obstipation in dogs and cats due to narrowing of the pelvic canal. The advantage of this surgical method is the ventral expansion of the pelvic cavity with the removal of pubic and ischium bones on both sides leading to clearing of obstructions to rectum and colon.

# ACCURACY OF DIAGNOSTIC CYTOLOGY USING IMPRESSION SMEARS IN EVALUATION OF CUTANEOUS AND SUBCUTANEOUS MASSES FROM DOGS

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Cytology is a rapid and cost effective diagnostic tool compared to histopathology. It could be efficiently used to diagnose a variety of inflammatory and non-inflammatory cutaneous conditions.

This study was designed to determine the diagnostic accuracy of cytology compared to histopathology, on cutaneous masses in dogs. Dogs presented with palpable cutaneous mass/es to the Veterinary Teaching Hospital, from March 2014 to August 2014 were included in the study.

Impression smears for cytology and sections for histopatholgy were prepared from the from excised cutaneous masses. The accuracy of cytology was determined using histopathology as the gold standard. For this purpose cytological diagnosis for a lesion was compared with the histopathological diagnosis for the same lesion at several diagnostic levels (inflammatory lesions 3 levels and non-inflammatory lesions 5 levels). Each level was scored at 1/0 basis considering the agreement of cytology with histopathology. The first level is assigned to differentiate inflammatory lesions from non-inflammatory lesions. If the lesion is identified as an inflammatory lesion second and third levels included identification of inflammatory cell type (Neutrophilic, Pyogranulomatous, Granulomatous, Eosinophilic, Lymphocytic +/- plasmacytic) and etiological agents, respectively. For non-inflammatory lesions, differentiation in to hyperplastic, cystic or neoplastic categories is considered as the second diagnostic level. If the lesion is neoplastic, identification of specific neoplastic cell type (epithelial, mesenchymal, round or melanocytes) is considered as the third level. Further identification as benign/malignant was taken as the fourth level while identification of specific tumor type was considered as the fifth level. The cumulative score for a lesion was calculated and converted to a percentage value.

Out of 30 available lesions 25 were diagnosed with 100% accuracy while the accuracy was 75%, and 50% for 3 and 1 lesions, respectively. Percent diagnostic accuracy was zero for one lesion which was diagnosed cytologically as an inflammatory lesion and histopathologically as an inflammatory lesion. Current findings confirm the possibility of using cytopathology as a reliable diagnostic tool considering the fact that histopathology is time consuming and expensive. However, more samples representing a wide variety of neoplastic and inflammatory lesions are necessary to determine the diagnostic accuracy more effectively.

# THE PROGNOSTIC SIGNIFICANCE OF BLOOD LEUKOCYTE COUNTS AT THE ONSET OF HEMORRHAGIC DIARRHOEA IN PARVO VIRAL ENTERITIS AMONG IMMUNIZED PUPS

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Canine parvovirus type 2 (CPV-2) causes haemorrhagic enteritis in young dogs. There are three antigenic variants of CPV-2 (2a, 2b and 2c) and it is not yet known whether the current vaccines are effective against all three variants. This paper discuss parvo viral enteritis among immunized young pups in and around Kandy. As CPV-2 is known to cause leukopenia with lymphopenia and neutropenia, we compared the leukocyte counts of affected dogs to predict the prognosis. The study cohort consisted of 34 dogs (1-9 months of age) who showed hemorrhagic diarrhoea and vomiting. They had received either one or two doses of parvo viral vaccinations (at $6^{th}$ and $12^{th}$ week of age). The DNA samples extracted from faeces of affected dogs were amplified using parvo viral specific primers by polymerase chain reaction (PCR). The peripheral blood samples collected on the first day of haemorrhagic diarrhoea were analysed and differences in the WBC, lymphocyte and neutrophil counts of survivors and non-survivors were determined by two sample *t-test* and the mean age of the cohort was four months.

Leukopenia (WBC <5000/µl) and neutropenia (< 2900) were observed in 94 % of the pups. Of the 34 dogs studied only 27 survived. A significant difference ($p<0.01$) in the WBC counts of the survivors and non-survivors. Lymphocyte and neutrophil counts of the non-survivors were significantly lower ($p <0.05$) than that of the survivors. The presence of parvo viral DNA in faeces was confirmed by PCR on 85% cases (29/34). Although the remaining 11 dogs showed severe leukopenia and neutropenia, the DNA samples failed to amplify probably due to presence of PCR inhibitors or low quality of the DNA.

Our results confirm that the severity of leukopenia, neutropenia and lymphopenia at the onset of hemorrhagic diarrhoea can be used as prognostic indicators in CPV-2 enteritis in general practice. Reasons for the ineffectiveness of vaccination observed is hitherto unclear and is probably due to emergence of new CPV-2 variant or due to non-protective immune titres. Assessment of parvo viral specific antibody titres (IgM and IgG ) in affected pups would help to test whether the latter statement is true.

# TREATMENT OF EXUBERANT GRANULATION TISSUE IN HORSES: A CASE STUDY

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Granulation tissue formation occurs during the second phase of wound healing. In the case of exuberant granulation tissue formation, it delays healing by decreasing epithelialization and contraction. Horses are more susceptible to this condition compared to other animal species. In horses, wounds of the distal aspect of the limbs that are healing by second intention have more chances to develop exuberant granulation tissue compared with similar wounds proximal to the carpus and tarsus.

Two horses (5 years old, three quarter stallion and 8 years old, Indian thoroughbred, mare) were presented to Veterinary Ambulatory Clinic in 2015 and 2016 with the chronic wound on the left hind limb of middle metatarsal bone and above the fetlock joint of left hind limb respectively. The history revealed that the animals have been suffered with wounds for more than one month despite the medical treatments. They were clinically normal except the wound with granulation tissue. The lesions were oval shape with 12 cm diameter, with growth of pink color mass in the stallion and 6cm in diameter, round, cauliflower like growth in the mare. The condition was tentatively diagnosed as an exuberant granulation tissue formation clinically and then confirmed by histopathology. The treatment was initiated by removal of excess growth of granulation tissue surgically and bleeding was stopped by placing a liquid nitrogen soaked gauze on excised surface. The same cryosurgical procedure was followed for two consecutive days. The treatment was continued by rubbing the wound with copper sulphate granules every other day for two weeks and applied Hydrocortisone ointment and povidone iodine solution. Horses recovered completely with conventional wound management (povidone iodine solution and negasunt dusting powder) for one month.

It could be concluded that both horses with exuberant granulation tissue were treated successfully by surgical removal of excess growth with cryosurgery and long term wound management with topical application of copper sulphate and corticosteroid.

# A LONGITUDINAL STUDY OF *BABESIA* AND *THEILERIA* INFECTIONS IN CATTLE IN POLONNARUWA AND NUWARA ELIYA DISTRICTS OF SRI LANKA

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Infections with *Babesia* and *Theileria* parasites often result in economically significant diseases in cattle. A longitudinal survey of *Babesia* and *Theileria* infections was conducted in 75 and 161 cattle in Polonnaruwa (dry zone) and Nuwara Eliya (wet zone) districts, respectively, in Sri Lanka. The DNA samples were extracted from the blood samples collected from these animals in June, September, and December 2014 and in March 2015.

The DNA was analyzed by PCR using specific primers for *Babesia bovis*, *B. bigemina*, *Theileria annulata* and *T. orientalis.* In addition, serum samples were subjected to enzyme-linked immunosorbent assays (ELISAs) for the detection of *B. bovis* and *B. bigemina* specific antibodies. All of the surveyed animals in Polonnaruwa and 150 (93.2%) of 161 animals surveyed in Nuwara Eliya were PCR-positive for the *Babesia* and/or *Theileria* at least once during the study period. In all samples in Polonnaruwa, the PCR-positive rates of *T. annulata* and *T. orientalis* were higher than those of *B. bovis* and *B. bigemina* whereas the *T. orientalis*-positive rates were higher than those of *B. bovis*, *B. bigemina*, and *T. annulata* in NuwaraEliya. In addition, *B. bigemina*-seropositive rates were higher than that of *B. bovis* in both districts. Although significant variations were sometimes observed in the *B. bigemina*-, *T. annulata*-, and *T. orientalis*-positive rates between sampling occasions, the rates of new infections with these parasites at 2nd, 3rd, and 4th sampling among the parasite-negative samples at 1st, 2nd, and 3rd sampling, respectively, as determined by PCR assays or ELISAs, were not different between sampling occasions in Polonnaruwa or in NuwaraEliya, suggesting that each parasite species infects cattle in constant rate in each sampled location. However, the new infection rates of *T. annulata* in Polonnaruwa were higher than those of *T. orientalis* in this district and those of *T. annulata* in NuwaraEliya, while the *T. orientlais*-new infection rates in NuwaraEliya were higher than those of *T. annulata* in this district and those of *T. orientalis* in Polonnaruwa. These findings suggest the need for year-round control measures against the bovine *Babesia* and *Theileria* infections in Sri Lanka.

# ANTIMICROBIAL RESISTANCE OF *ESCHERICHIA COLI* ISOLATED FROM BROILER, LAYER AND BACKYARD CHICKENS IN SRI LANKA

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Colibacillosis caused by the bacterium *Esherichia coli* (*E.coli*) is one of the common diseases affecting chickens. The disease is usually being treated with antimicrobial drugs but this treatment is becoming increasingly ineffective due to acquired resistance of *E.coli.* The objective of this study was to find out the development of antimicrobial resistance of *E.coli*, the causative organism of colibacillosis in broiler, layer and backyard chickens. We analyzed the antimicrobial sensitivity patterns of 91 *E. coli* strains isolated from the cases received to Central Veterinary Investigation Center of Veterinary Research Institute, Gannoruwa, during the period of 2011 to 2015. There were 76.92% *E.coli* isolates from Broiler, 15.38% from Layer and 7.7% from Backyard chicken and antibiotic discs of Trimethoprim-sulfa, Doxycycline, Flumequine, Tetracycline, Enrofloxacin, Neomycin and Amoxicillin were used in the study.

All *E. coli* strains isolated during the period were found resistant to Amoxicillin. High percentage of resistance (55.55% to 100%) of *E.coli* to all tested antimicrobials was highlighted and resistance to Tetracycline and Trimethoprim-sulfa was on the inclining trend during the period. Multi-drug resistant *E.coli* isolates were evident. Of the 91 strains tested, only one isolate was sensitive to all 7 antimicrobial agents and one was sensitive to six. Remaining 89 strains were multi-drug resistant (resistant to more than two antimicrobial agents). Seven of those strains were resistant to all seven antimicrobials tested while 16 were resistant to six antimicrobials. The abundance of penta drug resistant (n=29) *E.coli* isolates was marked and rest of the isolates showed resistant to four (n=16), three (n=18) or two (n=3) antimicrobial drugs. All tested antimicrobials have reached above the level of 55% resistance in both commercial and backyard poultry, indicating a possible spillover of antimicrobial resistance from commercial to backyard setting.

# DISTRIBUTION OF *STAPHYLOCOCCUS* SPECIES ISOLATED FROM CANINE PYODERMA

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Canine pyoderma is a bacterial skin infection which is mainly caused by *Staphylococcus* species. Objective of this study was to reveal distribution patterns of *Staphylococcus* species in canine pyoderma in order to understand whether single or mixed infections predominate. A total of 187 *Staphylococcus* isolates were obtained from 22 canine pyoderma cases. The pus samples/material collected from three randomly selected pustules from each dog were used for bacterial isolation and to prepare impression smears. Out of the 22 cases *Staphylococcus* species were isolated from 20 cases. The prevalence of *Staphylococcus* species in canine pyoderma was 90.09%. The most predominant *Staphylococcal* species was *Staphylococcus intermedius* (49.47%)and followed by *Staphylococcus pseudointermedius* (24.59%), *Staphylococcus aureus* (14.43%) and *Staphylococcus epidermidis* (1.60%). Additionally, *Bacillus* spp (9.62%) was occasionally isolated. The occurrence of mixed infections in canine pyoderma was 90% while single infections were 10% in individual dog. Most common mixed infections were with *Staphylococcus pseudointermedius/Staphylococcus intermedius* (50%) combination and *Staphylococcus intermedius/Staphylococcus aureus* (27%). When an individual pustule was considered 35 pustules had more than one *Staphylococcus spp* and 22 pustules had one species of Staphylococcus. Accordingly, more than one *Staphylococcus* species was recovered from one pustule from a dog and several combinations of mixed infections were observed. The most common mixed infections were *S. pseudointermedius/S. intermedius* combination (37.87%) followed by *S. intermedius*/*S. aureus* combination (10.60%). Therefore, mixed infections were predominate in the canine pyoderma cases both in individual dogs and pustules.

# MOLECULAR DETECTION OF *THEILERIA ORIENTALIS* TYPE 1 IN CATTLE IN GALLE AND RATHGAMA VETERINARY RANGES OF SRI LANKA

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Bovine Theileriosis is a tick borne heamoprotozoal disease of clinical and economic importance. *Theileria parva* and *Theileria annulata* are mostly pathogenic to cattle and buffaloes. *Theileria orientalis* is usually considered benign but clinical disease has been reported in Asia Pacific region. Of the known 11 genotypes of *Theileria orientalis,* Type 1, 2 and 7 are pathogenic and Type 2 is more prevalent in oriental Theileriosis. A suspected outbreak of Theileriosis was reported from Southern Province of Sri Lanka during 2014-2015. Clinical signs werelow milk production, weakness, anaemia, recumbence and death.

In a preliminary study carried out in Theileriosis suspected farms in Galle and Rathgama veterinary ranges indicated the presence of *Theileria orientalis* by PCR technique (10/16). As all the genotypes of *Theileria orientalis* are not pathogenic, aim of the present study was to detect the presence of type 1 by genotypic specific PCR assay targeting the Major Piroplasmic Surface Protein (MPSP) antigen gene. The DNA extracts positive for *Theileria orientalis* were used for the genotypic specific PCR. The primers focusing 559 bp fragment of MPSP gene with the forward primer TTGCCTAGGATACTTCCTCATCG and the reverse primer TGCGGTGTATTTGGCCTTC was used.

According to PCR analysis, 50% of the samples were positive for Type 1 genotype. The results show that the outbreak is due to Type 1. However, a previous study has reported that most clinical cases were due to both Type 1 and 2 concurrent infections. Therefore, it is suggested to screen the samples for the presence of *Theileria orientalis* Type 2 as well.

# COLONIZATION OF METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* IN DOGS AND DOG HANDLERS

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Extensive dissemination of methicillin-resistant *Staphylococcus aureus* (MRSA) has become a serious concern worldwide. Earlier these strains were limited to hospital settings (HA-MRSA) and now widespread community acquired MRSA (CA-MRSA) clones have been identified and the organism is no longer limited to humans. Potentially zoonotic MRSA clones have been identified in livestock and companion animals.

The present study was conducted to determine the colonization of MRSA in companion animals, their owners who attended the Veterinary Teaching Hospital (VTH) and VTH staff members. Nasal swabs were collected using sterile cotton swabs from 20 canine patients presented to the OPD of the VTH and 30 hospitalized canine patents remained over a week at the VTH. Another 22 nasal swabs were collected from human subjects in close contact with animals including pet animal owners and VTH staff members. Samples were enriched and cultured on a MRSA selective medium. Colonies grown on this medium were confirmed as Gram positive cocci and subcultured on mannitol salt agar and nutrient agar. Catalase test and coagulase tests were performed on these isolates following standard microbiological procedures. DNA was extracted from the isolates by boiling method and PCR was performed to screen for *MecA* gene using published primer sequences (F- 5' AAAATCGATGGTAAAGGTTGGC and 5' AG TTCTGCAGTACCGGATTTGC). MecA gene encodes a low-affinity penicillin-binding protein (PBP 2) and only present in MRSA strains.

Of the 72 samples collected, Gram positive, catalase and coagulase positive cocci were isolated from 15 samples grown on MRSA selective medium. Six of those isolates were from dog owners (4) and VTH staff (2) members. Of the remaining isolates, three were from OPD patients and six were from hospitalized patients. All six human isolates and 8 isolates collected from dogs harboured *MecA* gene. Present study shows that a considerable proportion of dogs presented or admitted to VTH, Peradeniya were colonized with MRSA. In addition, animal handlers also harboured MRSA strains. In order to confirm the potential of human to animal or animal to human transmission, it is necessary to determine whether the human and animal isolates represent the same sequence type.

# A MOLECULAR EPIDEMIOLOGICAL SURVEY OF BOVINE *BABESIA*, *THEILERIA*, AND *TRYPANOSOMA* IN CATTLE AND WATER BUFFALO IN VIETNAM

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Bovine hemoprotozoa parasites, including different species of *Babesia*, *Theileria* and *Trypanosoma*, infect cattle populations worldwide, causing significant economic damage to the livestock industry. Although recent studies conducted in Vietnam demonstrated the prevalence of hemoprotozoan parasites in livestock animals though the complete epidemiological picture is not clear. Therefore, in the present study, an epidemiological survey of *Babesia*, *Theileria*, and *Trypanosoma* parasite species was conducted in cattle and water buffalo in Vietnam. Blood DNA from cattle (n = 258) and water buffalo (n = 49) reared in Thua Thien Hue province of Vietnam were screened for *B. bigemina*, *B. ovata*, *T. annulata*, *T. orientalis*, *T. evansi*, and *T. theileri* using parasite-specific PCR assays. Subsequently, PCR amplicons from the parasite-positive samples were cloned and sequenced for genetic analyses.

The findings demonstrated that both cattle and water buffalo were infected with *B. bigemina*, *T. orientalis*, and *T. theileri*, while 3 DNA samples from cattle tested positive in the PCR assay targeting *B. ovata*. However, none of the samples tested positive for *T. annulata* or *T. evansi*. Of the 258 cattle and 49 water buffalo, 208 (80.6%) and 38 (77.6%) , respectively, were positive for at least one parasite species, and among them, 92 (44.2%) and 16 (42.1%), respectively, were co-infected with multiple parasite species. The sequence analyses of *B. bigemina* Apical Membrane antigen-1 (*AMA-1*), *T. orientalis* Major Piroplasm Surface Protein (*MPSP*), and *T. theileri* Cathepsin-L like Protein (*CATL*) gene fragments confirmed the findings of the PCR assays. In contrast, the *AMA-1* gene sequences amplified by the *B. ovata*-specific PCR assay shared low identity scores with known *B. ovata* sequences and formed a sister clade to *B. ovata* in phylogeny. In addition, phylogenetic analysis detected *T. orientalis MPSP* genotypes 3, 5, 7 and N3 in cattle and 5, 7, N1 and N2 in water buffalo. Water buffalo-derived *T. theileri CATL* sequences clustered together with a previously reported cattle-derived sequence from Vietnam. The present study is the first to report a new *Babesia* sp. closely related to *B. ovata* in cattle, and *T. theileri* and *T. orientalis MPSP* genotype 7 in water buffalo in Vietnam.

# VALIDATION AND USE OF INFRARED THERMOGRAPHY TO DETECT WOUNDS ON LIMBS OF DAIRY CATTLE.

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Lameness and leg lesions are major welfare concerns in dairy farms. Lameness can arise from systemic disease, hock wounds, and hoof lesions. Intensive management gives rise to leg wounds in cows and mostly occur due to lying and standing on concrete surfaces. "Cow comfort" is important in assessment of cattle welfare. Skin wounds on limbs known to inflict pain on cows and thereby reduce comfort. Elevated temperature due to inflammation is common in wounds and detection of this can be used to identify leg wounds.

Infrared Thermography (IRT) is a noninvasive and quantitative method to assess temperature with minimum temperature artifacts. Although IRT can evaluate hoof pathologies and mastitis in dairy cattle, the use of it to evaluate surface skin lesions is not documented. This method is advantageous to detect surface wounds in cattle welfare assessment due to less invasive and rapid procedure. The objective of this study was to identify skin wounds on the limbs of dairy cattle using IRT and to validate the method for welfare assessment.

Fifty dairy cows in two up country intensive, tie stalls farms were evaluated for wounds using a FLIR® T420 Thermal camera. Twenty five cows were examined to detect leg wounds by an experienced person. Each leg was divided in to upper and lower regions using the stifle or elbow joint as the midpoint. Wounds were counted for each region by both methods. Examinations were done without cleaning or washing to simulate natural farm assessment setting. Infrared Thermography detected higher temperature on the wounds than the average skin temperature and could identify focal wounds covered with slurry. In validation study, IRT could capture more leg wounds than the number identified by the trained observer and all the wounds identified by the observer were also detected by the IRT images. In the current study IRT successfully detected wounds with a higher accuracy and wounds with low degree temperature rise that were not readily visual due to mud and dug covering. Therefore, IRT was superior in detecting leg wounds in farm conditions.

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# LESSONS LEARNED IN DAIRY MANAGEMENT FROM NEW ZEALAND

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The dairy sector is identified as a priority in the livestock sector in Sri Lanka, which has an estimated cattle population of 0.5 million, domestic milk production of 418 million litres including buffalo milk, with an average milk production about 2.7 L/cow/day contributing to 38% of the milk requirement (DAPH, 2015). The average farm-gate price is about Rs. 60/L and high production cost has made the industry non-profitable for many farmers. The objective of this presentation is to share my experiences on modern dairy cattle management gathered while working as a dairy manager in New Zealand, Qatar and Sri Lanka.

The objective of dairy farming should be to have a lactation period of 260-305 days, producing about 2000 litres/cow/year, amounting to 7 litres/cow/day and to get a calf every year, which can eventually make the country self-sufficient in cow milk, saving Rs. 30–40 billion spent on milk powder importation. Furthermore, replacement heifers must reach puberty at 15-18 months of age and the first calving around 24-27 months. The BCS will reach an optimum before parturition (~3.50) by feeding during the latter part of lactation and dry periods which will restore depleted reservoirs, preparing the cow for the subsequent cycle of lactation.

Limiting calcium in feed before parturition will prepare the body to mobilize calcium reservoirs during calving and lactation, and calcium and magnesium supplements can be provided after calving. Since the ability to uptake feed is limited during the last stages of gestation due the occupation of a large area of the abdominal cavity by the gravid uterus, feeding during the transition period should aim at adapting ruminal microbes for a high energy diets postpartum, and to prepare the rumen for a higher feed intake during peak lactation.

In order to maintain and produce 15 L milk, a 400kg cow requires 102 MJ Metabolic Energy. A ration containing 14kg DM from 58kg $CO_3$ grass and 4kg commercial feed is sufficient to provide the required energy. Care should be taken to prevent feeding Neutral Detergent Fibre (NDF) >1.1% of BW, especially if hay or mature roughages are fed. Providing ad libitum water (about 115 L/day) is essential as a litre of milk produced requires about 5 litres of water in addition to the maintenance requirement of 40 L/day.

For cows managed under semi and intensive conditions, feeding good quality roughage to increase the milk production cost effectively, can be achieved by cultivating, $CO_3$ fodder (1 square meter/bush) in an acre of land which is sufficient to feed 5 dairy cows producing 15 litres a day each. A total of 300kg (about 50-100 bushes) of $CO_3$ fodder is necessary to feed 5 cows (about 60kg $CO_3$ fodder/day). Cutting $CO_3$ fodder earlier than the recommended 45 days will provide better outcomes, since around 30 days, a $CO_3$ bush can weigh from 3-6 kg depending on environmental conditions.

Apart from feeding management, quality milk production, HRM, financial budgeting, animal breeding, health and safety management of workers, animal welfare, risk management strategies and an environmental friendly operation are vital for successful dairy operations.

# A PRELIMINARY STUDY ON REPRODUCTIVE PERFORMANCE OF DAIRY COWS INSEMINATED WITH EITHER SEX SORTED OR CONVENTIONAL SEMEN

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This study investigated the reproductive performance of Friesian cattle inseminated either with Sex sorted (SS) semen or Conventional Semen (CS) in an up country commercial dairy farm. Data for cows gave to live births, abortions or stillbirths during the year 2014 were obtained from farm records. The data included the type of the semen used for each insemination and sex of the live calves born. The farm breeding policy is to use SS semen for the first three consecutive AI and any cow failing to conceive will be inseminated with CS for two more times. Natural service was used only for cows failing to conceive for five AI. The conception rate (CR), calving rate (CLR) and services per conception (SC) were calculated for SS semen and CS for cows and heifers. Cattle that aborted or gave stillbirth were also considered as conceived for calculating overall CR and AI done using SS in heifers and cows. Sex of the calves that were aborted or stillborn were not available for analysis. The CLR was calculated for CS semen. Total of 453 cows were bred during the period. Out of them, 109 (24%) were heifers and the rest 344 (76%) were cows. Total of 818 AIs were performed on these animals. Of these 498 AI was done using SS and the rest (320) was inseminated with CS. There had been 276 live births resulted from these inseminations, out of that 74 were males and 202 were females. The overall CR and SC were 74% and 2.4 respectively. CR and SC for cows and heifers AI with SS semen were 40% and 2.8 and 63% and 1.7 respectively. Overall CLR and SC for CS were 35% and 3.2 respectively. CLR and SC for cows and heifers inseminated with CS were 30% and 3.7 (6.8) and 61% and 1.6 (4) respectively. Nearly 87% claves born to SS was female and for CS sex ratio was 50.5:49.5. SC for cattle subjected to CS was quite high (indicated within parenthesis) when considering AI done with SS. As expected fertility indices of heifers were much higher than for cows. Poor conception rate of cows inseminated with SS reduce the overall reproductive performance of the farm. It would have the best if we could study the same parameters in first lactation cows. Based on the above data it can be concluded that SS semen could skew sex ratio favourably towards the female while compromising the reproductive performance. It is suggested that detail analysis is required to make recommendation for using SS in cows.

# POLYMORPHISM OF CASEIN CLUSTER GENES IN AYRSHIRE AND HOLSTEIN FRIESIAN DAIRY HERDS IN SRI LANKA.

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Main goal of dairy cattle breeding is to improve the quality and quantity of milk in the resultant progeny. Genetic marker assisted selection is used to identify the best sires and dams in progeny selection. Allelic variants of bovine kappa- casein (κ-casein) gene and Alpha S1-Casein (CSN1S1) gene are associated with production traits such as milk yield, composition and cheese yield in several dairy breeds. This study was conducted to optimise the tetra-primer ARMS-PCR technique for bovine κ-casein and CSN1S1 genes and to genotype the dairy cows in up country farms in Sri Lanka for single nucleotide polymorphisms in both genes using this technique. The study was performed using blood samples of 150 Ayrshire and 150 Holstein Friesian cows. Tetra-primer ARMS-PCR technique was performed using extracted genomic DNA to identify the κ-casein and CSN1S1 variants in these animals. Genotypes AA, AB and BB were found for κ-casein gene and BB, BC and CC were found for CSN1S1gene. In κ-casein gene, an allele was the major allele in the population of both breeds with a frequency of 0.805 in Ayrshire cows and 0.72 in Holstein cows. K-casein AA genotype was present at a higher frequency in both breeds, followed by AB and BB. In CSN1S1 gene, the predominant genotype of the both breeds was BB with a higher frequency followed by BC and CC genotypes. However in the Ayrshire population, no CSN1S1 BC or CC genotypes were found. But in the Holstein population all three genotypes were found and the genotype frequencies of BB, BC and CC were 79.28%, 17.12% and 3.6% respectively. Allele B (0.878) was found more frequently than Allele C (0.122) in this studied Holstein Friesian population. The genetic makeup among these studied two population showed a significant difference especially in CSN1S1 gene. The result obtained from this study was in agreement with the earlier observations reported in several studies. According to the literature, these variants are associated with production traits in the dairy breeds. Therefore we are in the process of conducting association analysis of genotypes and milk yield. Association analysis results will provide an insight into genetic influence of variants in casein cluster genes on milk production in Sri Lanka.

# THE EFFECT OF IMPROVED LOCAL FISHMEAL AND IMPORTED FISHMEAL ON GROWTH, MEAT QUALITY AND NECROTIC ENTERITIS IN BROILER CHICKENS

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Fish meal is a costly protein supplement in poultry diets and a major amount is yet imported to the country. Although it is a high quality protein source for poultry the utilization is limited in the poultry industry. A fatal disease outbreak due to *C. perfringens* contaminated local fish meal (LFM) was reported in Sri lanka in 1971. Therefore, it is a need to identify and improve the quality of locally available fish meal. To achieve the need, locally produced fish meal samples were tested in the laboratory for their nutritional and microbial quality and processed with different additives to improve the quality.

An experiment was conducted to compare the effect of improved local fishmeal with imported fishmeal in broiler chicken diets on their growth performance, meat quality parameters and Necrotic Enteritis (NE)/ *C. perfringens* exposure in broiler chickens. Five dietary treatments were prepared each incorporating one type of fish meal to provide 10% of the total protein requirement of the diet. Five treatment diets contained: (1)imported fish meal, (2)LFM, (3)LFM ensiled with probiotics, (4)LFM ensiled with acidifier and (5)LFM incorporated with protease enzyme. All five treatment diets had a similar nutrient composition. Each treatment had six replicates with 12 birds in each experimental unit or the pen. Thus a total of 360 broiler chickens were randomly allocated to experiment. Experimental diets fed *ad libitum* from day1-42 of age.

The body weight gains of the birds fed the diets containing imported fishmeal (2.72kg) and probiotic ensiled local fishmeal (2.72kg) were higher ($P<0.05$) compared to the birds fed with untreated LFM (2.56kg) diets. Feed intake, feed conversion ratio, dressing percentage, visceral fat, liver weight percentage, serum antibodies for *Clostridium perfringens* α toxin, meat drip loss, freeze thawing loss and cooking loss were not affected ($P>0.05$) by dietary treatments. In further studies a non pathogenic Bacillus species was identified from the imported fish meal. Thus the comparatively higher growth effect could be due to the initial colonization of beneficial microorganisms in broiler intestines. Therefore, the local fishmeal could be improved by ensiling with probiotics.

# FIRST EVIDENCE OF THE PRESENCE OF KOI SLEEPY DISEASE CAUSED BY CARP EDEMA VIRUS IN KOI CARPS (*CYPRINUS CARPIO KOI*) IN SRI LANKA

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Koi Sleepy Disease (KSD) is an emerging infectious disease of common carp and Japanese color carp/koi (*Cyprinuscarpio*) caused by a pox virus, known as carp edema virus (CEV). First detected in Japan in mid 1970s, KSD occurred exclusively in Japan for many years; and recently clinical outbreaks of this disease were encountered in several European countries and in the United States. In this study, we investigated a clinical presentation suggestive of KSD among koi carps in a fish breeding farm in Polonnaruwa, where the mortality in juvenile koi reached up to 100% within four days of transferring fish from earthen ponds to cement tanks. The diseased fish were extremely lethargic and lying on the bottom of the ponds before death. Clinical examination revealed swollen gills, dyspnoea, enophthalmos and generalized edema. Five moribund fish were sampled and subjected to a detailed parasitological, bacteriological and pathological investigation after humane euthanasia. External and internal parasites were not detected, and no significant bacterial growth was observed upon culturing the kidney. Histopathological examination of gill tissues showed extensive hyperplasia and clubbing of primary gill filaments and edema of the epithelial cells in the secondary gill filaments. As the clinical presentation and histopathological findings were suggestive of KSD, the DNA extracted from the gills, kidney, liver and skin was amplified by nested PCR using CEV specific primers. DNA from all fish yielded positive amplicons for CEV, and the first step amplicons were sequenced and the resulting sequences were aligned using nucleotide BLAST to confirm PCR identification. The sequence comparisons revealed 98% nucleotide homologyto a carp edema virus isolated from koi carps in Germany.

This is the first report that confirms the presence of KSD caused by CEV in koi carps in Sri Lanka using a polyphasic diagnostic approach. In this context, we highlight the importance of screening of the import/export stocks of koi carps for CEV during quarantine, and strict measures should be taken to prevent the spread of this disease to the other parts of the country to minimize economic losses in koi carp industry in Sri Lanka.

# DETECTION OF IRIDO VIRUS INFECTION IN SEA WATER REARED ASIAN SEA BASS (*Lates calcarifer*) IN SRI LANKA

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The interest of farming Asian sea bass (*Latescalcarifer*) commonly known as barramundi has increased during recent years in Sri Lanka. Although there are few hatcheries in Sri Lanka, the fingerlings are still imported from countries like Australia and Singapore. One of the key issue of the barramundi farming is the high mortality due to occurrence of diseases in Sri Lanka and other countries as well.

The present study was aimed to investigate aetiopathology of the disease that cause high mortality in Asian sea bass farmed in the Eastern sea of Sri Lanka. Two episodes of disease outbreaks with 80% and 48% mortalities were recorded in the same farm during November 2014 and December 2015respectively.The affected populations were investigated for mortalities and clinical signs. The mortalities in the cages in both episodes were observed in 10 days after stocking of fish with 30g average body size. The clinical manifestations showed by affected fish in both episodes were red eye, darkened skin and scales drop especially at abdominal area. Twenty fish samples of moribund fish in each episode were also subjected to postmortem examination and samples from brain, spleen, kidney and liver of moribund fish were collected and preserved in 85% ethanol at the farm site. DNA was extracted from pooled tissue samples from individual fish and PCR assay was carried out according to the methods described by Sudthongkong*at el*, 2002. Twenty fish samples showing no clinical signs were also collected as a control. The samples of kidney from affected and healthy fish were also inoculated in to TCBS and TSA. There were no external parasites found in skin scrapings and gill clips in any of the fish. Postmortem examination revealed that there were splenomegaly and hemorrhages in the brain.

Out of 40 affected fish examined, 31 samples displayed positive PCR product (band size = 709 bp) suggesting for irido virus infection, while unaffected fish were negative. All samples from affected population inoculated into both TCBS and TSA medium displayed cultures of gram negative rods. Collectively clinical presentation and laboratory findings suggested, the primary cause for mass mortality observes in both disease episodes in the farm was caused by an irido virus infection.

# FIRST ISOLATION OF EXOTIC BACTERIAL PATHOGEN *Edwardsiella ictaluri* FROM AN IMPORTED STOCK OF CATFISH (*Pangasius sutchi*) IN SRI LANKA

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There is a serious risk of introducing exotic pathogens of fish into the country through importation because Sri Lanka is actively engaged in global aquarium trade. In this context, we report the isolation of an exotic bacterial pathogen *Edwardsiella ictaluri* from a stock of albino Sutchi catfish/Shark catfish (*Pangasiussutchi*) imported from Singapore.

Four moribund catfish were submitted for disease investigation by a farmer from Pasyala with the history of lethargy, reduced appetite and high mortality in fish after four days of stocking 6,000 pairs in mud ponds and cement tanks. The fish were humanely euthanized and subjected to necropsy. Skin scrapings and gill clips were examined for parasites, while the kidney and liver were processed for histopathology. In addition, the samples from kidney were cultured on trypticase soy agar (TSA) and blood agar (BA) and incubated at room temperature and at 37˚C for 48 hrs. The gills were pale and deep ulcers, pinpoint haemorrhages and large numbers of *Trichodina*spp. were found on the skin. There were pinpoint haemorrhages in the kidney and swim bladder, and histological examination revealed extensive necrosis in the liver and kidney with apparent bacterial multiplication. After 48 hrs of incubation at room temperature, a pure bacterial growth characterized by pinpoint, round, translucent and pale coloured colonies were observed on TSA, while the colonies on BA were pinpoint and haemolytic. The isolate was Gram negative, short non motile rods with the biochemical profile similar to *E. ictaluri*. To confirm the phenotypic identification, PCR was performed by targeting two different genesof*E. ictaluri*followed by sequencing of the PCR amplicons. The comparison of the sequences of the amplicons using nucleotide BLAST revealed 99% identity to the *E. ictaluri* 93-146, a strain associated with an outbreak of enteric septicemia of channel catfish. This is the first report of isolation and identification of *E. ictaluri* in Sri Lanka and our results highlights the necessity of stringent implementation of import health certification and intensifying quarantine measures to all imported fish stocks in order to minimize the introduction of exotic pathogens of fish into the country.

# FAECAL CORTICOSTEROID METABOLITES AS INDICATORS OF STRESS OF ELEPHANT CALVES DURING REHABILITATION AND RE-INTRODUCTION TO THE WILD

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Stress responses play a key role in allowing animals to cope with change and challenging circumstances. Stress is associated with the release of several hormones. Among these, the glucocorticoid hormones, cortisol and cortisone are key elements in the neuroendocrine stress axis. The liver metabolizes these hormonesand secrete with bileprior to excretion through feces. Thus fecal samples can be used to measure the excretion of glucocorticoid metabolites (GCM).We used the level of GCM in feces as a stress indicator in elephant calves during rehabilitation and reintroduction to the wild. Asian elephant calves that are either orphaned or abandoned in the wild are reared at the elephant transit home in Udawalawe, Sri Lanka until 6 years of age and are released back to the wild.

The study was conducted using 10 elephants (six males and four females) aged between 5-6 years who were due to be reintroduced to the wild. Fecal samples were collected forGCM analysis on a monthly basis for nine months prior to release and three weeks following the release event. All the elephants were radio collared one month prior to release for post-release monitoring. Animals were tracked using radio signals and fecal samples were collected, oven dried at$70^0$C for 12-24 hours, stored at -$20^0$C until analysis. Fecal extracts were assayed for GCM using a validated immunoassay. Results were analyzed using repeated measures ANOVA to ascertain whether the GCM values changed over time in the pre and post release periods. There were no significant differences between the GCM levels of males and females. The average GCM pre-release was 51.88 +/- 2.151 compared to post-release values at 88.94 +/- 5.843 ($P<0.05$). The post-release values were highest at 5 - 8 days after reintroduction to the wild and after 17 days were still higher than the pre-release average value. These preliminary results indicate that GCM can be used as a non-invasive method to assess stress during rehabilitation and to monitor stress after reintroduction to the wild. Further studies are needed to establish whether and how long it will take for the stress levels to reach pre-release GCM levels after reintroduction.

# USE OF INFRARED THERMOGRAPHY IN CAPTIVE AND WILD ELEPHANTS

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Infrared Thermography (IRT) is a non-invasive and quantitative method to assess temperature of living beings. Thermal images taken from a distance canavoid temperature artifact associated with capture and confinement. Therefore, IRT has been used as a disease diagnostic tool. Elephant shave several strategies for regulating body temperature and low surface to weight ratio make heat dissipation crucial for them. Body areas responsible for heat exchange are termed "Thermal windows" and, important for thermoregulation. Understanding thermoregulation in elephants plays an important role in assessment of welfare in captive and wild elephants. Detection of temperature fluctuations can also help to identify early inflammation and infections. Penetrating skin lesions and complicated infected wounds with sinus tracks are common in both captive and wild elephants, and detrimental to their welfare.

This paper describes use of IRT to study "Thermal windows" and to evaluate wounds and abscesses in Asian elephants. Infrared images were taken from 18 wild and 10 captive Asian elephants to define Thermal windows. The Environmental temperature at imaging was 31.8 $^0$C wild and 29.5 $^0$C in captive setting. Thermography was used in three additional cases to detect and evaluate progression of skin lesion over different time points. Imaging was done at <20mdistanceusing FLIR® T420 camera with an emissivity of 0.98. Significantly higher skin temperatures were observed in wild elephants than captive and this was influenced by environment temperature. No significant differences were observed between body areas within an elephant. When accounted for the temperature difference of the environment, skin temperature at the "Top Body" area was significantly lower in wild elephants and this area was significantly different from the other measured body areas. There was a trend towards a significant difference in the surface temperature of the ear in wild elephants.

Collectively ear, top body and legs could be identified as thermal windows in elephants. In clinical cases, thermography could detect inflamed areas around wounds and abscesses, and inflammation under the skin that tracks deep. This information was used to treat captive elephants.

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# ASSESSMENT OF LYING BEHAVIOR IN CAPTIVE ASIAN ELEPHANT CALVES AND EVALUATION OF DATA LOGGERS TO CHARACTERIZE THE BEHAVIOR

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Sri Lanka is one of many countries to have centers for elephant rehabilitation, release and repopulation in the wild. In captive and rehabilitation centers, proper welfare is significant in decreasing chronic stress among elephants. Prolonged stress interferes with social learning in individual elephants and causes difficulty in their environmental responses. One method in evaluating stress is recording captive sleep patterns or lying behavior in elephants. Recent studies have identified sleep or resting of elephants being equivalent to elephants in a recumbent position and research on lying down patterns of elephant calves is limited. Previously, lying patterns have been observed using visual and video surveillance systems that require constant observations. Time to collect video data proved itself difficult in a semi wild setting. Application of automatic detection methods could be utilized to conduct lying studies in elephants. The aim of this study was to observe the lying behavior of elephant calves at the Transit Home while identifying a new technique for lying pattern assessment using data loggers. One goal being to visually examine the patterns of nocturnal lying by elephant calves and the second was to evaluate the performance of the HOBO® Pendant™ G Data Logger on recording the data of nocturnal lying and standing times in comparison to observed visual patterns.

Three elephant calves were monitored for 15 nights (9hr /night) using live observations and HOBO® Pendant™ G Data Loggers that were placed on the neck. Data loggers could detect lying or standing of elephants and was set to record positional data every 30s. Recorded data were summarized to compare two methods. This study demonstrated that elephant calves spend roughly half the night lying down (51%) and half their time standing (49%) based on the visual observations. In the preliminary analysis, there was no significant difference between the data loggers to the gold standard visual observation method in detecting lying bouts. Although lying duration recorded from both methods were not significantly different, sensitivity was 86% with the logger recordings. Data loggers are promising method to detect number of lying bouts and may not be very precise in detecting lying duration.

# SEROEVIDENCE FOR HANTAVIRUS INFECTION AMONG RATS IN URBAN HABITAT OF KANDY, SRI LANKA

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Hantaviruses are RNA viruses belonging to the family *Bunyaviridae* and genus of Hantaviruses; transmit to humans directly by rodents considered as the natural reservoir of the disease. Humans develop two important clinical syndromes: hemorrhagic fever with renal syndrome (HFRS) in Europe and Asia, and Hantavirus cardiopulmonary syndrome (HCPS) in the Americas, case fatality rates range 35–50%. In Asia, Hantaan virus (HTNV) and Seoul virus (SEOV) are the major causative agents of HFRS, other viruses such as Thailand virus (THAIV) and Serang virus (SERV) were reported. Vitarana *et al*., 1988, first described Hantavirus infection in Sri Lanka. Gamage*et al*., 2011 and Sarathkumara*et al*., 2015, disclosed the presence of Hantavirus infection in humans in Kandy, Sri Lanka. However, there is scarcity of scientific literature on rodent reservoirs harbouring the viruses in Sri Lanka. Thus, the current study was focused to reveal the Hantavirus infection in rodent in urban habitats in Kandy City, Sri Lanka.

A cross-sectional study was designed to capture rodents during October 2015, using live traps inside and outside of the Municipal Market, Kandy City, Central Province of Sri Lanka. Twenty-five live traps were setup. All samples were subjected to indirect immunofluorescence antibody assay (IFA) using acetone fixed smears of Vero E6 cells infected with SEOV, PUUV (Pumala Virus) and THAIV, as the primary antigens and Fluorescein isothiocyanate(FITC)-conjugated goat anti-rat IgG as the secondary antibody. Positive sera were subjected to western blotting (WB) using recombinant N protein of SEOV expressed by baculovirus vector, serum dilution rate as 1:120. During the 20 days of trapping, 102 rats were collected. All rats were belonged to *Rattusrattus*. Of 102 rats, two (2%) were positive for both SEOV and THAIV, by IFA. During the WB analysis, those two samples were given weak bands. Present study confirmed that the rats are common in urban habitat settings of Kandy Municipal Market. Two rats were infected by possibly a new Hantavirus strain which may share common immunogenic properties of SEOV and THAIV

# USE OF BEES' HONEY AND CINNAMON-OIL COMBINATION IN TREATING NECROTIC WOUNDS IN DOGS AND CATS

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Bees' honey and Cinnamon (*Cinnamomum cassia*), both of which show inhibitory effect to many aerobic and anaerobic, gram-positive and gram-negative bacterial species had been used to treat infected wounds for many centuries. They also act as antifungal agents against yeasts and all common dermatophytes. The antibacterial property of bee's honey occur due to its reverese-osmotic effect on bacteria and by an enzyme in honey ("inhibine") that produce hydrogen peroxide which further aids in destroying bacteria. It also stimulates proliferation of peripheral blood lymphocytes. Cinnamon is well known to eliminate bacterial bio-films that are difficult to destroy with antibiotics. Cinnamaldehyde in cinnamon is effective in inhibiting growth of bacteria and fungi. The current prevalence in antibiotic-resistant microbial species (e.g. MRSA, multidrug resistant *Klebsiella*) leads to a re-evaluation of the therapeutic use of ancient remedies.

This communication evaluates the therapeutic use of the combination of these two substances in managing necrotic wounds in dogs. Four dogs (D1, D2, D3, D4) and one cat (C1) presented to the VTH in February and March, 2016 with maggot infested contaminated open wounds were used in this study. All wounds were cleaned thoroughly with manual removal of maggots. Necrotic tissues were removed and 0.1 ml of Ivermectin 1% was diluted in 3 ml of water and was locally infiltrated into maggot-infested wounds. A combination of bees' honey and cinnamon-oil (approximately 3 teaspoons of honey to 1-2 drops of oil) was applied to completely conceal the exposed wounds and covered with gauze bandage. Amoxicillin-clavulanic acid was prescribed for 5 days for two dogs and the cat (D1, D2 and C1). Patients D3 and D4 did not receive any antibiotics. D1 and C1were sent home after the initial consultation and both reported back within 2 weeks with successful wound healing. Patients D2 and D3 were hospitalized Within 48 hours of application of the bees' honey and cinnamon-oil combination, both D2 and D3 showed successful growth of healthy granulation tissue and loss of purulent exudates and necrotic tissue. Patient D2 had a relatively slow rate of heeling, as it continuously removed its bandage on its own. Patient D3, in addition to being a 12 year old senile dog and did not receive any antibiotics, showed similar improvement within 7 days of treatment. Patient D4 showed quick recovery within 3 days of treatment. Approximately 1ml for every 1 $inch^2$ of the exposed tissue must be used of the bee's honey and cinnamon-oil combination to cover the wound in order to achieve adequate potency.

For optimal effect this combination should reach the deepest sites of infection and retain a 'reservoir' of sufficient quantity that is substantially depleted. From a clinical perspective there is strong evidence to support the use of bee's honey and cinnamon-oil in wound care. No complications were observed in using this combination.

# SIGNIFICANCE OF THE DEEP SKIN SCRAPING IN THE DIAGNOSIS OF SEVERE GENERALIZED CANINE DEMODICOSIS; A REVIEW OF SIXTEEN CASES

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This paper describes sixteen long standing cases of severe recurrent ulcerative and erosive dermatitis presented to the Veterinary Teaching Hospital (VTH), Faculty of Veterinary medicine and Animal Science between August 2015 and January 2016 which were eventually diagnosed to be generalized canine demodicosis (GCD). Patients included six males and ten females of mixed breeds aged between 2 -5 years. There were German Shepherds (6/16), Labradors (2/16), Dalmatians (2/16), Rottweilers (2/16), Bull Mastiffs (2/16), a Dachshund and Golden retriever. The clinical history and the treatment information were obtained through records and client-veterinarian communications. Previous diagnostic tests included bacteriological culture and sensitivity (4/16), total T4 and Free T4 (2/16) measurements, and skin histopathology in one case. Treatment included a mix of antibiotics in all cases antihistamines (14/16), topical shampoos and ointments (14/16), corticosteroids (6/16), Levothyroxine (5/16) and anti-fungals (4/16). None of the treatment plans included miticidals. Patients had been treated for varying periods that extended from 5-6 months (4/16), to 6-12 months (10/16) and in some instances more than months (2/16). On presentation to the VTH skin lesions were noted and a general clinical examination revealed a pyrexia (9/16) and mild lymphadenomegaly (10/16) in some of the animals. Differentials considered were GCD, primary/secondary pyoderma, *Malassezia* dermatitis, dermatophytosis, allergy and autoimmune skin diseases. Initial diagnostic testing included a deep skin scrapings (DSS) and cytology. Deep skin scrapings from all 16 dogs revealed Dermodex mites with all life stages present in half the animals , adult with nymph /larvae in 7 dogs and only adults in one case . Cytology revealed cocci (15/16) and *Malassezia spp* (8/16). A diagnosis of severe GCD with secondary bacterial and/fungal infections was made and treatment commenced with miticidals (oral Ivermectin, gradual increase from 50 µg to 400 µg/kg/day within a period of 1-2 weeks), Cephalexine (25mg/kg bid) together with, Clohexidine baths and supportives (Cod liver oil capsules, Vitamin E and Zinc). Complete recovery (two consecutive negative DSS at weekly interval) was achieved at the end of 4 weeks (3/16), 5 weeks (3/16), 6 weeks (4/16), 7 weeks (3/16) and 8 weeks (3/16). These findings demonstrate the gross under diagnosis of demodicosis, a common skin disease in dogs due to ineffective use or exclusion of a DSS, a rapid, simple, cost effective yet highly reliable diagnostic test procedure in the investigation of canine dermatopathies.

# EFFECTS OF A BROILER STARTER-BASED FEED ON RUMEN PAPILLAE DEVELOPMENT IN PRE-WEANED CALVES.

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In newborn calves, the rumen is underdeveloped in terms of its size, papillae development and muscularization compared to adult cattle. Therefore, stomachs of pre-weaned calves are functionally more similar to monogastric animals than ruminants. Calves need to develop a physically and functionally sound rumen before they can efficiently digest forages and absorb products of digestion. Rumen papillae development is particularly important for transitioning the non-functional rumen into a functional one. The impact of milk and forage-based diets on rumen papillae development is minimal. In contrast, butyric and propionic acid resulting from fermentation of concentrate feeds (e.g. calf starter), have the greatest impact on rumen papillae development.

Therefore, calf starter is an essential component of a calf diet in a commercial dairy enterprise. Unfortunately, calf starter is a rarity in Sri Lanka, especially in the context of small and medium-scale dairy farms. Consequently, dairy calves of such farms have under-developed rumina at weaning and display poor feed conversion and poor weight gains post-weaning. Aware of the importance of calf starter, certain dairy farmers have resorted to feeding broiler starter feed to calves, given the non-availability of calf starter. These calves are said to show better body weight gains compared to calves fed forage and milk-based diets; however, this has not been scientifically proven to-date. This study was conducted to test the effects of broiler feed on calf growth rate and rumen papillae development. Four calves born at the Veterinary Teaching Hospital, Uda-Peradeniya, from January – April 2015, were used for this experiment. Three calves were fed a broiler starter-based feed (broiler starter: cattle feed = 70:30) from day 4 onwards. The fourth calf was fed adult cattle feed without broiler feed. Rumenotomy of calves fed the broiler starter-based feed revealed that their papillae of the ventral ruminal sac were on average 0.4 - 0.5 mm long (~3 months of age). These values are smaller than published values (ventral ruminal sac: 1.96 – 2.37 mm at 9 weeks). The results of this experiment suggest that broiler starter-based feed does not result in satisfactory ruminal papillae development in pre-weaner calves compared to those on calf starter feeds. This may be due to the relatively low fiber content of broiler starter feeds. However, further studies with a larger number of experimental subjects are necessary to confirm these findings.

# A PRELIMINARY STUDY ON STRESS IN VETERINARIANS IN COLOMBO CITY.

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Stress is common and veterinarians are not exempt from it. This is particularly so in middle-income countries where one works within low-resource settings. This study explored two objectives: (i) the rates and selected correlates of stress among Colombo city veterinarians; (ii) the effectiveness of a Stress Management Workshop (SMW) on them. As part of a larger study, 20 (40%) veterinarians with a Colombo city address and registered with the Sri Lanka Veterinary Council were selected as a convenience sample. They were invited for the SMW by letter/email. At the start of the SMW participants completed a stress scale (the Perceived Stress Scale: PSS). The four-hour-long workshop included information on what stress is; what stressors are; impact of stress; and psychological techniques of stress management. A month after, participants convened for a two-hour discussion on how they applied to their life what was learnt from the workshop, where they also re-did the PSS. Colombo Medical Research Institute's Ethics Review Committee approved the study. Of the pre-SMW sample of eight (two males) participants (Only eight out of the invited 20 attended), 62% produced stress scores higher than their group average. Non-parametric correlations indicated that stress scores had a: (i) positive correlation with age (Spearman's ρ: 0.343), (ii) negative correlation with years of experience (Spearman's ρ: -2.12). These were not statistically significant. As the post-SMW sample was only four participants (one male), PSS scores were not normally distributed. Hence the non-parametric measure Wilcoxon Matched Pair Signed Rank Test was used to assess the impact of SMW. Though the results were not statistically significant at 0.05, it missed being so by only 0.01. Further, the group average stress scores had dropped from 28.5 at pre-SMW to 24 at post-SMW. This study shows that a majority of veterinarians' in the study sample experience stress levels that are above their group average. Factors such as work demands and low resources may have led to this finding. Though the impact of the SMW was not statistically significant, it missed being so by 0.01. A reason for this may be the very small sample size. Future such studies with larger samples are recommended.

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# HEALTH CONDITIONS OF PET RABBITS PRESENTED TO THE VETERINARY TEACHING HOSPITAL (VTH), UNIVERSITY OF PERADENIYA.

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Forty five pet rabbits of different breeds with various clinical conditions were presented to the VTH from January 2014 to March 2016 reflecting an emerging trend in companion animal ownership and health concerns. Of these cases, Psoroptic mange was the major (42.2%) issue, while traumatic injuries (26.7%) including dog bite wounds, fractures, eye conditions and chemical trauma; and also infectious diseases (17.8%) namely, ulcerative pododermatitis, respiratory tract and urinary tract infections; miscellaneous cases such as floppy rabbit syndrome, heat stress, nutritional deficiency and prolapsed vagina. The objective of this communication is to make the veterinary practitioners aware of the common health conditions encountered in pet rabbits and how to treat and manage them.

Psoroptic mange caused by *Psoroptes cuniculi* was manifested with crusty exudates formed within the ear canal which extended up to the pinna, the nose, paws and the perineal region. Diagnosis was confirmed by microscopic examination of the exudates for mites and treated with ivermectin (0.4 mg/kg) SC. Complete recovery was evident 10-12 days after treatment.Traumatic injuries were mostly due to dog bites and iatrogenic causes. Two cases of dog bites, one an infected wounds at the neck and below the base of the left ear, and the other an avulsion below left tibia and fibula were treated by wounds toileting with normal saline followed by povidone Iodine application and enrofloxacin (10mg/kg) sid SC; and amputation for the second under general anaesthesia (GA) with Ketamine (35mg/kg) and Xylazine (5mg/kg) IM respectively. Four iatrogenic trauma included three fractures and one epistaxis cases. Limb fractures were fixed with intra-medullary pin insertion and/or external coaptation with plaster of paris and epistaxis was managed with cold fomentation and applying Oxymetazoline® nasal drops. Two rabbits with hypersensitivity reaction caused by exposure to Lysol® were treated with dexamethasone (2mg/kg) and chlorpheniramine malaete (0.4mg/kg) after cleansing off the chemical with water. Eye conditions namely, corneal opacity, conjunctivitis, corneal ulcer and abscess, were treated with keterolac, betamethasone, ciprofloxacin eye drops and enucleation respectively. Two cases of ulcerative pododermatitis, one with an abscess which was drained, were treated with enrofloxacin, meloxican and Soframycin®. Three rabbits with respiratory tract infection treated with systemic antibiotic and dexamethasone responded well. One rabbit with sludgy urine and cystitis was treated and managed with enrofloxacin, furosemide (1mg/kg) and vitamin C with supply of *ad libitum* drinking water. A rabbit with floppy rabbit syndrome manifested with forward head tilt and inability use fore limbs was treated with fluid therapy, enrofloxacin and dexamethasone.

# PROFILING OF BACTERIAL PUBLIC HEALTH HAZARDS ASSOCIATED WITH ELEPHANTS PARTICIPATING IN THE "ESALA PERAHERA".

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Sri Lanka has about 150 domesticated elephants participating in religious, cultural, and other human entertainment activities. During such activates the elephants come into close contact with humans creating a potential disease transmission threat between elephants and humans. The objective of this study was to screen the elephants participated in the Esala Perahera 2015 for the zoonotic bacterial pathogens namely *Salmonella*, *Campylobacter and Mycobacterium tuberculosis* complex and to estimate the prevalence of antimicrobial resistance among isolated bacteria to identify potential public health risks. Freshly voided fecal samples collected from 50 elephants were cultured to isolate and identify *Salmonella*, *Campylobacter* and *E.coli.* Antimicrobial susceptibility of the isolated bacteria was tested according to the guidelines of the Clinical and Laboratory Standards Institute (CLSI). Total fecal DNA was extracted using Qiagen Mini Stool kit and a faecal PCR assay was conducted to detect *Mycobacterium tuberculosis* complex specific DNA (targeted IS 6110, IS986 and HupB genes) according to a previously published method.

The isolation rates for *E.coli* and *Salmonella* were 100% and 8%, respectively while *Campylobacter* was not isolated from any of the samples. Three of the four *Salmonella* isolates were resistant to ampicillin and tetracycline and the rest of the isolates were susceptible to all the antimicrobials tested. A number of *E.coli* isolates were resistant to ampicillin (8%), sulfamethoxazole and trimethoprim combination (8%), tetracycline (8%), ceftriaxone (8%), amikacin (6%), nalidixic acid (4%), imipenem (4%), gentamicin (2%), streptomycin (2%), ceftazidime (2%) and ciprofloxacin (2%). However, all tested *E.coli* isolates were susceptible to cefotaxime. Further, 8% of the *E. coli* isolates showed resistance for more than three antimicrobials and can be classified as multidrug resistant. None of the elephants yielded a positive result for the fecal PCR assay indicating that the animals did not excrete pathogenic mycobacteria in their feces. This study revealed that a number of bacterial isolates tested were resistant to many important antibacterials including ceftriaxone. Ceftriaxone is a third generation cephalosporin and listed as a high priority critically important antimicrobial by the World Health Organization. Further, third generation cephalosporins are one of few available therapies for serious *Salmonella* and *E. coli* infections, particularly in children. Such important antibacterials may become ineffective in treating human diseases in the near future if not used sparingly and carefully on animals. Therefore, it is very important to closely monitor the antimicrobial resistance in bacteria isolated from animals. This study did not find any risk of transmitting tuberculosis from elephants to humans during the Esala Perehara held in 2015.

# SURGICAL CORRECTION OF HIP LUXATION OF CANINES USING A TOGGLE.

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Coxo-femoral joint luxation is the displacement of the femoral head from the acetabulum, tearing round ligament of the joint. It is commonly associated with traumatic injuries, spontaneous displacement due to hip luxation or due to breed specific shallow acetabulum, which are mostly diagnosed as sustained trauma. Closed reduction of the joint is the most common method used in Sri Lanka. However it is associated with recurrence and failure in heavy animals and canines with shallow acetabulum.

This report discusses the successful correction of the coxo-femoral joint luxation, surgically using intra-articular toggle pin technique in four canines with massive joint capsule injury and was overweighed. These cases were presented to City Pet animal hospital over a period 6 months from August 2015.

The surgery was performed in all four the patients under general anaesthesia (IV Propofol 6.6 mg/kg). The toggle was inserted by drilling the femour at an angel which will go through the femoral neck, lateral aspect near the third trochanter and finally through acetabular fossa using the bone drill. Four strands of non absorbable nylon sutures were attached to the toggle with free ends at the other end. The toggle was then passed through the hole drilled in to the acetabular fossa and was pulled to set the toggle pin parallel to the medial acetabular surface. The rear free ends of sutures were then passed through a button and were secured with several knots. All patients were recovered successfully without any incidence of re-luxation up to date.

Major disadvantages of the above method includes less successfulness in degenerative joint disease, deep incision wound which causes collection of inflammatory fluid at the site of incision. This method is most suitable in severely damaged joint capsule, chronic injuries and for animals with multiple limb injuries as it requires no immobilization of the joint supporting early weight bearing.

# MASTICATORY MUSCLE MYOSITIS (MMM) IN A DOBERMAN PINSCHER DOG: A RARE CLINICAL CASE

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Masticatory muscle myositis is an autoimmune, focal inflammatory myopathy which mainly affects the large dog breeds causing severe pain and trismus (inability to open the jaw). Masticatory muscles include the bilateral temporalis, masseter, pterygoid and rostral digastricus. These contain 2M muscle fibers, protein that structurally mimics the bacterial surface protein. Data on MMM cases reported in Sri Lanka are scarce. Therefore the objective of this paper is to make the practicing veterinarians aware about this rare clinical condition and to share the successful treatment plan.

A-3-Years old, 40Kg, intact Doberman pinscher male dog was presented to the private clinic at Malabe, with the complaint of inability to open his mouth for four days. Though he could protrude his tongue out a little bit and was able to take liquids. According to the owner it had developed over night and they have never fed any meat bones to him. Dog was properly vaccinated and he seemed hungry and showed interest in eating.

General clinical examination revealed mild fever (40˚C), moderate dehydration (5%), pink mucosa, droopy eyes, slight submandibular lymphadenopathy and orthopnoea. Jaws were rigid, leaving 1-1.5 cm gap in between. Frothy saliva was noticed at the mouth commissures. A growing bump was noticed on his forehead due to the atrophy of temporal muscles and the face was thin due to the atrophy of masseter muscles. The dog was severely depressed. Differential diagnoses were masticatory myositis, polymyositis, temporomandibular joint (TMJ) disorders, tetanus and painful oral conditions. Full blood count and urine dipstick tests were performed initially and the results were normal. External palpation and X ray radiograph of the head and neck regions ruled out the TMJ disorders. Therefore tentative diagnosis was MMM and the dog was placed on aggressive immunosuppressive treatment. Treatment was initiated with intravenous methylprednisolone succinate (30 mg/Kg) followed by 15 mg/Kg once in every 6 hours on the first day. Methylprednisolone 8mg (0.22-0.44 mg/Kg), Amoxicillin 500 mg cap (20mg/Kg), Omeprazole 20 mg spansule (1 mg/Kg) were given PO bid. One capsule of Omega 3, 6 was given once a day. Methylprednisolone acetate was administered intramuscularly (1mg/Kg) once a week for three weeks. Owner was advised to feed small portions of a gruel diet frequently. Jaw movements were completely normalized by two and half weeks. Methylprednisolone dose was gradually tapered over 4 weeks. There was a relapse after 6 months which may have caused due to the inadequate dose of corticosteroids and quick withdrawal of the prednisolone. Thereafter no relapses were reported for the next 3 years until he died of tick fever last January. Specific diagnostic tests like detection of 2M auto-antibodies and temporal muscle biopsies were not carried out due to the lack of facilities.

# AN EPISODE OF ACUTE ENTERITIS IN A CAPTIVE POPULATION OF GUANACO (*LAMA GUANICOE*)

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The guanaco (*Lama guanicoe*) belong to a group called New World Camelids, originally found in South America and one of the largest artiodactyl in the region. They are both browsers and grazers, and consume a variety of plants. National zoo, Dehiwala has maintained a herd of guanacos in two enclosures (sections) and there were both males and females in each enclosure, fed with green fodder and concentrates.

Sudden death of five adult animals (male and female) was noted during the period of three months (from November, 2015 to January 2016) and a routine health checkup including an examination of haemogram did not reveal any significant abnormalities in other contact animals. Several preventive measures such as moving of animals to another place, giving of prophylactic dose of long acting amoxicillin injection were taken. However, death was in progress.

Necropsy examinations of the first four animals were performed in the zoo and prominent lesions included hemorrhages on multiple organs including the small intestine (3/4), congested lungs (2/4), pulmonary oedema (1/4) and pulmonary emphysema (1/4). Necropsy examination of the 5$^{th}$ animal was done in the Veterinary Teaching Hospital and the prominent lesions were ecchymotic haemorrages of the jejunum; large amount of aspirated ruminal content in the trachea, bronchial tree and the lung tissue; hepatic congestion and multifocal dark discolouration of the spleen. Morphologcal diagnosis were aspiration pneumonia (severe, acute, diffuse), enteritis (severe, acute, locally extensive) and hepatic congestion (severe, chronic, diffuse). Culture of intestinal contents was positive for excessive growth of clostridium suggesting death due to complications associated with enterotoxaemia. However we were unable to isolate the toxins due to lack of facilities. The pattern of deaths, necropsy lesions and the culture results of the last death were suggestive of acute enteritis in the herd of guanaco. Stress related to captive rearing of animals including the confinement of animals in reduced spaces may have contributed to this outbreak.