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ORIGINAL ARTICLE**COMPARATIVE STUDY OF SIX ALTERNATIVE SOLUTIONS FOR EMBALMING DOGS FOR GROSS DISSECTION STUDIES**

Jojo D. Cauilan, DVM, MSc^{1*}, Bella C. Cruzana, DVM, PhD²,
 Rio John T. Ducusin, DVM, MAgr, PhD³, Ceferino P. Maala, DVM, MS, PhD²

¹*School of Veterinary Medicine, Isabela State University, San Fabian, Echague, Isabela, 3309, Philippines;* ²*Department of Basic Veterinary Sciences;* ³*Department of Veterinary Clinical Sciences College of Veterinary Medicine, University of the Philippines Los Baños College, Laguna, 4031, Philippines*

ABSTRACT

Due to its health hazards, the quest for formalin substitutes has long been going on. This study was conducted to compare the efficiency of six alternative fixative solutions as to the traditional formalin used to preserve dog specimen for gross dissection in veterinary anatomy. Dogs (n=35) in each treatment group were embalmed with 10% formalin (Treatment 1), Soap Ethanol-based Fixing Solution (Treatment 2), Weigner's Solution (Treatment 3), modified SEFS 1 (Treatment 4), modified SEFS 2 (Treatment 5), modified Weigner's Solution 1 (Treatment 6) and modified Weigner's Solution 2 (Treatment 7). Color, texture, odor characteristic, and conjunctival irritation scoring was done once a month for five months by the evaluators. Among the six alternative fixative solutions used, Treatment 6 had shown results that are most favorable for use in gross anatomical dissection. Treatment 6 can be used as an alternative fixative for gross anatomical studies considering the factors in selection of the type of fixative required for dissection such as the retention of color and texture of tissues and organs, odor characteristic, and conjunctival irritability, and including its nature of being an environmentally friendly preservative.

Keywords: Fixative, Preservatives, Cadaver, Embalming, Preservation

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INTRODUCTION

Animal dissection is a central tool used for teaching anatomy in veterinary schools as the students learn the basic constructional principles of the animal body by dissecting the specimen. In recent times, the value of dissection has been a challenging subject of discussion in developing countries due to high costs and time constraints in some veterinary medical curricula.

With the advent of new techniques and computers, alternative methods of teaching anatomy have come into existence which include a multiple range of special study modules, problem-based workshops, computers, plastic and plastinated models, and 2-dimensional and 3-dimensional models (Older, 2004).

***FOR CORRESPONDENCE:**

(e-mail: cauilanjojod@gmail.com)

ORIGINAL ARTICLE

ULTRASONOGRAPHIC FEATURES OF THE HEART, LIVER, SPLEEN, AND KIDNEYS
IN PHILIPPINE NON-DESCRIPT DOGS

Trisha T. Alina, Jezie A. Acorda, DVM, MAgr, PhD
and Arville Mar Gregorio A. Pajas, DVM, MS*

*Department of Veterinary Clinical Sciences, College of Veterinary Medicine,
University of the Philippines Los Baños, Laguna, 4031, Philippines*

ABSTRACT

The ultrasound features and measurements of the heart, liver, spleen, and kidneys of apparently healthy Philippine non-descript dogs were determined according to: sex (15 male and 10 female), age with 15 samples (≤ 3 years old) and 10 samples (> 3 years old); and weight with 14 samples (≤ 7 kg) and 11 samples (> 7 kg). A Digital Color Doppler Ultrasound System with 7.5 MHz micro-convex scanner was used. The echocardiographic parameters and indices did not show significant difference between age, sex, and bodyweight groups. Right kidney thickness in males was significantly higher than in females. Echo mean values for the liver, spleen, and kidneys did not show significant differences between age, sex, and body weight groups. The ultrasonographic features obtained in the study can be used as references for diagnosis of diseases and disorders in Philippine non-descript dogs.

Key words: *dog, echocardiography, echo mean value, liver, kidneys, spleen, ultrasound*

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INTRODUCTION

In the Philippines, there are no established data regarding the total population of dogs according to breed. Regardless, it can be observed that the Philippine non-descript dog population is quite high especially in rural areas. The Philippine non-descript dog is locally called “*aspin*” or “*askal*” which are shortened forms of the words “*asong pinoy*” and “*asong kalye*”, respectively. However, these terms are not recognized to be official names for this type of dogs. Several literatures stated that these dogs are among the mongrel breed due to their uncertain ancestry (Miklósi *et al.*, 2018).

With the occurrence of various diseases, the use of non-invasive diagnostic tools such as ultrasonography is gaining popularity. Ultrasonography is the second most commonly used diagnostic imaging tool; and the heart and abdominal organs constitute majority of

the examinations performed in dog and cats (Lattimer, 2016). Echocardiographic values and features were already established for several breeds such as Greyhound, English Pointer, Cocker Spaniel, Great Dane, Beagle, Golden Retriever, Corgi, Afghan, Newfoundland, Wolfhound, Spanish Mastiff, and Miniature Poodle (Boon, 1998). Moreover, a study by Acorda and Alegre (2011) involves ultrasonographic features of the liver, spleen, and abdominal cavity in dogs with clinical signs of abdominal distension. However, ultrasonographic values and features of various organs in apparently healthy Philippine non-descript dogs have not been established and studied.

*FOR CORRESPONDENCE:

(Email address: aapajas@up.edu.ph)

ORIGINAL ARTICLE

**ANTIDIARRHEAL EFFECT OF A COMMERCIALIZED MIXED HERBAL
MEDICINE AND IN CONJUNCTION WITH PROBIOTICS IN DIARRHEIC WATER
BUFFALO (*Bubalus bubalis*) CALVES**

**Gabriel Alexis SP. Tubalinal, DVM¹, Ryo Murata, DVM, PhD²,
Toshio Nakamori³, Misao Onuma, DVM, PhD⁴
and Claro N. Mingala, DVSM, MVSt, PhD¹***

¹Biosafety and Environment Section, Philippine Carabao Center, Science City of Muñoz, Nueva Ecija, 3120, Philippines; ²Faculty of Agriculture, Department of Animal Science, Rakuno Gakuen University, Hokkaido, 069-8501, Japan; ³Nakamori Pharmaceutical Co. Ltd., Miyazaki Techno Research Park, Miyazaki, 880-0303, Japan; ⁴Hokkaido University, Sapporo, Hokkaido, 060-0808, Japan

ABSTRACT

The study assessed the efficacy of a commercialized mixed herbal medicine in alleviating diarrhea in water buffalo (*Bubalus bubalis*) calves. The study involved 15 diarrheic water buffalo calves regardless of sex and with less than a year old from one farm divided into three treatments using randomized block design. Treatment 1 was served as control given with antibiotics and intestinal protectants.; Treatment 2 was mixed herbal medicine and probiotics and lastly, Treatment 3 was mixed herbal medicine only. The calves were treated three times a day for seven days for Treatments 2 and 3 while Treatment 1 (control) were treated once a day for 7 days. The animals were observed and scoring of diarrhea were done and recorded daily for the next 7 days. Results of the study showed significant decrease in diarrhea scores on Day 6 and 7 post-treatment in Treatments 1 and 2 compared to the control. At Day 8 post-treatment, all calves showed soft to apparently normal stool. Genetic analysis of the possible causative agent of diarrhea revealed infection caused by rotavirus A, bovine coronavirus, BVDV, and ETEC. Results revealed that diarrhea caused by these pathogens can be alleviated by the herbal medicine and herbal medicine in addition of probiotics parallel to antibiotic treatment.

Key words: calves; diarrhea; herbal medicine; water buffalo

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INTRODUCTION

Calf diarrhea is a multifaceted condition with multiple etiologic agents and pathogenesis causing economic losses directly through animal mortality and indirectly through veterinary cost and poor animal production (Srivani *et al.*, 2017; Radostits *et al.*, 2007). Water buffalo (*Bubalus bubalis*) calves are more often vulnerable to gastroenteritis causing diarrhea than bovine calves. Mortality rates in water buffalo calves due to gastroenteritis are observed to be as high as 70% while 50% was observed in bovine calves (Foster and Smith 2009; Tiwari *et al.*, 2007;

Fagiolo *et al.*, 2005).

The variance may be due to the greater vulnerability of water buffalo calves to gastrointestinal diseases than bovine, however, this may also reflect the deficiency of suitable management practices for water buffalo species as a whole (Borrielo *et al.*, 2012).

*FOR CORRESPONDENCE:
(e-mail: cmingala@hotmail.com)

ORIGINAL ARTICLE**RISK FACTOR ANALYSIS ON BOVINE MASTITIS IN DAIRY HERDS OF BATANGAS, PHILIPPINES**

Flor Marie Immanuelle R. Pilapil-Amante, DVM, MSc^{1*}, Loinda R. Baldrias, DVM, MS, PhD²,
Antonio A. Rayos, DVM, MS, PhD³, Billy P. Divina, DVM, MS²

¹*Department of Veterinary Clinical Sciences;* ²*Department of Veterinary Paraclinical Sciences, College of Veterinary Medicine;* ³*Institute of Animal Science, College of Agriculture and Food Science, University of the Philippines Los Baños, College, Laguna 4031, Philippines*

ABSTRACT

Mastitis is the inflammation of the mammary gland. It is the most costly disease in dairy cattle due to the milk production loss and culling of infected animals (Barlow, 2011). This study was conducted to estimate the prevalence of bovine mastitis and to understand the factors that predict the occurrence and the use of antibiotics in the treatment and control of mastitis in dairy cattle farms assisted by the National Dairy Authority (NDA) in Batangas, Philippines. Two thousand four hundred six (2,406) teats from 624 milking cows in 12 dairy cattle farms were subjected to the California mastitis test (CMT) last June 2016. A pretested standardized questionnaire was used to collect information on each farm. CMT results showed a 9% (215/2,406) subclinical mastitis rate and an 18% (425/2,406) clinical mastitis rate. Thirty nine percent (14/36) of the potential risk factors were identified. The practice variable: dry off treated cows without markings (P18) and the knowledge variable: incorrect knowledge on extra-label use of antibiotics leading to antimicrobial resistance (K6) remained significant ($p < 0.05$) in the regression analysis. Mastitis management is essential not only for farm economics but also for public health.

Key words: bovine mastitis, California mastitis test, risk factor analysis

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INTRODUCTION

Mastitis is the inflammation of the mammary gland as a response to the infection of bacterial, mycoplasmal, or fungal origin (Oliver and Murinda, 2012). It is recognized as the most costly disease in dairy cattle due to the discarded milk, decrease in milk production (Zhao and Lacasse, 2008), and death or culling of infected animals (Barlow, 2011). The two classifications of mastitis according to severity are subclinical and clinical. Subclinical mastitis depicts mild non-visible inflammation of the mammary gland and the milk and quarter still appear normal. It is the main form of mastitis in dairy herds, exceeding 50% of cows in given herds (Oliver and Murinda, 2012).

Subclinical mastitis may be identified by bacteriological culture of milk or by the measurement of indicators of inflammation such as Somatic cell count (SCC) and California Mastitis Test (CMT) (Barlow, 2011; Oliver and Murinda, 2012). Subclinical mastitis can be self-limiting and could heal spontaneously or it could develop within hours up to several months to clinical mastitis (Oliver and Murinda, 2012). The cost of subclinical mastitis is very difficult to quantify, but most experts agree that subclinical mastitis costs the average dairy farmer more than that of clinical mastitis (Zhao and Lacasse, 2008).

***FOR CORRESPONDENCE:**

(e-mail: frpilapil@up.edu.ph)

ORIGINAL ARTICLE**KNOWLEDGE, ATTITUDES, AND PRACTICES ON PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME OF SMALLHOLD SWINE RAISERS IN SELECTED LOCALITIES OF LEYTE PROVINCE**

Kenny Oriel A. Olana, DVM, MVE^{1*}, Loinda R. Baldrias, DVM, MVS, PhD²
 Jovencio Hubert A. Abalos, DVM, MS³, Amadeo A. Alcantara, DVM, MS³

¹*Department of Veterinary Paraclinical Sciences, College of Veterinary Medicine, Visayas State University, Baybay City, Leyte, 6521, Philippines*

²*Department of Veterinary Paraclinical Sciences; ³Department of Veterinary Clinical Sciences, College of Veterinary Medicine, University of the Philippines Los Baños, College, Laguna, 4031, Philippines*

ABSTRACT

Porcine Reproductive and Respiratory Syndrome (PRRS) is a viral disease that causes significant production and economic losses to swine raisers. This study aimed to assess the knowledge, attitudes, and practices (KAP) of backyard and small-hold swine raisers in Leyte towards PRRS. Data were gathered from 104 small-hold and backyard swine raisers in 11 localities in Leyte through questionnaire-interview. KAP levels were determined by performing descriptive statistics. Predictors and associated variables were verified through univariate and multivariate regression analyses. The majority of the respondents have poor knowledge (90, 86.54%) and practices (88, 84.62%) on PRRS. Nevertheless, majority (65, 62.5%) have good attitudes towards the control and prevention of PRRS. Education ($p < 0.0001$) and the number of years of experience (1-5 years, 6-10 years, and 16-20 years; $p < 0.0001$) in raising pigs seem to have an important role in the knowledge and practices of the farmers. Information, education, and communication (IEC) campaigns on PRRS can be a very helpful tool to educate the farmers and improve their knowledge and practices on economically important swine diseases.

Key words: knowledge, attitudes, practices, backyard farm, Leyte, PRRS

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INTRODUCTION

Porcine Reproductive and Respiratory Syndrome (PRRS) is a viral disease that can cause significant production and economic losses. PRRS is caused by an enveloped, RNA *Arterivirus* (Stadejek *et al.*, 2008; Dietze *et al.*, 2011). PRRSv strains produce common signs which include reproductive loss or failure in breeding animals, post-weaning pneumonia, and increase mortality in growing pigs (Dietze *et al.*, 2011; Rahe and Murtaugh, 2017).

In the Philippines, an outbreak of atypical PRRS has occurred in Central Luzon in 2007 causing high mortality and morbidity with case fatality rates reaching almost 40% resulting to great economic loss. Prevalence and mortality rate were highest in the Municipality of Candaba in Pampanga ranging from 3.24% to 10.76% (Baltazar, 2009; Cudal, 2009; Dumenden, 2009).

***FOR CORRESPONDENCE:**

(e-mail: kaolana@up.edu.ph)

ORIGINAL ARTICLE**BIOSECURITY ASSESSMENT AND TRADING NETWORK ANALYSIS OF DUCK FARMS IN CANDABA, PAMPANGA, PHILIPPINES**

Neil Tanquilut^{1,2*}, Maria Victoria Espaldon², Decibel Eslava², Rico Ancog², Celia Medina³, Michelle Grace Paraso⁴, Ronnie Domingo⁵, and Reynaldo Bundalian Jr⁶

¹College of Veterinary Medicine, Pampanga State Agricultural University, Magalang, Pampanga, 2011, Philippines; ²School of Environmental Science and Management, University of the Philippines Los Baños; ³Crop Protection Cluster, University of the Philippines Los Baños; ⁴College of Veterinary Medicine, University of the Philippines Los Baños, Laguna, 4031, Philippines; ⁵Bureau of Animal Industry, Department of Agriculture, Quezon City, 1100, Philippines; and ⁶Center for Advanced Research and Innovation, Angeles University Foundation, Angeles City, Pampanga, 2009, Philippines

ABSTRACT

The Philippine duck industry has seen a steady growth in recent years. However, the industry's association with bird flu in 2017 and the apparent low compliance to strict biosecurity were feared to set back its development. Through face to face interviews, compliance of 171 duck farms in Candaba, Pampanga to basic biosecurity measures was assessed. Majority (69%) of farms had poor compliance to these measures while 14% (24/171) and 17% (29/171) had moderate and good compliance, respectively. The trading network was also analyzed using social network analysis which revealed the wide distribution of duck and duck products on a local, regional, and national scale (reaching even to Visayas and Mindanao). The network also brought to light the importance of middlemen in the network. The results of this study suggest the need to craft appropriate policies to improve compliance to biosecurity measures in this industry. Up-scaling of the backyard style of operation and management of the industry is highly recommended. Furthermore, this study may offer a new perspective in crafting policies for disease prevention, surveillance, monitoring, and control of duck diseases and zoonosis. To our knowledge, this is the first report in the Philippines that assessed biosecurity and analyzed trading networks in duck farms.

Key words: biosecurity assessment, duck farms, social network analysis

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INTRODUCTION

Duck raising is recently becoming a more competitive enterprise which provides good income particularly for the marginalized sector in the country. As of January 2019, the total duck inventory in the country stood at 11.58 million birds, with Central Luzon as the region with the highest contribution, followed by Region 12, and Western Visayas (PSA, 2018).

These regions contributed 58.06% to the

total duck population in the country. Majority of ducks were raised in commercial farms of Central Luzon, Bulacan, Nueva Ecija, Pampanga, and Tarlac are the four provinces in Central Luzon with the greatest number of ducks.

***FOR CORRESPONDENCE:**
(e-mail: neil@psau.edu.ph)

ORIGINAL ARTICLE

ULTRASONOGRAPHIC FEATURES OF FETAL GROWTH IN SOWS FED ACTIVATED INSULIN LIKE-GROWTH FACTOR I-SUPPLEMENTED FEED

Harrah Grace L. Magsino, DVM, Arville Mar Gregorio A. Pajas, DVM, MS*
and Jezie A. Acorda, DVM, MAgr, PhD

*Department of Veterinary Clinical Sciences, College of Veterinary Medicine,
University of the Philippines Los Baños, Laguna, 4031, Philippines*

ABSTRACT

Insulin-like growth factor I (IGF-I) is a 70 amino acid long polypeptide hormone involved in metabolic regulation of growth and reproduction in livestock. The present study was conducted to determine the effects of dietary supplementation of activated IGF-I on porcine fetal growth using real-time B-mode ultrasonography. Thirty-seven crossbred pigs were randomly assigned to different treatments composed of basal gestation diets with 0, 0.25, 0.5, and 1 kg/ton activated IGF-I. Feeding trial started from Day 1 post-breeding until farrowing. Dietary supplementation of 1 kg/ton activated IGF-I significantly increased the gestational sac diameter at Day 21, biparietal head diameter at Day 75, and abdominal circumference at Day 100. Sows supplemented with activated IGF-I regardless of inclusion rate had fetuses with high abdominal circumference at Day 75 compared with the control. At birth, average litter weight had an increasing trend with increasing IGF-I concentration. The results obtained in this study demonstrated the potential of activated IGF-I supplementation in increasing fetal growth and consequently, swine production performance.

Keywords: activated IGF-I, fetal growth, insulin-like growth factor I, swine, ultrasonography

Philipp. J. Vet. Med., 57(1): 87-96, 2020

INTRODUCTION

Among livestock mammals, intrauterine growth restriction in fetuses occurs the most in pigs causing lifetime negative impacts on the offspring which can even be carried over to the succeeding generations (Ji *et al.*, 2017). Fetal growth and development can be enhanced by optimizing maternal nutrition as sows serve as reservoir of nutrients for fetuses (McPherson *et al.*, 2004). Recent studies have shown the effects of insulin-like growth factor I (IGF-I) in promoting cellular mitosis leading to increased growth rate (Laron, 2001).

IGF-I, in its raw form, is bound to a complex preventing it from being utilized by the body. Through bioactivation process, IGF-I is liberated into its functional form thus, termed

as activated IGF-I. This enables the immediate bioavailability of functional proteins, therefore improving its utilization in the body. Dietary supplementation of activated IGF-I in gestation diets claimed to increase fetal growth, which improves the average litter weight of piglets at birth (Reyes *et al.*, 2016).

Previous trials have shown the effects of dietary supplementation of activated IGF-I in sows at different stages of swine production.

***FOR CORRESPONDENCE:**

(e-mail: aapajas@up.edu.ph)

RESEARCH NOTE**SURFACE MUCOSA OF THE UTERINE TUBES OF SEXUALLY MATURE PHILIPPINE WATER BUFFALO (*Bubalus bubalis* LINN.) UNDER SCANNING ELECTRON MICROSCOPE (SEM)**

Virgilio D. Viernes Jr., DVSM, MSc, PhD

*Department of Morphophysiology and Pharmacology, College of Veterinary Science and Medicine, Central Luzon State University, Science City of Muñoz, Nueva Ecija, 3119, Philippines***ABSTRACT**

Surface mucosa of the uterine tubes of sexually mature Philippine water buffalo was described using 12 specimens from apparently healthy animals. Specimens were dissected to identify the four major subdivisions such as the infundibulum, ampulla, isthmus, and uterotubal junction. Each subdivision was longitudinally cut into two equal halves then pre-fixed using 10 percent formalin. After 24 hours, it was then subjected to routine scanning electron microscopy technique. Processed specimens mounted on metal stubs were observed under the scanning electron microscope. The surface mucosa of each subdivision showed a marked variation in the appearance of the epithelial structures such as the peg cells, goblet cells, and cilia. The peg cells were interspersed between clumps of cilia which were irregularly distributed on the mucosal surfaces. The cilia sometimes merged with each other, and can be mistaken as goblet cells. The orientations were varied even projecting to different directions and could be found in group or merged with each other. These irregular patterns were attributed to the abnormal estrous cycle or poor breeders such as those animals in the slaughter house where the specimens were collected.

Keywords: Uterine tube, scanning electron microscopy, Philippine water buffalo, surface mucosa, uterotubal junction

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INTRODUCTION

In Philippine agriculture, the water buffalo plays an important role in almost all operations such as ploughing, harrowing, and leveling agricultural land; pulling carts, sledge, bamboo poles, and logs; pressing oil from seeds, extracting juice from sugarcane, and pumping water from wells (Momongan, 1985; Majid, 1992 and Sarabia, 1994). With the 2.88 million heads of Philippine buffalo (Philippine Statistics Authority, 2019), an approximate of 72 percent of this is used

for farm operations. In fact, according to Roque (2010), the Philippine water buffalo is contributing a total of about PhP 3.30

billion in the agricultural economy.

Recognizing its economic importance, the Philippine Carabao Center has developed and used modern techniques in artificial insemination, in vitro fertilization, multiple ovulation and ovum transfer, somatic cell nuclear transfer, ovum vitrification, and semen cryopreservation for the reproduction improvement of the Philippine water buffalo. However, the detailed basic anatomy of the reproductive system is still scattered and in aimless state.

FOR CORRESPONDENCE:

(e-mail: virgilio_viernes@ymail.com)

RESEARCH NOTE**NASAL CARRIAGE OF METHICILLIN-RESISTANT *Staphylococcus aureus* (MRSA) AMONG HOSPITALIZED DOGS IN NUEVA ECIJA, PHILIPPINES**

Paul A. Cardenio, DVM^{1*}, Ronalie B. Rafael, DVM, MS¹, Yasser C. Cabansag, DVM²,
Apolinario V. Yambot, PhD²

¹*College of Veterinary Science and Medicine, Central Luzon State University;*

²*College of Fisheries - Molecular Biology and Biotechnology Laboratory,
Central Luzon State University, Science City of Muñoz,
Nueva Ecija, 3120, Philippines*

ABSTRACT

Dogs are potential carriers of methicillin-resistant *Staphylococcus aureus* (MRSA) which is an emerging public health concern. This study was performed to isolate and characterize MRSA from the nasal vestibule of hospitalized dogs. Nasal swabs were collected from 50 dogs with skin and respiratory problems from five veterinary clinics in Nueva Ecija, Philippines. The samples were enriched in Trypticase Soy Broth supplemented with 6.5% NaCl, then purified in 5% egg yolk-tellurite supplemented Baird-Parker media. Selected colonies were transferred to Brain Heart Infusion Broth and cultured in MRSA chromogenic agar supplemented with cefoxitin. The DNA was extracted and was subjected to multiplex PCR. The antimicrobial susceptibility pattern was determined using disk diffusion method. A total of 31 dogs had coagulase-positive Staphylococci. Nasal carriage rate of MRSA among hospitalized dogs was 2%. Multiplex PCR positively detected 16S rRNA, *femA* and the MRSA resistance gene, *mecA*. The isolate was negative for *luk-S* gene, responsible for Panton-Valentine Leukocidin. Antimicrobial susceptibility test revealed that the isolate was resistant to clindamycin, erythromycin and rifampicin, intermediate resistant to trimethoprim-sulfamethoxazole, and susceptible to tetracycline, ciprofloxacin and gentamicin. This study proves the presence of MRSA in hospitalized dogs in the study area through bacterial isolation and multiplex PCR.

Key words: Dog, *femA*, *mecA*, MRSA, Philippines

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INTRODUCTION

Staphylococcus aureus is a critically important human pathogen that is also an emerging concern in agriculture and veterinary medicine due to its rapidly evolving resistance to many antibiotics particularly β -lactam antibiotics, including penicillins, cephalosporins, carbapenems, and their derivatives (Lakhundi and Zhang, 2018). Since 1960, methicillin-resistant *Staphylococcus aureus* (MRSA) has been causing hospital-associated infections throughout the world. Hospitalized human patients acquiring these resistant bacteria could develop severe

pneumonia, soft tissue and surgical site infections, and bacteremia that may result to death (Datta and Huang, 2008; Shuping *et al.*, 2017). However, a recent epidemiological shift has been observed as MRSA started to prevail in the community and livestock animals (Cuny *et al.*, 2015; Loewen *et al.*, 2017) MRSA infections may occur outside and independent of hospitals, caused by community associated MRSA (CA-MRSA).

***FOR CORRESPONDENCE:**

(e-mail: pacardenio@clsucvsm.edu.ph)

RESEARCH NOTE

PRE- AND POST-PARTURITION INSULIN RESISTANCE IN GHEZEL EWES (*Ovis aries*)

Aliasghar Chalmeh, DVM, PhD*, Abdollah Mirzaei, DVM, PhD, Mehrdad Pourjafar, DVM, PhD, Khalil Badiei, DVM, PhD, Mohammad Mazrouei Sebdani, DVM, Iman Saadat Akhtar, DVM, Mohammad Hadi Zarei, DVM

Department of Clinical Sciences, School of Veterinary Medicine, Shiraz University, Shiraz, Iran

ABSTRACT

While there are several studies on insulin resistance in ruminants, information regarding this phenomenon in Ghezel ewes as a fat-tailed breed is rare. In the present study, the intra-venous glucose tolerance test was performed to evaluate insulin resistance in sheep. Five adult Ghezel ewes were selected at 4 weeks before parturition and followed at 2 weeks before, 2 and 4 weeks, and 2, 3, and 4 months after parturition. A blood sample was taken and dextrose 50% was administered at 500 mg/kg, 10 ml/kg/hour. Blood samples were collected from all ewes prior to and 1, 2, 3, and 4 hours after dextrose infusion to analyze glucose and insulin levels. The glucose and insulin levels at Hour Four remained significantly higher than Hour Zero in pre parturition periods. Despite presence of high concentrations of insulin, high levels of glucose were seen in pre parturition periods which represented insulin resistance in these periods. Finally, the highest degree of insulin resistance was observed at pre parturition periods in Ghezel ewes and it may be concluded that protecting the ewes from insulin resistance at pre parturition periods may manage their metabolic healthiness.

Key words: insulin resistance, metabolic disorder, obesity, pregnancy, Ghezel ewe

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INTRODUCTION

Glucose requirements of mammary gland and gravid uterus during lactation and pregnancy can equal or even exceed its requirements of the rest of body in ruminants (Bionaz *et al.*, 2012). These animals derive little glucose from their diet due to fermentation of carbohydrates in the rumen and so have to synthesize most of their glucose requirements by hepatic gluconeogenesis (Morrison *et al.*, 2010). Lactation and pregnancy, thus, significantly increase gluconeogenesis in ruminants (Wilkinson and Garnsworthy, 2017). This need for extra gluconeogenesis is partly diminished by a decrease in glucose utilization by adipose tissue during lactation and pregnancy in ruminants (Wilkinson and Garnsworthy, 2017).

Pregnancy and lactation can be considered as physiological periods during the ewe's life. Following the increasing fetal and mammary demands, and maternal energy requirements, alterations in partitioning and utilization of maternal nutrients must occur (Regnault *et al.*, 2004). These adaptations are regulated by changing blood concentrations of regulatory metabolites and hormones, together with changes in target tissue responsiveness.

*FOR CORRESPONDENCE:

(e-mail: achalmeh81@gmail.com)

CASE REPORT**DIAGNOSIS AND MANAGEMENT OF VARROOSIS IN EUROPEAN HONEY BEES, *Apis mellifera* L., (HYMENOPTERA: APIDAE) IN AN APIARY**

John Paul F. Galvez, DVM¹, Richard D. Lagrimas, MS², Riva Marie C. Gonzales, DVM, MPH²,
Jesalyn L. Constante, DVM, MS³, Remil L. Galay, DVM, PhD^{4*}

¹*College of Veterinary Medicine, University of the Philippines Los Baños;*

²*Animal Disease Diagnosis Reference Laboratory, Veterinary Laboratory Division, Bureau of Animal Industry, Visayas Avenue, Quezon City, 1128, Philippines*

³*Department of Veterinary Clinical Sciences; ⁴Department of Veterinary Paraclinical Sciences College of Veterinary Medicine, University of the Philippines Los Baños, College, 4031, Laguna, Philippines*

ABSTRACT

Varroosis is one of the most destructive parasites of the European honey bees *Apis mellifera*. Due to the spill-over from its natural host, the Asian honey bee, *Varroa destructor* has devastating effects in its alternate host as the bees have not yet developed immunity against the parasite. In this case, dissection of the trachea, removal of the gut and wet mount preparation, and sugar shake method were conducted to examine for suspected pathogens including mites. Approximately 300 European honey bees were sampled for the sugar shake method and 30 honey bees were sampled for tracheal dissection and gut removal. Diagnostic tests showed negative results for *Nosema* spores, tracheal mites, and *Tropilaelaps*. The sugar shake method revealed a positive result for *Varroa destructor* with a 5% infestation. Impregnated flumethrin strips were used as varroacide treatment. The sugar shake method and mite fall monitoring were used as part of management practices. Recommendations include rotation of miticide use, implementation of biotechnical methods and integrated pest management, requeening, re-stocking with *Varroa*-resistant bees, and veterinary supervision of the apiary. Being the most important parasite of honey bees, proper treatment and management are needed in reducing its number to that which is below the economic threshold.

Keywords: *Apis mellifera*, colony, honey bees, *Varroa destructor*, Varroosis

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INTRODUCTION

The apiculture industry in the Philippines started in the 1980s and since then, has already faced various challenges. With the growing number of colonies due to expanding operations, pests and diseases have also started to plague the industry and affect the health of honey bees. One of the most important commodities gained from apiculture is honey. Other products like propolis, beeswax, bee-collected pollen, royal jelly, and honey bee venom. These are important in local and international trade for purposes

of both human consumption and bee-keeping (Attfield, 2001). The European Honey Bee, also known as Western honey bee (*Apis mellifera*), is considered as the most important species in commercial honey production. Nevertheless, this species is greatly affected by confounding factors (i.e. pests and diseases, pollution and habitat loss, and detrimental beekeeping practices).

***FOR CORRESPONDENCE:**
(e-mail: rlgalay@up.edu.ph)