INTRAMUSCULAR FAT AND SEVERAL FACTORS AFFECTING INTRAMUSCULAR FAT DEPOSITION IN BEEF CATTLE

Vol 95. January, 2019. Pp. 2-16

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Intramuscular fat or marblingin beef cattle is one of the most important factors affecting meat quality, primarily to flavor, juiciness and tenderness. Deposition of intramuscular fat is greatly influenced by the genetics, nutrition and animal management. This review describes the formation and development of adipose tissue in cattle during growth and some genes involved. Research on the genetic background of cattle including breed, gender and heritability are discussed. Recent advances in animal nutrition has applied to enhance the accumulation of intramuscular fat, but not subcutaneous fat. Management srategies, including castration, early weaning, slaughter weight and age affecting the accumulation of intramuscular fatare also discussed. The coordination of several factors could have better influence on improving IMF content. Therefore, a combination of several strategies may be needed to manipulate IMF content in cattle, depending on the customer's beef preference.

Keywords: *Beef cattle, Intramuscular fat, Genetics, Nutrition, Animal management.*

USE OF DIETARY NITRATE TO REDUCE METHANE PRODUCTION AND PROVIDE NON-PROTEIN NITROGEN FOR RUMINANTS

Vol 95. January, 2019. Pp. 17-25

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This study presents an introductory overview of the mechanism of methane production (CH_4) in the rumen of ruminants, and through that understanding to enable scientists to experiment with different nutritional strategies to inhibit the formation of CH_4, a byproduct of microbial fermentation. The process of generating CH_4 causes wastage of 5 to 7% of the total crude energy intake for the fiberous enriched diet, equivalent to producing 16 to 26 g CH_4 per kg of dry matter. Use of dietary nitrate is the current nutritional strategy that has been evaluated to effectively provide a stable CH_4 reduction in ruminants. Rumen microbes are able to transform nitrate into ammonia, which is a source of nitrogen for microbial synthesis of essential amino acids. Free hydrogen (H_2) invloves in the conversion of nitrate to ammonia, thus creating H_2 competition with the formation of CH_4 ($CO_2 + H_2 \rightarrow CH_4$). Although nitrate is not toxic to ruminants, nitrite is, since nitrite combines with hemoglobin to convert to methaemoglobin, which is not able to transport oxygen, thus supplementing dietary nitrate to ruminants must follow the recommended dose and provide rumen microbes a time to adapt.

Keywords: *methane, nitrate, NPN, ruminants*

ASSESSMENT POSSIBILITY GROWTH AND FOR MEAT OF BROILER CHICKENS RITN

Vol 95. January, 2019. Pp. 26-33

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The experiment was conducted at a research station for Pho Yen chicken in 2016 with the objective of evaluating the growth and meat production of hybrid chicken RiTN. Using the economic hybrid method between cocks Ri and hens TN3 hens to create hybrids and arrange experiments according to the method of plotting a completely random factor (CRD) to identify possibilities for meat hybrid chicken RiTN. Results grow to 14 weeks of age showed that: survival rate 96.67%; body weight gain 2208,87g, heterosis was 7.44%; FCR was 3.13kg, heterosis was -4.93%; carcass rate was 76.43%; meat thighs 22.26% and lean meat ratio was 20.02%.

Keywords: *hybrid chicken RiTN, body weight, heterosis*

POSSIBILITY FOR MEAT OF BROILER CHICKENS RITP IN THUY PHUONG POULTRY RESEARCH CENTER

Vol 95. January, 2019. Pp. 34-42

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The experiment was conducted at Pho Yen chicken research station from August to December 2016 with the aim of assessing the growth and meat yield of RiTP hybrid chicken. Using economic hybrid method between chicken Ri and chicken TP1 and to determine the ability of RiTP hybrids. Arrangement of experiments using a lottery model to model a completely random factor (CRD) to determine the ability of RiTP hybrids. Results of raising meat up to 14 weeks showed that the body weight of RiTP chicken reached 2070.47g, the hybrid weight of the body of RiTP chicken was 2.27%; The feed consumption per kg of RiTP chickens was 3.18 kg, and the crossbreeding value of crossbred rats was -3.83%. The effectiveness of raising 100 Rieng hybrid chickens for income was 3706.30 thousand VND increased 8.82% compared to Ri and 33.95% compared to chicken TP1. Ratio of chickens RiTP chickens is 74.64%, the rate of thigh meat is 22.10%, the rate of breast meat is 19.78%.

Keywords: *hybrid chicken RiTP, heterosis, body weight*.

DETERMINATION OF APPROPRIATE CUTTING TIME, METHOD AND STORAGE TIME OF GRASS VA06 FOR SILAGE

Vol 95. January, 2019. Pp. 43-51

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The determination of appropriate harvesting time, methods and storage time for making silage is important to provide adequate and quality feed for cattle. The experiment was conducted in Mai Son district, Son La province from March 2017 to June 2018. The VA06 grass was studied at harvesting times of 40, 45, 50 days after the first havesting to determine the appropriate havesting time. In order to study the method and duration of storage, three different silage methods (silage built of brick, plastic bags, silage digging) were prepared. The experiment evaluated the color, odor and chemical composition of the silage at the time of storage at 0,1,2,3,4,5 month. The harvesting time of 45 days was the highest yield of green matter and highest protein yield, which ensured that the quality of grass for silage processing was 181.31 and 3.19 ton/ha, respectively per year. After 5 months of preservation, the method of making silage (with 20 cm of dry straw under the bottom of the hole) gave the best quality of silage and the longest preservation time (5 months). The lossing of protein and dry matter is low. At 5 months of presevation, the crude protein value is 10.58% and the dry mattter is 20.95%, pH value lower 4.2. For silage digging and plastic bag method have low quality of silage, after 2 months of preservation appeared white mold from 1-3 cm thick. If the time of preserving is longer the white mold became thicker and preserve only be in 1-2 months for good quality.

Keywords: *Silage, presevation, quality, havest.*

EFFECT OF DIFFERENT SUPPLEMENTS OF ARGININE IN DIETS ON GROWTH RATE, NUTRIENT DIGESTIBILITY AND NITROGEN RETENTION OF CROSSBRED RABBITS (CALIFORNIAN × LOCAL)

Vol 95. January, 2019. Pp. 52-60

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A study was conducted at the experimental farm in Long Hoa commune, Binh Thuy district, Can Tho city to evaluate effects of different supplement levels of arginine in diets on growth rate, nutrient digestibility and nitrogen retention of growing crossbred rabbits (Californian x local). The trial was a completely

randomized design with 5 treatments and 3 replications. The treatments were 5 arginine supplement levels of 0, 0.15, 0.30, 0.45 and 0.60% of DM intake (correspondings to the AR0, AR0.15, AR0.3, AR0.45 and AR0.60 treatments). There were 4 growing crossbred rabbits at 6 weeks of age (balanced sex) per experimental unit and the experimental time lasted for 12 weeks. The results showed that daily intakes of dry matter, metabolizable energy and other nutrients were not significantly different among the treatments ($P>0.05$). The rabbits supplemented from 0.30 to 0.6% arginine in diets improved weight gain, final live weight, digestibilities of DM, OM, CP, EE and NDF ($P<0.05$). Thus, it was concluded that at level of 0.45% arginine supplementation (DM) in diet gave the highest on daily weight gain, final live weight and most of nutrient digestibility and nitrogen retention.

Keywords: *Arginine supplement*, *crossbred rabbit,, weight gain, digestible nutrient*

EFFECT OF VITAMIN E SUPPLEMENTIN DIETS ON REPRODUCTIVE PERFORMANCE OF CALIFORNIAN RABBITS

Vol 95. January, 2019. Pp. 61-71

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A study was conducted at the experimental farm in Binh Thuy district of Can Tho city to evaluate effect of vitamin E supplement in diets on reproductive performance of Californian does. A total of 30 rabbits from 5 to 6 months of age were arranged in a completely randomized design with 5 treatments and 6 replicates with 1 doe per experimental unit and the trial was done for 2 litters. The treatments were 5 different vitamin E supplement levels of 0, 0.1, 0.2, 0.3 and 0.4 g/head/day, corresponding to E0, E0.1, E0.2, E0.3 and E0.4 treatments, respectively. The results for two litters show that daily intakes of DM and most of nutrient were not significantly different ($P>0.05$) among the treatment, exception for vitamin E intake increased with increasing vitamin E levels in diets ($P<0.05$). The litter size at birth and at weaning and live weight at weaning per litter were significantly ($P<0.05$) higher for the E0.3 and E0.4 treatments. The daily milk yield of does (g/doe) was significantly the highest ($P<0.05$) for the E0.3 treatment in both 2 litters. It was concluded that supplementation of vitamin E in the diets improved reproductive performances of Californian does and at level of 0.3 g/head/day has the highest daily milk yield and better profit.

Keywords: *E vitamin, live weight at birth, litter size at weaning, milk yield*

THE INVESTIGATING OF MILK FEVER (HYPOCALCEMIA) ON DAIRY HEARD IN VIETNAM CONDITION

Vol 95. January, 2019. Pp. 72-83

Ngo Dinh Tan, Tang Xuan Luu, Tran Thi Loan, Dang Thi Duong, Khuat Thi Thu Ha, Phung Quang Truong, Nguyen Yen Thinh, Khuat Thanh Long, Phung Thi Dieu Linh and Phung Quang Than

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Hypocalcemia is a complex metabolic disorder that occurs at the onset of lactation. Clinical symptoms of this disease include inappetence, tetany, lateral recumbency, and eventual coma and death if leaft untreated. To evaluation of the current situation of milk fever in dairy herds in Vietnam, therefore, the objective was investigating the hypocalcemia status in lactating dairy farm. This work was conducted in smallholder dairy farm in the North and Southern of Vietnam. The survey also investigated the ration of the hypocalcemia cows to analysis the effect of feeding method on this disorder. The results were showed that, incidence of milk fever on dairy cow was increasing at first three month of lactation, and so need prepare the strategies to prevention the hypocalcemia in dairy herd. Milk fever mainly occurred in high milk yield dairy cow in first and second month of early lactation and have manifestations include reduce body temperate, placental retention. Hypocalcemia increasing effected with higher in the cow with high milk yield and body condition. In addition, the ration of dairy cows in dry period was showed at dietary cation anion difference (DCAD) was 176.83 mEq/kg DM may incidence of milk fever in early lactation

Keywords: *Dairy cow, hypocalcemia, ration*.

EFFECT OF CREAM CONTAINING SILVER-CHITOSAN NANOPARTICLES ON THE ABILITY TO PREVENT INFECTION, MASTITIS

Vol 95. January, 2019. Pp. 84-96

Tran Thi Loan, Dang Thi Duong, Nguyen Hong Nhung, Nguyen Hoai Chau, Tran Van Tua, Dao Trong Hien, Phung Thi Dieu Linh, Khuat Thi Thu Ha, Nguyen Ba Tuyen, Tang Xuan Luu and Ngo Dinh Tan

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The study was conducted at Bavi Cattle and Forage Research Centrer to evaluated of effects of cream containing silver-chitosan nanoparticles on prevention and treatment of mastitis on dairy cow. The experimental was conducted at laboratory work to evaluated the effect of the produc on *S.aureus, E.coli* and *P.aeruginosa*; and using the pregnancy dry cows and milking cows for prevention and treatment effectively of the cream containing silver-chitosan nanoparticles. The results were showed that: Cream containing silver-chitosan nanoparticles in the range of 50-250ppm effected on against bacteria such as *E.coli, P.aeruginosa* and *S.aureus*. The Cream containing silver-chitosan nanoparticles can used as mastitis treatment, prevention, and reduced the SCC effectively without negative effect on health cows teats. Especially effective in the prevention and treatment when combined with other antibiotics.

Keywords: *Silver-chitosan nanoparticle; mastitis, dairy cows*

SELENIUM IN ANIMAL NUTRITION: METABOLIC PATHWAYS AND ANIMAL RESPONSES

Vol 96. February, 2019. Pp. 2-13

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Livestock animals are not able to synthesize selenium (Se), a trace element, but it is a major component of many enzymes such as glutathione peroxidase, thioredoxin reductase and deiodinases. These enzymes are primary defenses of the body against reactive oxygen species and lipid hydroperoxides to ensure normal cellular function. Organic Se such as selenium-enriched yeast exhibits better absorption, greater retention and higher accumulation of Se in blood and tissues compared with inorganic Se such as selenite and selenate. Supplementation of Se to females during late pregnancy and lactation would be beneficial to maintain the Se metabolic requirement and reduce the oxidative stress experienced by the transition periods. The newborn are dependent on milk intake containing Se transferred from the mother to deal with the oxidative stress. The recent research shows that supplementation of Se in diets of livestock animals increase antioxidant activities, but this does not always relate to the increased animal productivity, reproductive performance and meat quality. However, to give livestock animals a chance to affectively cope with environmental challenges, there should be enough Se reserves available and an ability of building Se reserves in the body via dietary Se is important in farm animal nutrition.

Keywords*: Antioxidant, glutathione peroxidase, trace elements.*

LAMB PRODUCTIVE PERFORMANCE, CARCASS AND MEAT QUALITY RESPONSES TO ALPHA LINOLENIC ACID RICH VEGETABLE OIL SUPPLEMENTATION - A REVIEW

Vol 96. February, 2019. Pp. 14-25

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The current review provides an overview ofomega-3 long chain polyunsaturated fatty acids (n-3 LC-PUFA) health benefits and the recent progress in using alpha linolenic acid (ALA) rich sources derived from oilseeds to enhance productive performance, n-3 PUFA profiles and sensorypropertiesof lamb for human consumption. In general, the supplementation of oilseeds and (or) their oils into low energy density diets can improve lamb

growth, carcass traits and eating quality because of increase in metabolisable energy intake and intrmuscular fat level. In iso-energetic and iso-nitrogenous diets, supplementing with ALA rich sources at or below 6% (dry matter basis) to seems unlikely to affect lamb dry matterintake, growth, carcass and sensory properties. Moreover, the inclusion of ALA rich sources in lamb diet potentially increase ALA content and reduce the omega-6/omega-3 PUFA ratio in lamb meat. It is suggested that supplementing with ALA rich sources at or below 6% (dry matter basis) to ruminant diets might promote n-3 PUFA profiles in lamb meat and is unlikely to have negative effects on feed intake, growth, carcass and sensory properties.

Keywords: *alpha linolenic acid,lamb, meat quality, canola, flaxseed, dietary supplementation*

INVESTIGATION OF REPRODUCTION, MILK YIELD AND GROWTH OF SAANEN GOAT IN TIEN GIANG PROVINCE, VIETNAM

Vol 96. February, 2019. Pp. 26-31

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The study was carried out on 24 female Saanen goats with 12 of first and 12 of second lactation periods and their 24 kids at Tam Hiep farm located in hamlet 6, Tam Hiep village, Chau Thanh district, Tien Giang province, Vietnam from May 2017 to May 2018. Reproductive data of Saanen goats were recorded on estrous cycle, gestation length, litter number, litter size at birth, litter size at weaning, preweaning mortality, percentage of male and female. Growth performance of kids were measured into 6 months. The experimental animals of study were housed in individual pens. Results showed that the average number of newly born kids, survival rate, percentage of male and female were from 1.33 to 1.42 kids/litter, from 88.9 to 89.5% and from 44 to 47%, respectively. The weight of kids at newborn, three and six months of age were 3.52 and 3.37 kg; 10.3 and 9.25 kg; 20.63 and 18.95 kg, respectively. Milk production of the first lactation period was 250.2 liters with average 1.19 liters/day/head which was lower than in the second lactation period 305.4 liters with average 1.45 liters/day/head ($P < 0.05$). Milk yield increased and reached up to the peak at the 2, 3 and 4^{th} month; then milk yield was gradually declined in the 5 - 7^{th} month ($P < 0.05$). The milk yield of the Saanen crossbreed was lightly lower than with recent studies, but it is promising adequate in the region.

Keywords: *Saanen goat, reproduction, milk yield, growth performance*

EFFECTS OF SUPPLEMENTING TANNIN-RICH SHRUBS TO BASAL DIET OF WATER SPINACH ON GROWTH AND MEAT PRODUCTION OF GOATS

Vol 96. February, 2019. Pp. 32-37

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Sixteen growing male Bach Thao goats with average live weight of 14.9 ± 0.48 kg were used in a C*ompletely* Randomized Design (CRD) with 4 replications and four treatments. The four treatments were water spinach ad libitum and concentrate; water spinach ad libitum and concentrate plus *Camellia sinensis;* water spinach ad libitum plus *Mimosa pigra*; water spinach ad libitum plus *Leucaena leucocephala*. Water spinach was offered ad libitum with the amount of 120% of average daily intake. Concentrated supplementation was fed at 120 g/head/day. The trial lasted 90 days. The results showed that the intake of DM, organic matter and crude protein significantly increased ($P<0.05$) with supplying tannin-rich shrub in the diets. Daily gain and feed conversion ratio also significantly enhanced when increasing the dietary tannin content of tannin-rich shrub ($P<0.05$). The study showed that nutrition was improved by increasing tannin-rich shrub in diets of growing goats, improved feed intake and feed conversion ratio, and consequently increased growth rates.

Keywords: *Growing goat, productivity, feed conversion ratio, supplementation, tannin*

ENSILING STEMS OF BANANA WITH SILAGE ADDITIVE AND WITH OR WITHOUT BIOCHAR

Vol 96. February, 2019. Pp. 38-44

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An experiment was carried out at laboratory to evaluate the effect of silage additives and biochar on nutritive value and fermentation status of banana pseudo stem. Banana stems were colledted at Long Xuyen city, An Giang province in Vietnam, and were chopped into small pieces (1-2 cm in length) and ensiled in plastic bags (2 kg of capacity) with silage aditives (sugar cane molasses 15%, yeast 3%, urea 3%, DAP 1% (all on DM basis)) with and without biochar 1%. Each silage additive was repeated three replicates, ensiling periods 0, 7, 14, 21 and 28 days. Samples were taken to analyzing for pH, DM, NH3-N, CP, CF and OM. Physical characteristics (smell, colour and mould growth) were also observed and recorded. For visual observation after 7 days, the colour of treatments without additives or containing molasses, yeast and without biochar had changed from yellow to light brown and darker at treatment added biochar. These treatments had a pleasant odour of lactic acid and were low of the pH (<5). Visible mould growth was observed at treatment containing DAP. The addition of urea had a dark brown in colour with unpleasant odour, were low of DM but high of pH (>5). The concentration of CP was had increased with the time of ensiling. The ammonia-N concentration was low at date 0 and lighly increased from 7 days to 28 days. The pH values for all treatments were around 6.5 at day 0 and then quickly fell below 4 at day 28. Nutritive value and fermentation status of banana stem with or without biochar were similar. Ensiling banana stem without or with silage additive such as molasses, yeast and ensiling period of between 14-21 days were appropriate proceduces as analysed by pH, CP and visual observation.

Keywords: *Ammonia-N, banana stem, biochar, ensiling, silage additive*

THE EFFECT OF OPERCULIA TURPETHUM ON THE BACH THAO GOAT'S GROWTH

Vol 96. February, 2019. Pp. 45-49

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A study was conducted at Tra Vinh University to evaluate the effect of *Operculia turpethum* on increasing weight gain and feeding efficiency of this kind in feeding Bach Thao goats. The study was arranged in a completely randomized design with four treatments and three replications, using 12 Bach Thao goats with an average live weight of 13.0 ± 1.18 kg. Four treatment groups were given with varying levels of Operculia turpethum in the diets: 0% (OT0, control), 25% (OT25), 35% (OT35) and 45% (OT45) respectively. The ratios (25, 35 and 45%) were calculated on the basis of 5% body weight and feathered grass. The results showed that the average weight gain of goats in treatments OT0, OT25, OT35 and OT45 was 77, 104, 111, and 91 g/unit/day respectively. The greatest weight gain was seen in treatment group OT35, and was statistically significant ($P < 0.01$). Additionally, dry matter intake of goats in different treatments was statistically significant in the OT35 treatment ($P < 0.05$). The lowest feed conversion ratio was found in OT25 (7.89) and the greatest was found in OT0 (9.38). However, the difference between OT25 and OT35 indicated no statistical meaning. The OT35 treatment showed better weight gain and better economic efficiency in feeding Bach Thao goats in Tra Vinh.

Keywords: *Operculia turpethum, Brachiaria mutica, Bach Thao goats and feed conversion ratio.*

EFFECTS OF CRUDE PROTEIN LEVELS IN BASAL DIET OF PARA GRASS (*BRACHIARIA MUTICA*) ON REPRODUCTIVE PERFORMANCE OF CROSSBRED RABBITS (NEW ZEALAND X LOCAL) IN THE MEKONG DELTA OF VIETNAM

Vol 96. February, 2019. Pp. 50-55

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Twenty five rabbit does were arranged in a completely randomized design with 5 treatments and 5 replications to evaluate the reproductive performance of crossbred rabbits fed 5 levels of crude protein (CP) including 30, 32, 34, 36 and 38g CP/doe/day corresponding to the CP30, CP32, CP34, CP36 and CP38 treatments. The crude protein supplementation in diets was come from water spinach leaves and concentrate with Para grass (Brachiaria mutica) as a basal diet.

The results showed that litter size at birth, weight of litter at birth, number of rabbit at weaning, weight of rabbit at weaning in litter1 enhanced with increasing of CP in the diets, the higher values were found for the treatments of 36 and 38g CP/doe/day (P>0.05). The growth rate of pregnant doe and milk production (g/doe/day)of experimental rabbits increased with increasing of CP levels in the diets and the values were higher for the treatments of 36 and 38g CP/doe/day (P<0.05). In litter 2, the results showed that litter size at birth, weight of litter at birth, number of rabbit at weaning, weight of rabbit at weaning improved with increasing of CP levels in the diets (P<0.05). The milk production (g/doe/day) increased with increasing of CP levels in the diets (P<0.05), the higher values for the treatments of 36 and 38g CP/doe/day. It was concluded that the higher reproductive performance in two litters were found in the 36 and 38g CP/doe/day diets.

Keywords: *crossbred rabbit, crude protein, Para grass, reproductive performance, water spinach*

EFFECT OF WATER SPINACH (*IPOMOEA AQUATICA*) SUPPLEMENT LEVEL IN DIETS ON FEED INTAKES AND NUTRIENT DIGESTIBILITIES OF SAANEN FEMALE GOATS

Vol 96. February, 2019. Pp. 56-61

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A study was carried out to evaluate the effects of dietary water spinach supplementation on feed intakes and nutrient digestibilities of Saanen goat. Four Sannen female goats from 8-10 months of age (24.0±0.92 kg) were used for this experiment with a Latin Square design. Four treatments were four levels of fresh water spinach supplementation in the diets at 0, 1, 1.5 and 2 kg/head/day corresponding to WS0, WS1, WS1.5 and WS2 treatments. All experimental goats were fed 1kg/head/day of soya waste and fed *ad libitum* elephant grass. The results showed that dry matter intakes ranged 443-544 g/head/day and from 263-303 g/head/day for NDF intakes. The CP intake of goat in the WS2 treatment (86.6 g/head/day) was higher significant (P<0.05) than that of WS1 treatment (65.0 g/head/day). There was a close linear relationship (R2 = 0.85) between DM intake and NDF intake and between DM intake and CP intake (R^2 = 0.69). The DM, OM, NDF digestibilities and CH4 production were not significant difference among treatments (P<0.05), however, CP digestibility got the highest value at the WS2 treatment and the lowest value at the WS treatment. In conclusion, fresh water spinach supplementation at 2 kg/head/day in the diet increased feed and nutrient intakes on Saanen female goats.

Keywords: *dairy goat, feed intake, digestion*

EFFECTS OF *TURMERIC* ROOT POWDER INCLUSION IN DIETS ON EGG PRODUCTION AND QUALITY OF HISEX BROWN LAYING HENS FROM 30-40 WEEKS OF AGE

Vol 96. February, 2019. Pp. 62-68

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The study was carried out to determine the effect of *Turmeric* root powder (TR) inclusion in the commercial diet on performance and egg quality of laying hens. Two hundred and forty Hisex Brown laying hens at the 30 weeks of age were randomly distributed into a completely randomized design, with 4 treatments and 15 replicates (pen), each replicate consisted of 4 birds/pen, and the experimental data was collected during 10 weeks. Treatments used: TR0: Basal diet + 0% TR(control); TR1: Basal diet + 0.1% TR; TR2: Basal diet + 0.2% TR and TR3:Basal diet + 0.3 %TR. The results showed no effect of *Turmeric* root powder on feed intake, egg weight and feed conversion ratio, but a little improvement of hen-day production and egg mass in the TR2 and TR3 diets compared to control and TR1 treatments. There was no significant effect of treatments on egg shell weight, shell thickness, albumen weight, yolk weight and Haugh Unit. But there was a significant improvement of (b) yellowness value of yolk colorin the TR2 and TR3 supplemented groups compared with control group. However, the higher TR inclusion in the diets resulted in the higher expense of feed/kg egg. In conclusion, adding *Turmeric* root powder at 0.2 and 0.3% in dietcould slightly improve hen- day production, egg mass and egg york color of commercial laying hens, but increase the expense of feed/kg egg.

Keywords*: Turmeric root powder, hen- day production, laying hen, egg york color, egg mass*

AN EVALUATION ON QUALITY OF WATER HYACINTH SILAGE EFFECTED BY ADDING MOLASSES AND GROUND MAIZE

Vol 96. February, 2019. Pp. 69-77

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The objective of this study was to determine the effects of molasses and ground maize as additives to make water hyacinth silage. The experiment was a completely randomized design with 7 treatments and 3 replications. The treatments included 0, 7.70, 11.5, and 15.3% for both sugarcane molasses and ground maize. The observation was done at day 0, 7,14, 28 and 56. The wilting WH was chopped to 2-3 cm and completely mixed with additives. Plastic bags were used for incubation as experimental units.

The results showed that pH values were significantly different among treatments ($P< 0.05$) at different incubated days. The pH at day 14 was 5.50, 4.45, 4.25, 4.22, 4.83, 4.76 and 4.59 for the treatments of 0, 7.70, 11.5, and 15.3% of molasses and 7.70, 11.5, and 15.3% of ground maize, respectively. The chemical composition of water hyacinth silage was not significantly different ($P>0.05$) among the treatments at different observed days, except CP content. From day 14 to 56, CP contents of WH silage made by molasses were significantly higher ($P<0.05$) than those of ground maize at the same levels of treating. Ensiling water hyacinth with molasses at the levels of 11.5 and 15.3% had the sour vinegar smell and light yellow color. The results of this study implied that treating water hyacinth with 11.5% molasses (DM basis) could be used for making a good silage .

Keywords: *water hyacinth, silage, molasses, ground maize, pH, smell, color.*

EFFECT OF DIFFERENT STRATEGIES OF PROCESSING RICE STRAW ON *IN VITRO* DIGESTIBILITY USING RUMEN FLUID OR FAECAL INOCULA OF LOCAL CATTLE

Vol 96. February, 2019. Pp. 78-82

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Two experiments were carried out to evaluate effect of different treatments of rice straw on *in vitro* digestibility using faecal and rumen inocula from local cattle fed natural grasses. In two complete randomized design experiments, there were 6 treatments and 3 replicates. The treatments included: fresh rice straw (FS), fresh rice straw treated by 1.5% urea (UFS), fresh straw with added urea-molasses-mineral mixture (FS+UMM), dry rice straw (S), urea-treated (5%) dry rice straw (US); and dry rice straw with added urea-molasses-mineral mixture (US+MM). The first experiment was done using rumen fluid as inoculum, while in the second one faeces were used as the microbial source. The results showed that adding urea, molasses and minerals to rice straw increased content of nutrients and *in vitro* digestibility values. There was a close relationship between *in vitro* digestibility parameters determined with rumen fluid and and with faecal inocula ($R^2 = 0.92$). It is concluded that the nutritive value of rice straw for cattle is improved by adding urea, molasses and minerals; and that faecal inocula can be used to evaluate in vitro feed digestibility, with reduced cost and improved animal welfare.

Keywords*: Rice straw, urea-molasses-mineral mixture, in vitro digestibility, rumen fluid, faeces, inoculums.*

DEGRADATION OF TOLUENE VAPOR USING VACUUM ULTRAVIOLET: A WAY TO REDUCE AIR POLLUTION

Vol 96. February, 2019. Pp.83-88

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Vacuum ultraviolet is a simple way to destruct volatile organic compounds (VOCs). In this paper, we are experiment the concentration of toluene during 30 minutes open VUV lamp. Results indicate that the toluene removal efficiency is only 11 % in the VUV process. This process is depend on the influence concentration of toluene, the concentration of toluene increased, removal efficiency decreased and the concentration decreased, removal efficiency increased.

Keywords: *Toluene vapor, VUV radiation, Flow rate, Removal efficiency, Toluene concentration*

EVALUATE THE GROWTH PERFORMANCE OF SOME 3-BLOODED CROSSBRED BEEF CATTLE

Vol 97. March, 2019. Pp. 2-10

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An experiment was conducted at Ho Chi Minh City Dairy Cattle Limited Company from January 2016 to October 2018. Using the frozen semen of Red Angus/Droughtmaster, BBB, Kobe bulls to inseminate for 2-blooded crossbred cows, including the cross between ♂ Brahman × ♀ Lai Sind, between ♂ Angus × ♀ Brahman and between ♂ HF × ♀ Lai Sind. A total of 143 crossbred calves of 9 crossbred formulas were evaluated weight at birth, 6 months, 12 months and 18 months of age. From data of the weight, daily weight gain (DWG) had been calculated at different age stages. Results showed that the weight at 18 months of age from high to low respectively in formulas VIII, VII, IX, V, IV, II, VI, I and III with 395.6, 393.3, 357.7, 290.8, 290.0, 277.4, 275.0, 264.5 and 259.7 kg/head. The average DWG from birth to 18 months of age from high to low respectively

in formula VIII, VII, IX, V, IV, VI, I, II and III with 716.2, 694.4, 630.6, 527.7, 505.8, 494.3, 492.2, 469.1 and 464.8 g/head/day. From results of the expreriment, following crosses with high growth performance should be considered for extension and development of beef production: ♂ BBB × (♂ HF × ♀ Lai Sind), ♂ Red Angus × (♂ HF × ♀ Lai Sind), ♂ BBB × (♂ Angus × ♀ Brahman) and ♂ BBB × (♂ Brahman × ♀ Lai Sind).

Keywords: *3-blooded crossbred, beef cattle, growth performance*

PRODUCTIVITY AND MEAT QUALITY OF BROLER MONG CHICKEN REARED IN THE DIFFERENT PRODUCTION SYSTEMS

Vol 97. March, 2019. Pp. 11-20

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The objective of this study was to assess the productivity, meat quality and the economic efficiency of broiler Mong chicken reared in the semi-intensive and intensive production system. The experiment was carried out in the Tuyet Tham Trade and Production Co., Ltd. Ha Nam province. A number of 50 Mong chicken was selected for each repetition of three repetitions. The number of chicken died were recorded. The body weight were weighted untit 15 weeks of age. Feed consumption was aslo recorded. Some basic expenses and revenues were estimated. The results showed that the average survivability of the broiler Mong chicken from 0 to 15 weeks of age in the semi-intensive and intensive production system was from 90.00 to 90.67%, respectively. The average body weight at 15 weeks varied between 1408.25 g in the semi-intensive production system to 1452,35g in the intensive production system. Feed conversion ratio (PCR)/kg increased body weight at 15 weeks of age was from 3.27 to 3.50 kg. The ratio of dry matter in thigh meat and breast meat was from 23.27 to 23.32% and from 25.52 to 25.83%, respectively. The ratio of protein in thigh meat and in breast meat varied from 19.63 to 19.90% and from 22.26 to 22.97%, respectively. The highest benefit was 5.466.663 Vietnamese Dong in the semi-intensive production system for 100 broiler Mong chicken.

Keywords: *Mong chicken, chicken production system, Vietnamese local chicken*

OPTIMIZATION OF SOLID-STATE FERMENTATION CONDITIONS WITH *LACTOBACILLUS FERMENTUM* NC1 TO IMPROVE ALPHA-GALACTOSIDASE IN SOYBEAN MEAL AT PILOT SCALE USING RESPONSE SURFACE METHODOLOGY

Vol 97. March, 2019. Pp. 21-30

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The Response Surface Methodology (RSM) was used to optimize the conditions of soybean meal fermentation process in order to improve the α-galactosidase production ability of *Lactobacillus fermentum* NC1. RSM is a statistical analysis of the impact of different process variables on fermentation process and also displays the interaction of different variables with each other at a time. The study was conducted at the laboratory of Institute of Animal sciences for Southern Vietnam from February 2018 to February 2019. The results showed that among 5 surveyed factors by Plackett-Burman design, three factors such as temperature, time and inoculum size have the most influence on the α-galactosidase production ability of *L. fermentum* NC1 ($P < 0.05$). The optimal conditions derived from Box-Behnken design for solid-state fermentation of soybean meal by *L. fermentum* NC1 were: temperature = 30^{o}C, time = 30 hours and inoculum size = 4%. Under this optimal condition, the α-galactosidase activity reached to the highest level, at 25.6 U/g and removed 83.06% of antinutritional oligosaccharide (raffinose, stachyose) in soybean meal.

Keywords: *alpha-galactosidase, Lactobacillus, soybean meal, Response Surface Methodology*.

EFFECTS OF THE METHOD FEEDING TO REDUCE THE ACIDOSIS ON DAIRY CATTLE

Vol 97. March, 2019. Pp. 31-43

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The objective of this research to evaluate diets on lactating dairy cows to reduce the ruminal acidosis, feed intake, milk production and lameness in dairy cattle. The trial was conducted in Bavi cattle and Forage Research Center from January to June 2018. The experimental were conducted on 15 dairy cows, they were randomly into three goups similarly with body weight, lactation, milk production. The first group, cows were fed twice per day, concentrate feed was eaten before the next forage crop; The second group, cows were fed twice per day, concentrate feed and forage crop were mixed well before feeding and the third group was fed like group 2 but was fed 3 times per day. The experimental were conducted on 85 days. The results was showed that the experimental group 2 and 3 effect has stabilized daily feed intake, no effect on body weight change and body condition score, maintaining the physiological of milk production, stabilize of dry matter, protein and fat in milk. In adition, the concentrate feed and forage crop diet was effected on maintenane of rumen pH above incidence of ruminal acidosis, positively affect the score of stool and no cows have foot disease. Base on this results it could be suggested that diet of concentrate and forage crop were mixed well before feeding in conditions of breeding, TMR feed is still limited may prevention of acidosis in early lactation dairy cows.

Keywords: *Diet, acidosis, dairy cow.*

THE EFFECTS OF ACTISAF® SC 47 STD ADDITION TO AC BROILER DIETS FROM 0 TO 9 WEEKS

Vol 97. March, 2019. Pp. 44-52

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The experiment was conducted to evaluate effects of Actisaf® SC 47 STD (Actisaf) in diet on the growth performance, meat productivity and quality of Ac broiler. The experiment was designed in CRD method and repeated 3 times with 100 chickens from 0 to 9 weeks old for each time; these were randomly assigned into 2 groups: controls (no supplement) and treatments (supplementing 0,1% Actisaf in mixed feed content). Chickens were vaccinated against Newcastle, birdflu, Gumboro and chicken pox. Feed and water were supplied equally for all groups. 3 males and 3 females of each group were slaughtered when experiments were finished. The results indicated that there was an increase in average body weight, average daily gain (ADG) of the chickens from 2 to 9 weeks old, carcass ratio, breast and thigh ratio, resulting in the reduction of feed conversion ratio **(**FCR). The live weight of chickens when supplementing 0,1% Actisaf was 13,44% higher; ADG was 13,88% higher; and FCR was 9,57% lower compared to the control. It had a good meat quality in terms of pH_{15}, pH_{24}, colour, drip loss, cooking loss, tenderness, chemical composition and there was not significant difference among them. It is, therefore, recommended that using Actisaf in diet could increase the growth rate, reduce FCR, maintain good meat quality, as well as resulted in higher economic efficiency.

Keywords: *Ac chicken, Actisaf, FCR, growth performance, meat quality*

EFFECT OF A-769662 ACTIVATOR IN CHICKEN SPERM QUALITY

Vol 97. March, 2019. Pp. 53-61

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We have studied the mechanism of A-769662, a new activator of AMP-activated protein kinase (AMPK). The aim of this study is to determine the role of A-769662 in the quality of chicken sperm by AMPK activation. The

project was carried out at Quy Nhon University and the French National Institute of Agriculture (INRA) from September 2018 to February 2019. Sperm were treated with or without A-769662 for 5, 30 and 60 min. Effects of A-769662 was assessed by evaluating AMPK phosphorylation (by western blot) and semen quality (by viability, motility, ability to perform acrosome reaction). Our study shows that the level of AMPK phosphorylation by A-769662 at 50μM is highest, decreases at 100μM and 250μM and causes cell death at 250μM. A-769662 also activated the sperm motility, sperm acrosome reaction and decreased the sperm viability in *in vitro* at 50μM. We also show that AMPK protein activation time of A-769662 in chicken sperm is very fast, after 5 minutes of incubation.

Keywords*: AMPK, A-769662, Metformin, spermatozoa, phosphorylation.*

INVESTIGATION OF KETOSIS ON DAIRY FARMS IN THE NORTH AND SOUTH OF VIETNAM

Vol 97. March, 2019. Pp. 62-72

Ngo Dinh Tan, Tang Xuan Luu, Tran Thi Loan, Dang Thi Duong, Khuat Thi Thu Ha, Phung Quang Truong, Nguyen Yen Thinh, Khuat Thanh Long, Phung Thi Dieu Linh and Phung Quang Than

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Ketosis is an important metabolic disease of dairy cows during the transition period, but it is not clearly know about the happening in smallholder farms in Vietnam condition. This investigation was conducted in smallholder dairy farms in the North and Southern of Vietnam. The cows selected in this survey were in milking periods with potential milk production of 5500 kg per lactation. The study was analysis the signal of ketosis in dairy cow, the effects of diets, season, lactation on ketosis percentage, and the influence of ketosis on milk yield. The results were showed that, for the milking cows, ketosis incidence at the winter season was higher than the other seasons. The ketosis in dairy cows was occurred in whole lactation, but the highest incidence is in early lactation. Moreover, the incidence was higher in multiple lactation cows and the cows with high body condition scores (BCS) (average of BCS is 3.5 and ranging from 3.4 to 3.6). Milk yield in dairy cows with ketosis was significantly reduced (28.83%), and the BCS was also decreased. The ketosis sign with 50% of them was keton smell, decrease of respiration, and ketone body in urine ranged from 1 to 4+ and in milk ranged from 1 to 2+. The energy density of ration on ketosis cows was lower and not meet the nutrition requirement in early lactation. Therefore, the results were suggested that it could be necessary for good management of the energy intake on transition period and offering high energy density on ration of early lactation dairy cows the needed energy intake.

Key words: *ketosis, dairy cow, ration, lactation, energy*.

EFFECTS OF CATTLE MANURE TREATMENT ON GREENHOUSE GAS EMISSIONS

Vol 97. March, 2019. Pp. 73-80

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The experiment was conducted to evaluate the effect of method of cattle manure treatment on greenhouse gas emissions. The experiment was arranged in a completely randomized design (CRD) with three methods of cattle manure treatment: store under roof with Balasa No.1 supplementation (Treatment 1-T1), store under roof with No.5 supplementation (Treatment 2-T2), store under roof without probiotic supplementation (Treatment 3-T3) with 3 repetitions. Implementing duration was 30 days for evaluating CH_4, CO_2 emissions from manure and changes in chemical composition of manure before and after treatment. Results show that average DM of manure in 3 treatments was increased of 3.82% and OM was decreased of 10.67% at the end ofexperiment and not different among 3 manure treatment methods. Nitrogen content at the end of experiment ranged from 1,40 - 1,43% and not significantly different among 3 manure treatment methods. Amount of N loss during treatment was statistically different among treatments, T1 (0.11%) was higher than that of T2 and T3, there wasn't a significant difference between T2 and T3 (0,03% vs 0,05%). The amount of cacbon at the end of experiment was different among treatments of 48, 45 and 47% respectively ($P<0.05$), the amount of cacbon lost during treatment

was not significantly different (ranged from 5% to 7%). Cattle manure storing under roof with probiotics supplementation increased the total amount emissions interm of CH_4 and CO_2 during the 30-day manure treatment, CH_4 and CO_2 content at treatments of BALASA No.1, No.5 supplement and no supplement were 4.79, 4.10 and 3.97 gCH_4 / kgOM; 714, 406 and 300 gCO_2 / kgOM respectively. After 30 days manure treatment, CH_4 and CO_2 emission from manure still continued.

Key words: *carbon dioxide, cattle manure, greenhouse gas, methane, manure management*

A BRIEF SUMMARY OF EUROPEAN LEGISLATION REGARDING ANIMAL WELFARE

Vol 98. April, 2019. Pp. 2-13

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An overview of the current European legislation concerning animal welfare is given. The legal requirements concern the housing and care of production animals (poultry, calves and swine), the transport of animals and the killing of animals (not only in slaughterhouses, but also in case of contagious animal dis- ease outbreaks). General information concerning the principles and contents of European pieces of legislation as well as detailed information concerning require- ments for individual animal species is given. Furthermore, other elements con- cerning animal welfare such as castration of piglets, ritual slaughter and animals used for experimental purposes are also reviewed. Finally, some recent initiatives in the field of animal welfare are mentioned and useful links are provided for find- ing the various legislative acts and additional supportive information.

Keywords: *regulation, directive, poultry, calves, swine*

CORRELATION OF CARCASS TRAITS OF SUPER MEAT DUCKS

Vol 98. April, 2019. Pp. 14-19

Le Thanh Hai and Duong Xuan Tuyen

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Study to analyze the correlation between meat productivity traits based on survey surgery results of 100 meat type ducks SM at Vigova duck breeding farm from 2014 to 2018. Method of weighing, measuring, counting and calculating based on the detailed description of Duong Xuan Tuyen (1998). Methods of survey surgery and calculation of meat production criteria according to the methods of Auaas and Wilke (1978), Bui Huu Doan et al (2011). Analyzing 10 traits with 45 correlated pairs. Method of correlation analysis between traits is variance and covariance analysis method by Minitab 16.2.0. The results show that traits mostly have low or medium correlations. There are only 5 correlated pairs have strong correlation are between breast meat ratio and breast muscle ratio (r = 0.92); breast meat ratio and breast circumference (r = 0.70); breast meat ratio and breast thickness (r = 0.88); breast muscle ratio and breast thickness (r = 0.92); between breast circumference and breast thickness (r = 0.75).

Keywords: *Meat type ducks, correlation, carcass traits*

SELECTION TO IMPROVE PRODUCTIVITY OF NINH HOA LOCAL CHICKEN RACE THROUGH GENERATIONS

Vol 98. April, 2019. Pp. 20-32

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The study was conducted at Phung Dau Son Breeding Co., Ltd from 2015 to 2018. From the source of genetic material, Ninh Hoa chicken race was collected and multiplied by the Company over many years to select and improve uniformity of appearance and body weight at saling, body weight and reproductive productivity.

Applying the parallel selection method of independent rejected on each individual for appearance, growth and family selection for reproductive traits. After 4 generations of selection, Ninh Hoa chicken had highly featured appearance, males had dark-purple color, yellow legs, buds comb accounted for 96.1% while females had dark-brown feather, yellow legs and buds comb accounted for 96.8%. Body weight of males at 8 weeks of age were 1086.4 g/head, of females were 872.6 g/head. Egg production/hen/year reached 100.2 eggs (in accordance with the proposed target), egg weight at 18-20 weeks of laying was 51.7 g/egg. The fertility rate was 90.46%. At hatching; proportion of grade-1 chicks was 77.53%. The productivity target at 12 weeks of age (commercial broiler chickens) was as followed: The uniformity of chickens with the CV value ranged from 14.6% to 15.6%. The average body weight at 12 weeks of male was 1768.3 g/head, and female reached 1,524.5 g/head (Achieved the registered target). The survival rate was 94.6%. FCR was 3,32.

Keywords*: Ninh Hoa chicken, selection, body weight, egg production*

GROWTH PERFORMANCE OF BEEF CROSSBRED CALVES IN BEN TRE PROVINCE

Vol 98. April, 2019. Pp. 33-40

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The objective of this study was to evaluate the growth performance of high-yielding beef calves from neonatal to 12 months of age at beef cattle smallholders in Ben Tre province from January to December 2018. The experiment was assigned into a completely randomized design of 3 groups of crossbred calves and lasted 12 months. The results showed that the birth weight of cross BBB × Lai Sind was highest with 30.2 kg, followed by cross Charolais × Lai Sind with 30,1 kg, and cross Red Sindhi × Lai Sind (between Red Sindhi with Lai Sind cow) with 23.9 kg (P=0.021). At the age of 3, 6, 9 and 12 months; body weight of cross BBB × Lai Sind was still highest with 110.3, 199.8, 227.2 and 278.3 kg, respectively; followed by cross Charolais × Lai Sind with 103.8, 189.8, 215.5 and 272.9 kg, respectively; and the lowest body weight was cross Red Sindhi × Lai Sind with 69.7, 136.7, 174 and 214,4 kg, respectively (P<0.001). Average daily gain at 9 to 12 months old was highest with cross BBB × Lai Sind with 0.69 kg/calf/day, followed by cross Charolais × Lai Sind with 670 g/calf/day, and the lowest average daily gain was cross Red Sindhi × Lai Sind with 510 g/calf/day (P<0.05).

Keywords: *BBB × Lai Sind, Charolais × Lai Sind, Red Sindhi × Lai Sind, growth rate, feed intake*

INVESTIGATION OF EFFECTS OF FEEDING NUMBER AND TOTAL MIXED RATION ON MILK YIELD AND QUALITY, LAMENESS DETECTION OF DAIRY COWS

Vol 98. April, 2019. Pp. 41-49

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The aim of study was to investigate effect of feeding number (FN) and total mixed ration (TMR) on milk yield and quality, lameness detection of dairy cows at Research and Technology Transfer Center, Nong Lam University of Ho Chi Minh City from July 2017 to August 2018. The experiment was arranged in a completely randomized block design with 4 treatments, 5 cows in each treatment randomized in the disease level, milk cycle and production: (1) two feeding times per day and without TMR (FN_2TMR_0), (2) three feeding times per day and without TMR (FN_3TMR_0), (3) two feeding times per day and with TMR (FN2TMR) (4) three feeding times per day and with TMR (FN3TMR). The results shown that feeding twice per day without TMR (FN_2TMR_0) had lower milk yield than feeding 3 times per day without TMR (FN_3TMR_0) by 14.01 and 14.18 kg/head/day; respectively. Feeding twice per day with TMR (FN_2TMR) has lower milk yield than of 1.5 kg/head/day compared with feeding 3 times per day with TMR (FN_3TMR), but still higher than in FN_3TMR_0 was 1.12 kg/head/day. In addition, feeding method also affected on milk quality. Milk dry matter in FN_2TMR_0 was lower than in FN_2TMR of 0.14%; in FN_3TMR_0 was lower than in FN_3TMR of 0.18%. Milk

protein content increased in FN_2TMR_0 or FN_3TMR_0 compared with in FN_2TMR or FN_3TMR at 4.26, 4.43, 4.57 and 4.81%, respectively. Milk fat content was also affected by feeding, highest in FN_3TMR of 3.77% and lowest in FN_2TMR_0 of 3.45%. Movement and body scores in FN_2TMR or FN_3TMR better than in FN_2TMR_0 or FN_3TMR_0 by 0.5.

Key words: *Feeding method, feed intake, milk yield and quality, body score*

DETERMINATION OF CRUDE PROTEIN AND LYSINE LEVEL FOR NINH HOA CHICKEN FROM 1-44 WEEKS OLD

Vol 98. April, 2019. Pp. 50-62

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A study was conducted to determine the optimal level of crude protein (CP) and lysine (Lys) on Ninh Hoa chicken. 900; 450 and 315 birds at one day old, 9 weeks old and 21 weeks old, respectively, were used in this trial. Three treatments were at the different CP and Lys acid level in diets, namely 16% and 0.7% (lowest); 18% and 0.85% (medium), 20% and 1.0% (highest) for treatment 1, 2 and 3, respectively. 3 pens were used for each treatment at each period, 100; 50 and 35 birds/pen in 1-8 weeks old, 9-20 weeks old and laying phase, respectively. In comparison to treatment 1, body weight and feed conversion ratio (FCR) in treatment 2 and 3 improved up to 8.84-13.05% and 6.51-7.28% in 1-8 weeks old stage; 5.32-8.03% and 7.28-7.77% in 9-20 weeks old period. Egg production, FCR/10 eggs in treatment 2 and 3 increased 3.26-4.27 egg/hen and declined 0.26-0.41 kg feed/10 eggs. Feed cost/10 eggs and hatchability eggs in treatment 2 have tended to improve in compared to those of treatment 1 and 3. The results indicate that, 18% CP and 0.85% Lys in diet were likely to be a right level for Ninh Hoa chick in 1-8 weeks old and laying period. 16% CP and 0.7% Lys were the optimal for 9-20 weeks old.

Keywords*: amino acid, crude protein, Ninh Hoa chicken.*

DETERMINATION OF THE APPROPRIATE CRUDE FIBER CONTENT IN THE DIET FOR GESTATIONSOWS LANDRACE AND YORKSHIRE IN GRAND-PARENT TIER

Vol 98. April, 2019. Pp. 63-70

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The objective of this study was to determine the appropriate crude fiber (CF) content in the diet for GP gestating sows to improve reproductivity in the lactation period. Sixty GP gestating sows (Landrace and Yorkshire) of the same of age, health and reproductive performancewere selected and randomly divided into 4 treatments (Treatment1: 8% CF; Treatments 2: 10% CF; Treatment 3: 12% CF and Treatment 4: 14%CF) and 15 replicates with CRD design (sows were kept in gestating crates). All 4 treatments were formulated with the same nutritive value (ME: 2900 Kcal; CP: 13.5%) and under the same raising conditions.The results showed that the increase fiber level in the diet from 8% to 10-12% improved 24-35% of weightgain of sow during gestating period, increased 12-17% feed intake of sow during lactating period, increased 2-8% total weight of litter and 6-10% of bodyweight of weaned piglets per litter per sow. The appropriate fiber level in diet for gestation sow were 10-12%. The diet for gestation sow was not formulated to have fiber level of higher than 12%.

Keywords: *Crude fiber; Gestating sows, feed intake, weight of litter, reproductivity*.

INVESTIGATION OF EFFECT OF HOOF TRIMMING ON MILK YIELD AND QUALITY, TREATMENT OF LAMENESS IN DAIRY COW

Vol 98. April, 2019. Pp. 71-76

Duong Nguyen Khang and Dang Hoang Dao

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The study aims to investigate the effect of hoof trimming on lameness prevention of dairy cows at Research and Technology Transfer Center, Nong Lam University of Ho Chi Minh City from June 2017 to August 2018. The experiment was conducted on two groups of cows with lameness, randomly completely to 2 blocks, each group of 5 cows uniform within lameness level, lactation period and milk yield. The experimental group was conducted by trimming the ulcers. The results shown that cows in the experimental group was better than 0.5 points, the milk yield increased 1.34 kg/head/day, the contents of dry matter, protein and fat increased by 0.22; 0.11 and 0.13%, respectively. Time for insemination and waiting for insemination decreased by 16 days compared to control group; cows with hoof trimming gave lower than 2 times of artificial insemination compared with 3 times without hoof trimming.

Keywords: *Hoof trimming, milk yield, milk quality, somatic cell counts, reproduction, body score*

DETERMINATION OF SUITABLE PRODUCTION SYSTEM FOR MIA CHICKEN BREED

Vol 98. April, 2019. Pp. 77-88

Ngo Thi Kim Cuc, Nguyen Cong Dinh and Doan Phuong Thuy

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This study aimed to determine a suitable production system for Mia chicken breed. The Mia chicken were reared in the semi-intensive and intensive production system. The experiment was designed into 2 groups with three repetitions. A total of 420 Mia chicken/group were observed.

The results showed that the average survivability of the broiler Mong chicken from 0 to 20 weeks of age in the semi-intensive and intensive production system was from 94.87 to 95.38%, respectively. The average body weight at 8 weeks of age varied between 576.25g in the semi-intensive production system to 582.46g in the intensive production system. The average body weight at 20 weeks of age varied between 1518,37g in the semi-intensive production system to 1525.63g in the intensive production system.

Egg productivity at 44 weeks of age was 32,43 eggs in the intensive production system and 31,52 egg in the semi-intensive production system. Feed conversion ratio/10 eggs in the intensive production system and semi-intensive production system was 6.22kg and 5,78kg, respectively. The highest benefit was found in the semi-intensive production system with 83.227 Vietnamese Dong/laying chicken and 96.242 Vietnamese Dong/laying chicken in theinten sive production system and in the semi-intensive production system, respectively. Therefore, the suitable production system to rear the Mia chicken is the semi-intensive production system.

Keywords: *Mia chicken, chicken production system, Vietnamese local chicken*

THE EFFICIENCY CONSTRUCTION MODEL OF DUCKS BREEDING VCN/TP-SD, GEESE VCN/TP-VS7 TOWARDS BIOLOGICAL SAFETY IN FARM HOUSEHOLDS AT HONG RIVER DELTA

Vol 99. May, 2019. Pp. 2-7

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The project was carried out in three years, constructed six model of ducks breeding with specializing in meat ducks VCN/TP-SD; geese with high economy value VCN/ TP-VS7 at six Hong river delta provinces (Ha Noi, Ha Nam, Nam Dinh, Thai Binh, Hai Duong, Bac Ninh) with 60.000 ducks scale (VCN/TP-SD) and 120.000

geese (VCN/TP-VS7). The result showed that ducks at the models also developed well in three years, had fast growth speed, the body weight at eight weeks old was 2.68 kg per a duck, the male geese at twelve weeks old also reached 4.46-4.73 kg per a goose, this result was perfect and overcame about weight target. The effeciency got from 35.08 million dongs to 70.30 million dongs for ducks breeding model, from 51.12 million dongs to 161.80 millions dongs for geese breeding model. The project held training in model for eighteen training classes with 360 people and training outside the model was 36 classes with 1080 people of six project deployment provinces in three years.

Keywords: *construct model, ducks VCN/TP-SD, geese VCN/TP-VS7, Hong river delta*

GROWTH PERFORMANCE AND DISEASE RESISTANCY OF BOER GOAT AND F_1 CROSSBRED (BOER × BACH THAO) IN HO CHI MINH CITY

Vol 99. May, 2019. Pp. 8-16

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The aim of this study was to evaluate growth performance and disease resistancy of Boer goat and F_1 crossbred (Boer × Bach Thao) in production condition in Ho Chi Minh city. The research was conducted at goat farm of One Member Dairy Joint Stock Company, Ho Chi Minh city from August 2017 to August 2018. The experiment was allocated into single factor completely randomized design with 3 groups of goat breeds and lasted 12 months. The results showed that birth weight of Boer goat was the highest (3.46 kg/goat), followed by F_1 crossbred (Boer × Bach Thao) (3.02 kg/goat) and the lowest with Bach Thao goat (2.71 kg/goat) (P = 0.039). At the age of 12 months, the body weight of Boer goat was still the highest (65.43 kg/goat), followed by F_1 crossbred (Boer x Bach Thao) (50.78 kg/goat) and the lowest with Bach Thao (33.43 kg/goat) (P = 0.001). Average daily gain in the period from neonatal to 12 months of age was the highest with Boer goat (172.1 g/goat/day), followed by F_1 crossbred (Boer × Bach Thao) (132.7 g/goat/day) and the lowest with Bach Thao (85.3 g/goat/day) (P = 0.016). The survival rate in the period from neonatal to 12 months of age was highest with Bach Thao goat (100%) and F_1crossbresd (Boer × Bach Thao) (100%), higher than that of Boer goat (95.0%) (P=0.362). The prevalence of normal diseases after calving to the first 3 months was the highest with Boer goat (25.0%), followed by F_1 crossbred (Boer × Bach Thao) (20.0%) and Bach Thao (20.0%) (P = 0.907); in the periods from 3-6 months, 6-9 months and 9-12 months was relatively low, ranging from 0.00% to 15.8% and the difference among three groups was not significant (P > 0.05).

Keywords: *Boer, F_1 (Boer x Bach Thao), Bach Thao, Body weight and average daily gain*

GROWTH PERFORMANCE, CARCASS CHARACTERISTICS AND MEAT QUALITY OF COMMERCIAL PIGS MSTP3 AND MSTP4

Vol 99. May, 2019. Pp. 17-26

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The study was conducted at Thuy Phuong swine research and development center from December in 2017 to December in 2018 to estimate the growth performance, carcass characteristics and meat quality of commercial pigs MSTP3 and MSTP4. The results showed that both commercial MSTP3 and MSTP4 had great growth performance. The average daily gain of MSTP3 pigs was remarkably higher than those in MSTP4 pigs (683.42 g/d vs 684.37 g/d) with P>0.05. The Feed conversion ratio of MSTP3 and MSTP4 were 2.66 kg and 2.67 kg, respectively (P > 0.05). The carcass characteristics of commercial pigs MSTP3 and MSTP4 was equivalent to the same traits such as dressing percentage, carcass percentage, lean meat rate. The dressing percentages of MSTP3 and MSTP4 were 82.15%, and 81.62%, respectively; the carcass percentage of those pigs were 69.94%, and 69.38%; lean meat rate reached 59.24% and 59.05%, loin eyes area were 51.40 cm^2 and 51.15 cm^2. In addition, the meat quality of the carcass in term of post mortem 45 minutes, 24 hour pH, meat color (L* - lightness, a* - Redness, and b* - yellowness) and water losses were in an acceptable range. For instance, the values for $pH_{45'}$ and pH_{24h} were 6.33 vs 6.06, and 5.72 and 5.48, respectively; the meat color at post mortem 24 hours and 48 hours of L*, a*, and b* were 44.59 vs 41.19; 15.45 vs 14.02; 7.55 vs 7.12 (P<0.05) and 44.94 vs 41.54; 15.61 vs 14.17; 7.88 vs 7.44 (P<0.05). The 24 and 48 hours drip loss were 3.15% vs 3.26% (P>0.05) and 3.89 vs 4.04

(P>0.05), respectively. In the meantime, the cooking loss at 24 and 48 hours were 29.02% vs 28.67% (P>0.05), and 30.40% vs 30.0% (P>0.05). The tenderness of commercial pigs MSTP3 and MSTP4 at 24 hours were 58.02N vs 55.49N (P>0.05), and at 48 hours were 51.14N vs 48.96N (P>0.05).

Keywords*: Growth performance, meat quality, carcass characteristics, MSTP3, MSTP4*

PRODUCTIVITY OF BLOILER MONG CHICKEN IN THREE DIFFERENT FEED RATIO

Vol 99. May, 2019. Pp. 27-36

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Three experiments were conducted to determine suitable feed rations for Mong chicken. Three different feed rations for the three rearing periods (01 day to 4 weeks; 5 weeks to 8 weeks and 9 weeks to 15 weeks, respectively) were tested. Each experiment had been repeated three time with 50 chickens/repetition. The survivability, body weight, feed conversion ration of the chicken were recorded. The economic efficiency was estimated. the result showed that the survivability of 15 weeks old chicken were from 90.00% to 91.33%. The body weight of 15 weeks old chicken at the ratio using commercial feed, commercial feed combined with local feed and local feed were 1458.67 g, 1450.33 g and 1403.67 g, respectively. Feed conversion ratio (PCR)/kg increased body weight at 15 weeks of age was from 3.23 to 3.60 kg. The highest benefit was 5.520.926 Vietnamese Dong at the ratio using commercial feed combined with local feed for 100 broiler Mong chicken.

Keywords: *Mong chicken, Commercial Mong chicken productivity, chicken feed ratio.*

SUITABLE FEEDING LEVEL FOR MEAT TYPE PARENT DUCKS VSM2227 FROM 0 TO 24 WEEK OF AGE

Vol 99. May, 2019. Pp. 37-46

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The objective of the study is to determine the suitable feeding level for meat type parent ducks VSM2227 from 0 to 24 week of age. Experiment was arranged as one factor random design with experimental factor was feeding level. Treatment 1 was control with feeding level as the old process, feeding levels of treatments 2 and 3 are higher 3% and 6% respectively compare to treatment 1. The results showed that all the treatments had high survival rate and there was no difference between the treatments (P> 0.05). Body weight of 24 weeks of age ducks was different between treatments (P> 0.05). Body weight of male and female of treatment 1 were 3907.22 g and 3304.89 g; treatment 2 were 3992.67 g and 3381.55 g; treatment 3 were 4060.84 g and 3438.67 g, respectively. Laying age of treatment 2 was 165 days of age, earlier 5 days compare to treatment 1. Egg production/42 weeks reached 216.41 egg/female, higher 4.9 egg/female and 8.2 egg/female than treatment 2 and 3 respectively. FCR/10 eggs of treatments 1, 2, 3 were 3.63 kg, 3.58 kg and 3.71 kg, respectively. Hatching rate per fertilized egg of treatments 1, 2, 3 reached 80.44%, 81.17% and 78.40%, respectively. Feeding level of treatment 2 was the best choice to apply to complete the process of raising for meat type parent ducks VSM2227.

Keywords: *Meat type parent ducks, food intake*

EFFECTS OF THE SUPPLEMENT MEDICAL PLANTS EXTRACT POWDER ON CHARACTERISTICS OF COMMERCIAL RI CROSS CHICKEN

Vol 99. May, 2019. Pp. 47-57

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This study aims to evaluate the effects of supplement medical plants extract powder on digestion, metabolism and carcass quality of Ri cross chicken. 36 chickens (Ri x Luong Phuong) at 4 weeks of ages were randomly

assigned to 4 experimental diets, each diets containg 9 chicken, asign to 3 cages with 3 chickens/cage (including 2 females and 1 male chicken). The experiment diets included control (without medicinal plant supplement) or 0.3% dry matter (DM) supplement of alpinia (RI, *Apinia officinarum*), tumeric (NGHE, *Curcuma longa*), *Belamcanda sinensi*s (RQ). The samples of feed, feces, blood and carcass were collected digestion, metabolism and meat quality were collected during the last 5 days of experiment to evaluated the intake, digestion, metabolism and carcass quality of chickens. The results showed that, the suplement of 0,3% *Apinia* extract powderreduced the feed, dry matter, orgarnic matter and crude protein intake ($P < 0.05$), but did not affect on the nutrient digestibility ($P>0.05$). The concentration of serum ALAT was the highest with the chickens fed *Belamcanda sinensis* supplement diet, and was the lowest with the chickens fed alpinia supplement diet ($P<0.05$). The serum creatine concentration was tendency highest for the chicken fed alpinia supplement diet ($P<0.05$). Supplement of alpinia and Belamcanda sinensis on chicken diets reduced the number of *E.coli* ($P<0.05$), but increased the number of lactic acid bacteria ($P<0.05$). However, supplement medicinal plant extract powder did not affect the chicken carcass quality.

Keywords: *Ri cross chicken, medicinal plant extracts, digestion, metabolism, carcass quality*

ASUITABLE PRODUCTION SYSTEM REARING BROLER MIA CHICKEN

Vol 99. May, 2019. Pp. 58-68

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The objective of this study was to determinea suitable production system rearing broler Mia chicken. The broiler Mia chicken reared in the semi-intensive and intensive production system. The results showed that the average survivability of the broiler Mong chicken from 0 to 15 weeks of age in the semi-intensive and intensive production system was from 90.66 to 91.33%, respectively. The average body weight at 15 weeks varied between 1335.02g in the semi-intensive production system to 1382.13g in the intensive production system. Feed conversion ratio (PCR)/kg increased body weight at 15 weeks of age was from 3.48 to 3.66 kg. The ratio of dry matter in thigh meat and breast meat was from 23.68 – 23.69% and from 25.93 – 25.97%, respectively. The ratio of protein in thigh meat and in breast meat varied from 19.13 to 19.20% and from 22.47 to 22.62%, respectively. The highest benefit was 3.760.669 Vietnamese Dong in the semi-intensive production system for 100 broiler Mong chicken.

Keywords: *Mia chicken, chicken production system, Vietnamese local chicken*

DETERMINATION OF SOME PHYSIOLOGICAL AND BIOCHEMICAL PARAMETERS FOR DAI XUYEN 15 MARINE DUCKS IN FRESH WATER AND MARINE WATER CONDITIONS

Vol 99. May, 2019. Pp. 69-76

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This study was carried out to determine blood haematological parameters (red blood cell count, hemoglobin, white blood cell count, platelet cell count, white blood cell count and compositions) and blood biochemistry (total plasma proteins, albumin, globulin and serum sodium, postassium, chloride and calcium levels) of the two Dai Xuyen 15 marine ducks reared in fresh water and marine water conditions and same age of experiment. Red blood cell and white blood cell parameters were measured with Cell-dyn 3700 system. Blood samples (without EDTA) were centrifuged 3000rpm for 15mins and serum was as described (Coles, 1996) for analysis for biochemical parameters using Cobas 6000 system. The results showed that there weren't no differences in red blood cell count, hemoglobin values, platelet cell count and white blood cell compositions between the two Dai Xuyen 15 marine duck groups. The ducks in marine water condition had higher white blood cell count while the counterparts had higher plasma total protein

and albumin concentrations. Differences in serum sodium, potassium and chloride levels were not observed in two groups while ducks in marine water condition gained higher serum calcium levels. Some sex-dependent parameters were observed.

Keywords: *Dai Xuyen-15 sea duck, biochemical parameters, haematology*.

CURRENT STATUS OF FOSTER CARE AND THE SITUATION HAS METABOLIC DISORDERS ON DAIRY HERDS IN THE NORTH AND THE SOUTH

Vol 99. May, 2019. Pp. 77-88

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The objective of this research to evaluation the current status of foster care and situation has metabolic disorders on dairy herds at 248 farms in the North and the South from January to October 2017. The experiments (TN) conducted on farms with scale over 10 animals with 177 farms in the North and 71 farms in the South. The results was showed that green forage was mainly elephant grass, maize, elephant grass silage, corn silage, banana tree, hay and rice straws were chopped before feeding; Concentrate: mixed bran, brewer's grain, corn flour, tapioca flour, soybean meal and supplement foods, enzyme, vitamins, minerals. Individual ration of concentrate and green food are high percentage, and the TMR or mixed ration before feeding is limited. Nutritional content of feeds for milking cow and dry cow ensures requirements. The ratio of concentrate and raw feed in the early and mid-lactation periods is still high. The number of feeding times per day is in the North over 3 times, in the South, cows are fed freely. Metabolic disorders are concentrated mainly in the early stages of milking then descending in the middle, late and dry period. Acidosis is the highest rate of ketosis and milk fever. Milk fever is found only in the early and mid-lactation period. The results of this study show an overview of foster care regimes related to metabolic disorders and appropriate preventive measures.

Keywords: *Metabolic disorders, feeding regimes, dairy cows.*

THE CELL WALL OF PLANT (NEUTRAL DETERGENT FIBER - NDF): STRUCTURE, VARIATIONS AND USING FOR RUMINANT LIVESTOCK

Vol 100. June, 2019. Pp. 2-20

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The cell wall structure of plant used as feeds consists of the middle wall, the primary wall and the secondary wall. The difference among these walls is the chemical composition of cellulose, hemicellulose, lignin, pectin and protein molecules. Cellulose is a long-chain polysaccharide consisting of linear chain of several hundred to many thousand of linked D-glucose unit, is an important structural component of the primary cell wall of plants. Hemicellulose is a short-chain polysaccharide, the main components are xylan, mannan and xyloglucan which are composed by pentose ($C_5H_{10}O_5$) and hexsose ($C_6H_{12}O_6$) molecules. Lignin is a phenylpropane polymer, a complex cross-linked structure from three hydroxyphenyl-lignin derivatives (H), guaiacyl-lignin (G) and syringyl-lignin (S) that form chemical bonds with attached hemicellulose stable with cellulose in cell walls. The ratio of the main components of the primary wall are cellulose, hemicellulose, pectin and proteins of cell walls but this ratio can be changed in the secondary wall. This change affects the primary link of the primary layer, which is the bond of xyloglucan with cellulose and pectin, but the increase of ligninization rate by age or the species of feed lead to increase those link in the cell wall. This can change the cell wall structure and percentage.

The structural change of NDF in plants is influenced by their varieties, ages, parts and the harvested time, which affects the dry matter and nutrients digestibility in ruminants.

Keywords: *fiber, cell wall, nutrition, cattle*

PRODUCTIVITY OF PARENT DUCK FROM TWO STRAINS OF HIGH-YIELD DUCKS SPECIALIZED IN MEAT V22 AND V27 UNDER FARM PRODUCTION CONDITIONS

Vol 100. June, 2019. Pp. 21-29

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The aim of this study was to examine the reproductive performance of parent ducks produced from two high-meat-yield V22 and V27 duck lines, reared in three farming models from January to May 2019. Ducks were reared in three farming models. Model 1 and 2 was open sided housing with backyard and swimming pond carried out in Long An province while model 3 had the same housing and backyard but without swimming pond in Dong Nai province. Number of ducks in laying period were 330 males and 2.000 females in Model 1, 250 males and 1.500 females in each of model 2 and 3. The results showed that survival rate from 0 to 7 weeks of age of models 1, 2 and 3 was 94.85%, 94.16% and 96.55% respectively, from 8 to 24 weeks of age was 98.30 %, 98.11% and 98.54% respectively. Age at first egg of the 3 models was 171 days, 173 days and 168 days respectively. Laying rate, egg production per female in 42 weeks of laying, feed consumption rate for 10 eggs produced of model 1 was 71.43%, 210.02 eggs and 3.69 kg, of model 2 was 71.28%, 209.62 eggs and 3.70 kg and of model 3 was 71.15%, 212.13 eggs and 3.57 kg respectively. Fertility and hatchability of model 1 was 95.09% and 80.04%, of model 2 was 94.66% and 80.44% and of model 3 was 96.44 and 0.82% respectively. Model 3 has the best productivity and economic efficiency.

Keywords*: Meat type parent ducks, farming models, reproductive performance*

PRODUCTION AND REPRODUCTION PERFORMANCES AND SOME GENETIC PARAMETERS OF MAIN TRAITS OF DUROC, LANDRACE AND YORKSHIRE BREEDS RAISED AT DABACO NUCLEUS BREEDING PIG COMPANY

Vol 100. June, 2019. Pp. 30-43

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The study was carried out to assess the current status of performance testing, reproductive performance and estimate the genetic parameters of some major traits in the GGP herds of Duroc, Landrace and Yorkshire breeds raised at Dabaco nucleus breeding pig company. The data of these breeds were: 2795, 3563 and 5762 individuals, respectively for the performance testing; 2779; 6252 and 5847 parities for reproductive performance. The GML in SAS 9.1.3 was applied to evaluate the influenced factors, calculate LSM, SE and compare significant differences. VCE6 software was used to estimate genetic parameters. The results showed that: the boars and gilts of Duroc, Landrace and Yorkshire gained an ADG of 812-834 g/day, lean rate of 59-60%. Heritability of these two traits were 0.35-0.49 and 0.48-0.56, respectively. Genetic and phenotype correlation co-efficiencies between these two traits were 0.08-0.31 and -0.08-0.09, respectively. The Yorkshire, Landrace and Duroc sows had 12,02; 11,58 and 9,85 for total of number piglets at birth (TNB); 10.70; 10.41 and 9.02 for number of piglets born alive (NBA); 10.14; 10.10 and 9.00 for number of weaned piglets (NW). Heritability of the TNB, NBA and NW were: 0.09-0.17; 0.06-0.12 and 0.03-0.10, respectively. The repeatability of these traits were: 0.14-0.24; 0.13-0.20 and 0.05-0.12, respectively. Genetic correlation co-efficiencies among them were 0.60-0.94, the phenotype correlation coefficient were 0.54-0.88.

Keywords: *production and reproduction performances, genetic parameter, Duroc, Landrace, Yorkshire.*

ASSESSING THE ABILITY OF MANPOWER AND HONEY PRODUCTIVITY APIS CERANA RAISED IN BAC GIANG

Vol 100. June, 2019. Pp. 44-50

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Assessing the development of bee colonies and deteminating honey productivity of the Apis cerana colonies were conducted in Bac Giang Agriculture and Forestry University. The experiment was monitored on 05 colonies with 03 combs/colony, the numbers of time for collecting honey bee were 2-3 times and 10 times respectively in Autumn-Winter and Spring-Summer. The average honey productivity in Spring-Summer was 0.7 kg/colony higher than 0.36 kg /colony in Autumn-Winter. The number of queen cell creating in the natural process was different between Spring-Autumn and Autumn-Winter (4.2 queen bee cells /colony and 1.5 queen bee cells /colony respectively). There was not different in the volume and the size of queen cell between two seasons. Laying egg capacity of Queen was 372.5 eggs/ day and night in Spring-Summer and 347.2 eggs / day and night in Autumn-Winter. The result shows the development of bee colonies was stable, however, honey productivity was slow.

Keywords: *honey productivity, queen cell, laying egg capacity, Apis cerana*

EFFECTS OF DIETARY SUPPLEMENT HERBAL MIX PREMIXHAD ON THE ECONOMIC-TECHNICAL INDICATORS OF GROWING PIGS

Vol 100. June, 2019. Pp. 51-59

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This study aimed to investigate the effects of the dietary herbral mix Premixhad (Oishi VJI, Vietnam) supplement on intake, gain, feed effeciency and prevent diarrhoea of growing pig from 60 - 142 day of age (BW 19,8 ± 0,42 kg). The experiment was conducted in the Experimental farm of Tan Viet Feed Co. Ltd (Lam Thao, Luong Tai, Bac Ninh) from May to August, 2018. 253 growing pigs were assigned into two experimental diets, include: (1) the control diets content neither antibiotic nor herbal mix, (2) the experimental diet content 0,03% DM of Premixhad. Each of diet included 5 cages which had 22-27 heads per cage. The growing pig were *ad libitum* from gravity feeders. The growth rate, intake, feed converted rate (FCR), diarrhoea status and feed and verterinary cost were observed. The results showed that, Premixhad supplementreduced the feed intake ($P<0,05$), even the diets did not affected on growing rate. Supplement Premixhad declined FCR of growing pigs ($P<0,05$) but did not affect on total feed cost. Both the ratio of days in diarrhoea occurrence and day number for diarrhoea treating were lower for Premixhad diets compared with the control diets ($P<0,01$). The vertarinary cost were lower 70 VND per kg weight gain for the Premixhad supplement diets compared with the control diet ($P<0,01$). In conclusion, the supplement of Premixhad mix at 0.03% DM into growing pig diet could completely improve the efficient of pig production at 60-142 days of age.

Keywords: *herbal, premixhad, growing pig, gain, FCR, disease prevention*

EXPERIMENT ABOUT YIELD AND QUALITY OF SOME VARIETIES OF GRASS RUZI, TD58 AND HAMIL IN TRA CU DISTRICT, TRA VINH PROVINCE

Vol 100. June, 2019. Pp. 60-66

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The experiment was conducted at farmer households and farms in 3 communes: Phuoc Hung, Tap Son and Tan Hiep in Tra Cu district, Tra Vinh province from April 2016 to December 2017. The objective was to evaluate the yield, the quality of some varieties of grass: Ruzi, TD58 and Hamil in Tra Cu district, Tra Vinh province. Area

of 2 ha; in which Ruzi and TD58 each 0.7 ha; Hamil 0.6 ha. Seeded. Grass seeds are produced and supplied by the Ruminant Research and Development Center.

The results showed that: Grasses: Ruzi, TD58 and Hamil have good growth and development ability and high yield in soil and climate conditions in Tra Cu district, Tra Vinh provinces. Green yields of the first year ranged from 148.93 to 221.26 tonnes/ ha/year and the second year was 185.35 to 272.94 tonnes/ha/year.

The quality of the three varieties of grass is quite good, dry matter 17.34 to 17.94%, crude protein is 1.80 - 2.61% (in natural form).

Keywords*: Ruzi, TD58 and Hamil grass, productivity, quality.*

STUDY ON INTESTINAL NEMATODE INFECTION IN BACKYARD CHICKENS AND EXPERIMENTAL THERAPY IN TRA VINH PROVINCE

Vol 100. June, 2019. Pp. 67-73

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The study was conducted with a total of 450 fecal samples from backyard chickens in Tra Vinh town, Chau Thanh and Cang Long districts of Tra Vinh province from 08 January 2018 to 30 January 2019. Overall prevalence of intestinal nematodes infectation was found to be 83,8% from fecal samples by using floatation technique. The results of classification and identification of intestinal nematodes species on backyard chickens by using classical parasitological techniques showed that the four different types of parasites observed in all four locations of the study included *A. galli:* 47,8%*, H. gallinarum:* 32,2%*, H. beramporia:* 21,3% and *C. obsignata:* 16%. The proportion of intestinal nematodes infection in free-range chickens, semi-intensive chickens, and confinement chickens were 100%, 91,3%, and 60%, respectively. The experimental deworming was carried out by using two kinds of anthelmintic drugs such as Levamisole (oral) and Albendazole (oral). It was found that all of drugs were safe and have no side effects to animals during treating. Especially, Albendazole and Levamisole with the dose of 1g/3kg body weight was the most effective with 100% deworming.

Keywords: *nematode, Tra Vinh province, infection rate,backyard chickens, deworming efficacy*

IMPACTS OF DROUGHT ON BEEF CATTLE PRODUCTION IN MIDDLE HIGH LAND ZONE

Vol 100. June, 2019. Pp. 74-84

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The investigation was carried out to assess the impact of drought on beef cattle production in middle land environment in two provinces (Gia Lai and Daklak) of Vietnam. Data were collected from a total of 170 cattle-owning households and of 85 crop production households from high middle landenvironments using questionnaires. The descriptive statistics and GLM procedures in MINITAB 16 were applied for data analysis.

The results showed that drought had a strong influence on reducement of productivity of forage amounted to 20.61%, lost productivity of the grasses depending on various grass varietiesand loss of productivity from 19.59% to 26.48%. The scaling of farms were varied tending to reducement, herd size on hold farms was decreased to 29.31%, herd size of breeding old bulls was remained, the herd size of birth to 12 months oldcalves was reduced to 22.13%; cow herd size decreased to 10.85%; heifer herd size reduced to 14.69%. General population size was reduced to 29.32% under the impact of drought. Number of breeding old bulls was maintained, young breeding bulls were reduced to 28.57%, calves of age classes from birth to 12 months old reduced to 43.26%; cow number was reduced 15.60% and heifer number was reduced to 35.00%. Performance was also lost, the different losses in various breeding groups. Specifically, birth weight was lost by 3.37%; the

weight at six months old was lost by 10.39% and 12 months old weight was lost by 7.99%. In period of drought the days open were increased by 31.68%, mainly due to the farmers actively stop mating and insemination to avoid negative and prolonged impacts of the drought.

It is concluded that drought has resulted in indirect impact on beef cattle production via reduced productivity and yield of main crops related to beef cattle production such as rice, maize, cassava and grasses. Moreover, the direct impact of drought on beef cattle production was that resulted in reduced hold farm scaling and herd sizes, growth and reproduction.

Keywords: *Drought, impact of drought, beef cattle production*.

CURRENT SITUATION OF USING PLANT PROTECTION DRUGS ON SOME HONEY SOURCE PLANTS FOR BEE KEEPING

Vol 101. July, 2019. Pp. 2-9

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The Center for Rural Development (Rudec) has conducted a study on "Current situation of using plant protection drugs (BVQ) and industrial plants (CCN) in some major growing areas of Vietnam". These are the key crops, playing an important role in the current share of agricultural exports in Vietnam. On the other hand, among the surveyed plants, there are some plants that are honey, chalk for beekeeping such as coffee, citrus, mango, dragon fruit. The objectivesof the study are to: (1) Review the state regulations relating to the management and use of pesticides, (2) Assess the current use of pesticides and compliance with regulations and the principle of safe use of pesticides, (3) Identify the causes of unsafety and unsafe use of pesticides, and (4) Propose some recommendations to improve management and effective use of pesticides. In order to carry out this study, in addition to exchanging discussions with leading experts in the field of plant protection and local pesticide management agencies, the research team conducted direct interviews with producers survey questionnaire. Research results shown that up to 38.8% of surveyed households sprayed pesticides periodically at the time of blooming flowers and 38.2% of surveyed households have treated / sprayed pesticides at the time of blooming flowers. Besides, many households used incorrect drugs, improper dosage and improper concentration to directly affect crops, exportive agricultural product quality and indirectly affect Vietnamese honey quality.

Keywords: *Pesticides, honey pollen, bee bloom*.

THE EFFECT OF SELECTING BODY WEIGHT OF PARENTS' BUFFALOES ON GROWTH PERFORMANCE OF CALVES BORN IN THAI NGUYEN PROVINCE

Vol 101. July, 2019. Pp. 10-23

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The research was carried out from January 2015 to December 2018 in the area of Bao Ly commune, Phu Binh district, Thai Nguyen province to assess the effect of selected parents' buffaloes via body weight on the growth rate of the calves herd. The research used 4 buffalo bulls with big body weight mated with 120 selected local female buffaloes (each buffalo bull was mated with 30 selected female buffaloes). Body weight of the calves in experiment was compared to calves' body weight in control group (nonselected parents). The results showed that: Using the big body weight buffalo bulls for mating with selected female buffaloes has enhanced the body weight and growth rate of the calves compared to the control group from 14.95 to 19.96%. The body weight of calves, which were born in the experiment was higher than in the control group: The male calves' birth weight was (27.91 kg compared to 23.16 kg), the female calve birth weight is (26.99 kg compared to 22,60 kg); 12 months old of male calve (179.89 compared to 152.96 kg), female calve (167.78 kg compared to 146.18 kg); 24 months old male calve (298.61 compared to 256.00 kg), female calve (272.85 kg compared to 241.14 kg). The phenotypic correlation coefficient between the birth weight and the body weight at the next age is allways on the same direction, positive and quite tight, fluctuating in the range of 0.538-0.576.

Keywords*: big size buffalo bull, selected buffaloes, birth weight, growth, body size.*

REPRODUCTIVE PERFORMANCE OF NUCLEAR HERDS LANDRACE AND YORKSHIRE AND ITS AFFECTING FACTORS

Vol 101. July, 2019. Pp. 24-33

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This research was conducted from 2017 to 2019 to evaluate the reproductive performance and its affecting factors of nuclear herds Landrace and Yorkshire in Tam Diep nuclear breeding swine research and development station, part of Thuy Phuong pig research, and development center. There were 100 Landrace sows with 400 litters, 80 Yorkshire sows with 80 litters, from the first to the fourth litter involved in the research. The nuclear herds' Landrace and Yorkshire had high reproductive performance with no statistically significant difference in reproductive physiological criteria between the two breeds. The age at first service of Landrace and Yorkshire were 351.99 and 352 days, the total number born alive were 13.03 and 12.93 piglets, the total number weaning were 12.41 and 12.39 piglets, the total weaning weight were 80.32 and 80.43 kg/litter, and the sow indexes were 28.63 and 28.70 piglets/sow/year. In both breeds, reproductive traits had oriental increasing from the first to the fourth litter ($P<0.05$), which was the lowest at the first litter and reached the highest at the fourth litter. Besides, the breed factor did not affect all interesting traits in this study. The litter did not affect the survival rate and age at the weaning factor affected the rest of the interesting traits in this study. The seasonal factor did not affect the survival rate, age of weaning, and neonatal weight per child but significantly affected to weaning rate and other traits.

Keywords: *Reproductive performance, affecting factors, Landrace, Yorkshire*

GROWTH PERFORMANCE OF CROSSBRED CALVES FROM BIRTH TO SIX MONTHS OF AGE IN BEN CAT TOWN, BINH DUONG PROVINCE

Vol 101. July, 2019. Pp. 34-45

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The experiment was carried out at small farms in Ben Cat town, Binh Duong province, to evaluate the growth performance of calves from birth to 6 months old (20 individuals / group) derived from crossbreeding between Red Angus, Charolais, Red Brahman or Lai Sind and synchronized oestruos Lai Sind cows by artificial insemination. The body weight, age, number of parities and calving interval of Lai Sind crossbred cows were comparatively similar. Pregnant cows and crossbred calves were completely confined and feeds were provided in the barn. Nutrition and health care for cows and calves were in the same condition. Results revealed that difference of the wither height was not statistically significant ($P> 0.05$) among crosses. Chest girth, cross body length and body length at 2, 4 and 6 months of Red Angus and Charolais crossbreds were equivalent but statistically significant higher than those of the Red Brahman crossbred and Lai Sind ($P<0. 05$). The round index of Red Angus and Charolais crossbred calves were similar at 6 months but significantly higher than that of the Red Brahman crossbreds and Lai Sind ($P<0.05$). The body weight of Angus, Charolais, Red Brahman crossbreds and Lai Sind at 6 months of age were 147.3 kg; 151.2 kg; 122.4 kg and 105.7 kg, respectively. Weight gain of Red Angus and Charolais crossbred calves were similar but higher than that of the Red Brahman crossbreds and Lai Sind ($P<0.05$).

Keywords: *crossbred calves, Red Angus, Charolais, Red Brahman, Lai Sind, body weight, weight gain*

EFFECT OF SUPPLEMENTINGGROUND MAIZE LEVELS ON GREENHOUSEPRODUCTION AND ORGANIC MATTERDIGESTIBILITY IN *IN VITRO* WITH THE SUBSTRATE OF ELEPHANT GRASS AND RUMEN FLUID OF BEEF CATTLE AS AN INOCULUM

Vol 101. July, 2019. Pp. 46-56

Lai Quoc Khanh and Nguyen Van Thu

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A study was conducted at Can Tho University to evaluate effects of the supplement of ground maize levels in the mixture on the *in vitro* CH_4, CO_2 production and organice matter digestibility. This experiment was arranged in a completely randomized design with 5 treatments and three replications. The treatments were the supplementation levels of ground maize of 0, 15, 30, 45 and 60% (%DM) corresponding to B0, B15, B30, B45 and B60, respectively. The main substrate was elephant grass (Pennisetum purpureum). The results shown that the total gas, CH_4 and CO_2 production (ml) at 72 h were significantly different ($P<0.05$) among the treatments with the highest value for the B30 treatment (62.4 ml) and the lower values for the B0 (55.7 ml) and B60 treatments (56.1 ml). Organic matter digestibility (OMD) at 72 hour significantly increased ($P<0,05$) among the treatments by increasing of levels of maize, and the highest value for the B60 treatment (69.3%). CH_4 production (ml/g DOM) at 72 h was significantly reduced from 0% to 60% ($P<0.05$). It was concluded that CH_4 and CO_2 production (ml/g DOM) were reduced, while OMD increased when enhancing the levels of high soluble carbohydrate of ground maize from 0-60% to the substrate with $y=-1.16x+149$ ($R^2=0.763$).

Keywords: *fermentation, methane, ruminants, soluble carbohydrate, supplements.*

A SURVEY OF DIETARY NEUTRAL DETERGENT FIBER LEVELS IN THE RATION OF BEEF CATTLE IN AN GIANG PROVINCE

Vol 101. July, 2019. Pp. 57-67

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A survey of dietary neutral detergent fiber (NDF) levels of beef cattle was conducted in Chau Thanh, Chau Phu and Cho Moi districts of An Giang province. The aim of the study was to determine the NDF level in diets of beef cattle. Two hundred and nineteen Zebu crossbred beef at 6, 12, 18, 24, 30 and 36 month of age located at 52 households were survived. Feed intake data levels at different ages for each beef were directly weighed with the amount of feed feeding and residue for 7 days continuously. The results showed that the total dry matter intake of beef cattle from 6 to 36 month of age increased gradually from 2.73 to 8.22 kg/head/day. The dry matter intake of supplemental feed (rice bran, broken rice and concentrate) in diets of beef cattle at 6, 12, 18, 24, 30 and 36 month of age were 0.29, 0.63, 0.94, 1.41, 2.11 and 2.15 kgDM/day. The dietary NDF (%) of beef cattle in this survey were 49.7; 55.8; 57.2; 56.6; 55.6 and 57.9 for beef cattle at 6, 12, 18, 24, 30 and 36 months of age, respectively. The dry matter intake (DMI) /body live weight (%) being 2.20; 2.10; 2.01; 2.02; 1.80 and 1.74 on beef at 6, 12, 18, 24, 30 and 36 months of age. The CP intake (g/100kg body live weight) and ME (kcal/100kg body live weight) consume of cattle at 6, 12, 18, 24, 30 and 36 months of age were 219 and 4,494; 196 and 4,429; 194 and 4,215; 192 and 4,299; 172 and 3,941; 153 and 3,738, respectively. These findings were higher than those values of previous studies. The higher NDF level in the diet reduced crude protein intake, ME and DMI / body live weight (%).

Keywords: *Beef zebu, feed intake, neutral detergent fiber*

RESEARCH AND EVALUATE A NUMBER OF INDICATORS ON THE QUANTITY, QUALITY OF SEMEN AND PRODUCTION ABILITY OF THAI SWAMP BUFFALO

Vol 101. July, 2019. Pp. 68-77

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Thai swamp buffaloes have been imported from Thai Lan into Viet Nam since May 2017, kept at the Mountainous Animal Husbandry Research and Development Center, Binh Son, Song Cong and Thai Nguyen. The results of the study on the semen quality of 05 Thai bulls in 2 seasons: April - May and September - October showed that: The average volume of semen reached 3.17 ml and 3.76 ml; The average sperm motility of Thai bulls reached 78.84% and 86.24%; The average sperm concentration in one ml of semen reached 910.5 million / ml and 924.7 million / ml; The average rate of abnormality sperm reached 16.18% and 14.52%; The ratio of live sperm reached 73.09% and 77.43%. The color of semen is milky white with the highest percentage of 64%; cream white color (24.0%) and the ivory white is the lowest (12.0%). The average semen pH of Thai bulls was from 6.8 to 6.9. The average number of standard straws produced is 191,56 straws per one time semen production. The rate of standard straws is 90%. The sperm motility after freezing is 51.54% in average.

Keywords: *Semen, amount of ejaculation, motility of sperm, sperm concentration, rate of abnorability sperms, rate of live sperm, semen color, semen pH.*

SURVEY RESULTS OF BEEF CATTLE LIVESTOCK DEVELOPMENT SITUATION AND BEEF MEAT CONSUMPTION MARKET IN TRA CU DISTRICT, TRA VINH PROVINCE

Vol 101. July, 2019. Pp. 78-88

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The survey was carried out at farmer households and farms in 5 communes: Phuoc Hung, An Quang Huu, Tap Son, Tan Son and Tan Hiep in Tra Cu district, Tra Vinh province from November 2015 to December 2015. Survey by the method of rural appraisal with the participation of the people of PRA (Participatory Rural Appraisal). Primary information is collected through direct interviews of farmers at farm households, slaughterhouse owners and beef shop owners. Interview information in the form of printed survey forms. The objective is to evaluate the situation of cattle raising at farmer households and farms in Tra Cu district, Tra Vinh province, such as: herd structure, crossbreeding, breeding management, some technical indicators on beef cattle and beef consumption market in Tra Cu district, Tra Vinh province.

The results showed that cattle of Tra Cu district increase in both quantity and quality through 2013-2017. Crossbreeding accounts for a high proportion of the population. Cattle raising accounts for a significant share of household income. The main species are cows. People have invested, as well as technical application in raising cattle such as farm buildings, land for grass planting, use of agricultural by-products, good breeding or artificial insemination disease prevention. The scale of cattle raising is concentrated in medium and small scale. However, management of insemination, reproductive management and crossbreds is not good. Foster care, especially nutrition for cows, is not sufficient.

Keywords: *Situation of cattle raising, technical indicators, consumption market.*

THE RESULTS OF GENETIC RESOURCE EXCHANGE IN LANDRACE, YORKSHIRE, DUROC AND PIETRAIN BREEDS IN THAI DUONG EXOTIC SWINE BREEDING COMPANY LIMITED

Vol 102. August, 2019. Pp. 2-11

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To evaluate the genetic exchange between three farms of Binh Thang, Thai Duong, and Thuy Phuong, four breeds including Landrace, Yorkshire, Duroc, and Pietrain, which raised in Thai Duong Exotic Swine Breeding Company Limited from 2016 to 2019. Before the genetic resource exchange, there were 730 sows with 300 Landrace sows (875 litters), 300 Yorkshire sows (873 litters), 100 Duroc sows (282 litters), and 30 Pietrain sows (70 litters). Nuclear herds were selected after genetic exchange included 190 sows with 70 Landrace sows (280 litters), 70 Yorkshire sows (280 litters), 40 Duroc sows (160 litters), and 10 Pietrain sows (40 litters). The results showed that the reproductive performance of the nuclear herd increased significantly in comparison to the previous herds. The total number weaned/litter (NW), the weaning weight/litter (WW), and total number weaned pig/sow/year (NWS) in four breeds increased more than 10 percent. The NW of Landrace, Yorkshire, Duroc, and Pietrain were 12.04, 11.99, 10.23 and 10.30 piglets, respectively. The WW of these breeds were 78.00, 77.57, 67.43 and 67.40 kg/litter, and NWS were 27.71, 27.50, 22.36 and 22.44 piglets, respectively. Also, the age of first mating and the first farrowing age of all four breeds were stable. The age of first mating ranged from 238.47 to 240.40 d and the age of first farrowing varied from 353.49 to 355.60 d. Besides, the neonatal weight/head, and weaning weight/head and sow index of all breeds were stable.

Keywords: *Reproductive performance, Landrace, Yorkshire, Duroc, and Pietrain*

APPEARANCE CHARACTERISTICS AND PRODUCTIVITY OF GREY GOOSE

Vol 102. August, 2019. Pp. 12-21

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The topic has been implemented from July 2017 to August 2018 at the Dai Xuyen Duck Research Center on the Gray Goose breed, that first time were imported in Vietnam with a population of 372 geese (186 males + 186 females) to assess appearance characteristics, growth ability, fertility. The results showed that: 01day old goose has yellowish-gray fur, pale yellow underbelly, legs and beak black. Adult gray goose has uniform color, gray color, white belly.

Gray goose has a high survival rate of 91.94%, body weight of 26 weeks of age male goose 6509.21 g/bird, female goose 5865.97 g/bird, reached the rate compared with the standard weight of 100.14 - 100.27%. Gray goose has a laying age of 229.67 days and a laying rate of 25.51%; egg production 33.92 eggs / female / 19 weeks laying, consuming food 6.12 kg/10 eggs; egg weight 159.39 g per egg, the breeding egg standards, hatching rate is high 72.96%.

Keywords: *Characteristis, body weight, egg production, Grey goose.*

FACTORS AFFECTING REPRODUCTIVE PERFORMANCE OF LVN1 AND LVN2 PIGS

Vol 102. August, 2019. Pp. 22-30

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A study was conducted to evaluate the and reproductive performance of LVN1, and LVN2 pigs and effecting factors in Thuy Phuong pig research and development center from 2017 to 2019. The evaluation involves 70

sows with 35 LVN1 sows (105 litters), and 35 LVN2 sows (105 litters). The age at first service of LVN1 and LVN2 pigs was 214.11 and 217.34 days ($P < 0.05$), the age at first farrowing was 328.77 and 331.14 days, respectively with $P<0.05$. LVN1 and LVN2 pigs had high reproductive performance with the total number born alive (NBA) reached 12.00, and 12.22 piglets, respectively; the total number weaning pigs were (NW) 11.70 and 11.36 piglets, the total weaning weight/litter (WW) were 73.84, and 71.97 kg and the sow index were 28.55, and 27.63 piglets/sow/year. Besides, the reproductive traits in both LVN1 and LVN2 were orientational increasing from the first to the third litter. LVN1 sows had the NBA from the first to third litter were 10.63, 12.51, and 12.86 piglets, NW reached 10.29, 12.20, and 12.60 piglets, WW was 65.30, 76.98, and 79.23 kg, respectively. The LVN2 sows from the first to third litter had 11.14, 12.40, and 13.11 piglets (NBA); 11.00, 11.26, and 11.83 piglets (NW), and 69.38, 71.76, and 74.76 kg (WW). The breed and litter affected to sow index. WW was not affected by the breed factor but was significant affected by litter.

Keywords: *reproductive performance, affecting factors , LVN1 pig, LVN2 pig.*

GROWTH PERFORMANCE, CARCASS AND MEAT QUALITY OF TWO CROSSEDBREDS: DUROC × (LANDRACE × YORKSHIRE) AND PIDU × (LANDRACE × YORKSHIRE)

Vol 102. August, 2019. Pp. 31-39

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This study was carried out in the experiment farm of Bac Giang agriculture and forestry university from 2016 to 2018 to avaluate growth performance, carcass characteristics and meat quality of Duroc (Du) boar – F1 Landrace x Yorkshire (LY) sow and Pietrain Duroc (PiDu) - F_1 LY sow. Growth performance was executed three times, each crossbred included 30 individuals per batch. The total of experimental pigs were 90 heads per crossbred. The results showed that over the same period of age, average daily gain of Du × F_1 (LY) was 821.78 g/day, higher than PiDu × LY (771.84 g/day). The lean meat rate of Du × F_1 (LY) and PiDu × F_1(LY) were 58.94% and 60.03%, respectively. At the end of experiments, 6 commercial pigs in each experiment were slaughtered to evaluate their meat quality. Killing out percentage and carcass yield of Du × F_1(LY) and PiDu × F_1(LY) were 70.08 and 81.15%; 75.75 and 72.38%. Indicartors of meat quatlity such as drip loss, pH_{45}, pH_{24} and color of meat were within normal range of pork. The pH of logissimus dorsi muscle at 45 minutes (6.28 and 6.52 for Du × F_1(LY) and PiDu × F_1(LY)) and 24 hours post mortem (5.7 and 5.74). It is therefore recommended that the crossbreds between Du and Pidu boars and F_1(LY) sows had good growth rate and meat quality.

Keywords: *Duroc, F_1(Landrace x Yorkshire), Growth rate, Meat quality, PiDu.*

THE EFFECT OF SELECTING BODY WEIGHT OF PARENTS' BUFFALOES ON GROWTH PERFORMANCE OF CALVES BORN IN THANH HOA PROVINCE

Vol 102. August, 2019. Pp. 40-51

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The research was carried out from January 2015 to December 2018 in the area of Ngoc Lien commune, Ngoc Lac district and Cam Tan commune, Cam Thuy distric, Thanh Hoa province to assess the effect of selected parents' buffaloes via body weight on the growth rate of the calves herd. The research used 4 buffalo bulls with big body weight mated with 120 selected local female buffaloes (each buffalo bull was mated with 30 selected female buffaloes). Body weight of the calves in experiment was compared to calves' body weight in control group (nonselected parents). The results showed that: Using the big body weight buffalo bulls for mating with selected female buffaloes has enhanced the body weight and growth rate of the calves compared to the control group from 14.95 to 19.96%. The body weight of calves, which were born in the experiment was higher than in the control group: The male calve birth weight is (28.82 kg compared to 23.89 kg), the female calve birth weight

is (27.93 kg compared to 22.91 kg); 12 months old of male calve (186.83 kg compared to 158.70 kg), female calve (175.43 kg compared to 153.65 kg); 24 months old male calve (307.27 kg compared to 264.35 kg), female calve (281.98 kg compared to 256.23 kg). The phenotypic correlation coefficient between the weight of father influences to the weight at age diffrence of calves much a lot, allways on the same direction, positive and quite tight, fluctuating in the range of 0.47-0.71. Similarity, the phenotypic correlation coefficient between the weight of mother with the calves luctuating in the range of (0.13-0.27), between the birth weight and the weight at the age difference of calves (0.42-0.59)

Keywords*: big size buffalo bull, selected buffaloes, birth weight, growth, body size.*

THE GROWTH PERFORMANCE OF LAC THUY CHICKEN AND F1 (LAC THUY × LUONG PHUONG) HYBRID RAISED IN VIET YEN – BAC GIANG PROVINCE

Vol 102. August, 2019. Pp. 52-63

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One experiment on Lac Thuy chicken and F1(LT × LP) hybrid chicken was conducted to determine growth performance and the effeciency of feed use by 02 experimental chicken groups. The experiment was divided into 2 groups; the first group included 200 Lac Thuy heads and the second group (200 F1(LT × LP) heads) with 3 replications. Both groups had a free diet and were raised in captivity. The experiments were raised in the same condition such as care ways, iso-sex and so on. The results showed significant differences from growth performance between 02 experimental groups: in the seventh week, the weight of Lac Thuy rooster was 2130 g/head, the that of hen was 1624 g/head and average Lac Thuy group was 1877.5 g/head. In term of the weight of F1(LT × LP) rooster was 2248.5 g/head, the figure of hen was 1751.4 g/head and 1999.9 g/head was average of this group. Absolute growth rate and relative growth rate followed by the rule of the growth. In the seventh week of Lac Thuy: each rooster and each hen used the amount of feed, with 4948.2 and 3238.1 g/head/week; FCRs of rooster and hen were 3.86 and 4.14 kg feed/kg increased weight. In term of F1(LT × LP) used the amount of feed and PCR for rooster and hen, at 4482.5 and 3570.7 g/head/week; 3.72 and 4.1 kg feed/kg increased weight respectively. The experiment showed F1(LT × LP) group had economic efficiency more than Lac Thuy group.

Keywords: *growth performance, Lac Thuy, F1(LTxLP), Viet Yen*

EFFECT OF NANO-TRACE MINERALS SUPPLEMENT ON PERFORMANCE, FEED EFFICIENCY AND MINERAL CONTENT IN BLOOD AND LIVER OF GROWING PIG

Vol 102. August, 2019. Pp. 64-73

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A total of 180 growing pigs with initial avarage body weight 25-30 kg were used to evaluate the effect of supplementation of nano-minerals at different levels compare with inorganic mineral on growth rate and feed efficiency and mineral content in blood and liver. Experiment was conducted for 120 days. The experiment was designed as a completely random one-factor model with 5 treatment, each treatment has three replicates. In control group, pigs were fed the diet containing inorganic mineral with the level recommended by NRC (2012) (Mn: 2; Fe: 60; Cu: 4; Co: 0,3; Se: 0,2; Zn: 60 mg/kg feed). Experiment treatments (treatment 2 to 5), the diet inclusion nano minerals at the level of (1.2; 20; 2; 0.1; 0.1 and 20 mg); (2.4; 40; 4; 0.2; 0.2 and 40 mg); (4.8; 80; 8; 0.4; 0.4 and 80 mg); (9.6; 160; 16; 0.8; 0.8 and 160 mg) respectively. Results showed that: (i) The supplementation of nano-minerals in growing pig at the level from 34,3% to 274,4% compare with control group did not impact on mortality rate, growth rate, feed intake, feed conversion; (ii) Using nano mineral at the level of 34,3% has not any negative effect on pig performance and feed effciency; (iii) Increasing level of mineral in the diet cause increase the mineral content in blood and liver sample of growing pig.

Keywords: *Growing pig***;** *nano-minerals*.

EFFECTS OF ENERGY AND PROTEIN LEVELS OF FEEDLOT DIETS ON WEIGHT GAIN OF LAI SIND STEERS

Vol 102. August, 2019. Pp. 74-86

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The experiment was conducted at beef cattle farms in Ben Cat town, Binh Duong province, to assess the effects of energy and protein levels in the diets on weight gain of Lai Sind bulls in beef cattle fattening. Forty five Lai Sind bulls (24 months of age and 307.4 kg initial body weight) were completely randomized arranged in 9 treatments (5 heads / treatment) with two factors of energy and protein levels (energy levels were 2.5; 2.6 and 2.7 Mcal ME/kgDM and protein levels were 105; 115 and 125 g CP/kg DM). The bulls were caged individually in the feedlot system, provided drinking water *ad libitum* and fed respective diets. The respective diets were fomulated as TMR (Total Mixed Ration) with the above energy and protein levels. The results show that during fattening period, weight gain reached 986.7-1.084.4 g / head / day and feed cost was 35.4-38.2 thousand VND/kg of weight gain. However, the weight gain of experimental cattle during fattening period did not differ between CP/DM levels of 105 g/Kg DM; 115 g/Kg DM and 125 g/Kg DM (P> 0.05). But the weight gain of bulls fed diet of ME/DM 2.5 Mcal / Kg DM and 2.7 Mcal/Kg DM were significant different (P <0.05). Fattening diet for Lai Sind bulls with CP/DM of 105g or 115 g CP/Kg DM corresponding to ME/DM at 2.5 Mcal/Kg DM or 2.6 Mcal/Kg DM were more economically efficient than the remaining energy and protein levels.

Keywords: *Fattening, dry matter, energy, protein, weight gain, Lai Sind bulls*

THE CURRENT STATUS OF FEEDING REGIME OF EXOTIC GILT AT FARM CONDITION

Vol 102. August, 2019. Pp. 87-96

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This research was conducted to assess the current status of feeding regime of exotic gilt production at farm condition in the North, Central and South. A stratified-system-random sampling technique was used to select 59 surveyed farms in three provinces of Thai Nguyen, Thanh Hoa and Dong Nai. The survey results show that about 50.9% farms raised gilts in one period with the starting age of 167.4 days, in two periods (20.3% farms) with the starting age of 153.42 and in three periods (28.8% farms) with the starting age of 105.24 days. Protein content and digestible lysine/ME ratio in the gilt diet at 30-60 kg and 60 kg - the first mating were respectively 16.81% and 2.34 g/Kcal; 15.14% and 2.03 g/Kcal. The number of weaned piglets/sow/year of gilts raised under 1, 2, 3 periods was 22.49; 23.62 and 22.52, respectively. In general, the average reproductive performance of exotic sow was 22.63 piglet/sow/year

Keywords: *Exotic gilt, farm, feeding regime, weaned piglet*

PHYSICAL CHARACTERISTICS, GROWTH AND REPRODUCTIVE PERFORMANCE OF LUNG PU, VAN PA AND SOC PIGS

Vol 103. September, 2019. Pp. 2-12

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This study was carried out to evaluate the appearance, growth and reproductive performance of Lung Pu, Van Pa and Soc pigs. The database of this study was collected not only from the survey but also from the direct monitoring process at the households. The result shows that most of Lung Pu pigs are black skin and hair with

six white spots on 4 legs, tip of the tail, and white curled hair on the forehead. Lung Pu pigs have quite rough skin which is covered with thick short hair. The ears are small, straight with protruding the sides and slightly crooked at the tip of the ears, and a medium-long, pointed head, followed by straight back with not sagged belly. Van Pa pigs have black hair with a salient feature of three hair strands in three follicles that are close to each other, forming an isosceles triangle shape where the hairs stick out to three dimensions, short and slender body with a small head, straight back, slightly belly, and small slender legs. The ears are thick and straight with small structures that taper to a point at the tip. Beside, Soc pigs also have back hair, slender body with a relatively large head with small straight ears which looks like a mouse ear. The hair in the nape of Soc pigs are long and stiff, the back is straight or slightly sagging, the belly is slender, the legs are moderately tall and straight. The age at first service of Lung Pu, Van Pa, and Soc pigs were about 6.5 – 8 months. The reproductive performance of these breeds was low. The total number born alive ranged from 6.34 to 7.22 piglets, the total number of weaned pigs varied from 5.24 to 6.05 piglets. Sow index of those breeds reached from 1.66 to 1.76 litter/sow/year. The growth performance was slow with an average of weaned weight was 3.02 – 4.98 kg/piglet at from 44.59 to 56.47 days of weaning age, and the average daily gain was 76.67 – 208.0 g/day.

Keywords: *Lung Pu Pigs, Van Pa Pigs, Soc Pigs, physical characteristics, growth performance, reproductive performance*

GROWTH PERFORMANCE OF CROSSBRED (GROWTH DUROC × INTRAMUSCULAR FAT DUROC) AND CROSSBRED (INTRAMUSCULAR FAT DUROC × GROWTH DUROC)

Vol 103. September, 2019. Pp. 13-20

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This study was conducted at Thuy Phuong pig research and development center from 2017 to 2019 to evaluate the growth performance of two crossbreds DVN1 (Growth Duroc × Intramuscular fat Duroc) and DVN2 (Intramuscular fat Duroc × Growth Duroc) which were imported from two growth and intramuscular fat Duroc lines from Canada. There were 100 DVN1 pigs (50 males and 50 females), and 100 DVN2 pigs (50 males and 50 females) from 30 to 100 kg period. The results showed that DVN1 and DVN2 had a great growth performance which average daily gain reached 889.58 and 887.48 g/d (P>0.05), lean meat percentage of 60.96 and 60.89% (P>0.05), and intramuscular fat percentage of 2.66 and 2.61% (P>0.05), respectively. There was an insignificant difference of average daily gain, backfat thickness, loin muscle area, and intramuscular fat percentage, between DVN1 and DVN2 pigs in the same genders.

Keywords: *growth performance, backfat thickness, loin muscle area, intramuscular fat percentage, DVN1 pig, DVN2 pig*

PRODUCTIVITY OF COMMERCIAL SEA DUCKS RAISED IN FRESH AND SALTY WATER ENVIRONMENTS

Vol 103. September, 2019. Pp. 21-34

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Sea Duck 15 - Daixuyen is able to adapt to the fresh, brackish and salty water environment for high productivity. To assess the meat productivity of Sea ducks 15 - Daixuyen in freshwater, saltwater environments conducted the experiment. Sea duck 15 - Daixuyen was reared commercially in fresh water at Daixuyen Duck Research center and in saltwater at the farm commune, Hoang Tan Quang Yen town, Quang Ninh province, with salinity of water

was 30‰. Ducks have a number of individuals from 1 day of age and raised until 10 weeks of age. Conducting survey at 8, 9 and 10 weeks of age with each of the 6 raising sites including 3 male ducks and 3 female ducks in each week of the survey. Results shown that survival rate was high in the freshwater reached 96.67%, salty water reached 93.33%. Body weight gain at 10 weeks of age for male and female duck in freshwater condition was 2787.92; 2639.75 g/duck and in saltwater condition was 2619.14; 2540.46 g/duck. Absolute growing rate of Sea duck 15 - Daixuyen in fresh and salt water was the highest in weeks of 5 - 6 age for male and female duck then gradually decreased. Relative growing rate was the highest in the first week of age, then gradually decreased according to the regulation of poultry growing rate. Feed consumption/kg body weight gain in the stage of 0 - 10 weeks of age was 2.70 kg in freshwater and 2.75 kg feed in salt water. The carcass rate was high. At the stages 10 weeks of age, breast meat of Sea duck 15 - Daixuyen was 16.71% pet freshwater, and 16.54% in the saltwater condition. The thigh meat rate was gradually reduced according to age at slaughter, reached from was 13.26% in freshwater and 13.09% in saltwater. Sea duck 15 - Daixuyen adapt well in saltwater condition and meat productivity was high.

Keywords: *Sea Duck 15 - Daixuyen, commercial duck, growing rate, environments*

GROWTH PERFORMANCE OF CROSSBRED (FRENCH YORKSHIRE × AMERICAN YORKSHIRE) AND (AMERICAN YORKSHIRE × FRENCH YORKSHIRE) IN THUY PHUONG PIG RESEARCH AND DEVELOPMENT CENTER

Vol 103. September, 2019. Pp. 35-43

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This study was conducted in Thuy Phuong pig research and development center from 2017 to 2019 to evaluate the growth performance of crossbred YVN1 (French Yorkshire × American Yorkshire) and YVN2 (American Yorkshire × French Yorkshire). There were 100 YVN1 pigs (50 males and 50 females), and 100 YVN2 pigs (male: female rate as 1:1) from 30 to 100kg period. The results showed that growth performance of YVN1 and YVN2 pigs were fast which average daily gain (ADG) were 865.57 g/d (YVN1 pigs) and 905.67 g/d (YVN2 pigs) with $P<0.05$. This means growth performance of YVN2 pigs was significant higher than YVN1 pigs. The lean meat percentage (LMP) of YVN1 and YVN2 were 60.69 and 60.22%, respectively ($P>0.05$), and Intramuscular Fat percentage (IMF) were 2.56 and 2.58%, respectively ($P>0.05$). The ADG and LMP of YVN1 and YVN2 male pigs were higher than those in female pigs but the IMF and backfat thickness (BF) in female pigs were higher than those in male pigs. Besides, growth performance of YVN1 and YVN2 were affected by breed, gender factors and their interaction. The BF was affacted by breeds factor, genders factor but was not affected by interaction between breed and gender. The loin muscle area and LMP was not affected by breeds factor but affected by interaction between breed and gender, and genders factor. The IMF was only affected by genders factor.

Keywords*: growth performance, factor affecting, YVN1 pig, YVN2 pig*

SOME APPEARANCE CHARACTERISTICS AND PRODUCTION CAPACITY OF HYBRID HEN BETWEEN VCN – Z15 AND LV CHICKEN

Vol 103. September, 2019. Pp. 44-54

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The experiment was conducted in Animal Experiments and Domestic Animal Conservation Center from February 2015 to July 2016 with the aim of identifying some appearance characteristics and production capability of hybrid chicken of two breeds (VCN-Z15 and LV chicken). Hybrid chicken (ZL) was bred

between VCN-G15 cock and LV hen. Hybrid chicken (LZ) was bred between VCN-G15 hen and LV cock. ZL and LZ chicken at one-day-old have the same appearance, dark body color with 3 stripes from head to tail. The center stripe is brown. Chicken has a pink peak, pink legs. At 20 weeks of age, ZL and LZ hybrid hens are brown with yellow spots, dark yellow neck hairs, suitable small legs, yellow skin, yellow beak, yellow peak, single crest, white ears. The survival rate up to 20 weeks of age was 95% and 94.58% with ZL chickens and LZ chickens respectively; the weight of 20-week-old hen of ZL and LZ were 1825.56 g and 1872.78 g; laying age at 5%, 30%, 50% production and the peak production of ZL and LZ chickens was 145 days, 164.33 days, 175.33 days, 217 days and 143.67 days, 166 days, 180.33 days, 217 days respectively. Egg yield to 72 weeks of age reached 180.02 eggs per hen with ZL chicken and 173.48 eggs per hen with LZ chicken; feed consumption per 10 eggs of ZL and LZ are 2.59 kg and 2.70 kg respectively; rate of breeding eggs reaches from 93.04 to 93.29%; The percentage of type I chickens per total hatched eggs is 81.59% with ZL chicken and 81.42% with LZ chicken. The result of the study shows that the ZL chicken have higher productivity and lower feed consumption than LZ chicken, so it should be used the ZL crossbred hen for breeding.

Keywords: *Chicken, hen, production, hybrid, egg, appearance*

PRODUCTION OF DA15-15 CHICKEN BREED RACE THROUGH GENERATION

Vol 103. September, 2019. Pp. 55-63

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The purpose of this experiment which conducted at centre of applied research and livestock genetic conservation from 2015 - 2018 was assess physical appearance characteristics and production ability of DA15-15 chickens Experiment was arranged according to the method of a completely random factor. Experimental results showed: DA15-15 chickens one-day-old have black fur, black skin, black meat, black bone. The survival rate of chickens in the period from 1 day to 8 weeks was from 95,61% - 96,35%. In the period of chickens, gilts (from 9-20 weeks old), roosters reach 96.49 - 97.70% and hens reach 96.36 - 97.48%. The average weight of 20-week-old rooster was 2183.00 - 2259.00 g, hens were 1571.33 - 1632.67 g. DA15-15 chickens have the first egg at the age of 152-158 days old. The number of eggs was 64.89 - 68.26 /hen/52 weeks of age and feed consumption was 3.79-3.99 kg; ingot rate of DA15-15 chicken was 88.96 - 90.35%

Keywords: *Chicken DA15-15, body weight, reproductivity.*

DETERMINATION OF APPROPRIATE PROPORTION OF PROTEIN IN INGREDIENTS OF POLLEN SUPPLEMENT FOR HONEYBEE (*APIS MELLIFERA*)

Vol 103. September, 2019. Pp. 64-73

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The aim of the current study was to determine the amount of pollen supplements that honeybee (*Apis mellifera*) consumed, assess the effects of protein levels in pollen supplements to honey yield and queen laying capacity as well as ability to maintain strength of beehives that is basic to produce pollen supplements for honeybee in dearth periods. The study was carried out in honey season of acacia, from May to August 2018, in districts of Kim Boi and Luong Son, Hoa Binh province. Six hundred beehives with *A. mellifera* were allocated into three apiaries equally. Two hundred beehives from each apiary were allocated equally into 10 formulas. Nine formulas, experimental group, consumed pollen supplements that contained different protein levels: 14%, 16%, 18%, 20%, 22%, 24%, 26%, 28% and 30% and 1 formula, control group, fed dry natural pollen contained 28% of protein. All formulas of pollen supplements contained energy of 4600 kcal/kg.

In average, each beehive consumed 4.87 kg to 5.70 kg pollen supplements with protein levels varied from 14% to 30%. Honeybees consumed pollen supplements with formulas CT5, CT6, CT7 (22%, 24%, and 26% of protein respectively) produced highest honey yield (27.25 kg/col.-27.55 kg/col.) and boosted queens to lay more eggs (775-787 eggs/24hrs) that did not differ with control group (799 eggs/24hrs). Formulars CT4, CT5, CT6, CT7 and CT8 (contained 20%, 22%, 24%, 26% and 28% of protein respectively) assisted beehives to stay

populous and healthy (6.84-6.89 combs/beehive) as beehives in control group fed by dry natural pollen (6.93 combs/beehive).

Keywords: *beehive, pollen supplements, protein, honey yield, queen laying capacity, strength of beehive*.

EFFECT OF SUPPLEMENTATION OF LEUCAENA LEUCOCEPHALA LEAVES ON DIETS ON METHANE EMISSIONS, LIVE WEIGHT AND FEED CONVERSION EFFICIENCY OF GROWING RED SINDHY CROSSBRED

Vol 103. September, 2019. Pp. 74-87

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Twenty (20) growing Red Sindhy crossbred bulls were at the age of 15 - 18 months, with an average weight of 157 - 159 kg used in this experiment. Complete rendomized design (CRD) includes: KP1 (control): no supplement of *Leucaena leucocephala* leaves (LLL); KP2: supplement 0.3% of tannin from (LLL); KP3: supplement 0.4% (LLL) and KP4: supplement 0.5% of tannins from (LLL) that equivalent to 0; 19.1; 25.9 and 31.5% DM of (LLL) respectively.

The results showed that the amount of dry matter intake ranged from 4.11 to 4.21 kg, the highest intake in animals fed on KP2 and the lowest intake was in animals fed on KP4. The amount of feed intake tends to decrease with increasing the percentage of *Leucaena leucocephala* leaves meal in the diet, although there is a difference in value but there is no statistical difference (P> 0.05).

For the whole experimental period, the ADG was highest in the animalfed on KP2 (683 g/head/day) while this value in anmal fed on KP1 (control); KP3 and KP4 are 662; 574 and 573 g/head/day respectively and there was a statistically significant difference among group (P <0.05). Feed efficiency ranged from 6.14 to 7.40 kg VCK/kg live weight gain, the lowest was the group of animal that fed on KP2 while the highest was found in animals fed on KP3 (P <0.05)

The highest amount of CH_4 produced (g) per kg live weight gain found the in the animals fed on KP1 (214.8 g) while this value in the animals fed on KP2; KP3 and KP4 was 141.7; 145.9 and 165 g respectively (P <0.05).

Keywords: *growing Red Sindhy crossbred, tannin, intake, methane production*

ASSESSMENT OF THE CURRENT SITUATION OF HOUSEHOLD BEEF CATTLE PRODUCTION IN BEN CAT TOWN, BINH DUONG PROVINCE

Vol 103. September, 2019. Pp. 88-96

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Survey of the current situation of household beef cattle production was carried out in the An Dien, An Tay and Phu An commune - Ben Cat town - Binh Duong province in December 2016, the results show that: The average cattle herd size of households was 4.4 heads/household (3.1-5.1 heads/household), more than 90% of households holded cattle all time in barn. The rate of households growing grass for cattle was low, accounted for 0-16.67%, mostly using natural grass (100%), and mostly farmers not using various sources of agriculture by-products as feed for their cattle (rice straw 1.11% of households, cassava by-product 5.56% of households). Number of households applying artificial insemination technique for cattle accounted for 16.67%. The infectious disease prevention for cattle was paid attention by local veterinary officers, 80% of households were involved. The percentage of households applying the prevention of parasitic diseases for beef cattle herds was still low, only 23-39% of households. The selling age of breeding cows ranged from 12-18 months, the selling age of slaughtering cattle was over 24 months (after fattening). The method of selling slaughter cattle was mainly through midle man (93.33%), the cows with yellow fur accounted for 46.11% of herd and cows with red fur accounted for 51.11%. At the time of the survey, average age of cows was approximately 4.25 years, body

weight of cows was 343.1kg (335-356kg), average parity of cows was 2.72 litters and the interval between two parities was 13.7 months (ranging 13.3-14.1 months).

Keywords: *Household, beef cattle, cow, body weight, herd size, feed*

EFFECT OF PROBIOTICS / PREBIOTICS ON THE HEALTH AND PRODUCTION ABILITY OF COWS

Vol 104. October, 2019. Pp. 2-17

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Probiotics/prebiotics have the ability to modulate the balance and activities of the gastrointestinal (GI) microbiota, and are, thus, considered beneficial to the host animal and have been used as functional foods. Numerous factors, such as dietary and management constraints, have been shown to markedly affect the structure and activities of gut microbial communities in livestock animals. Previous studies reported the potential of probiotics and prebiotics in animal nutrition; however, their efficacies often vary and are inconsistent, possibly, in part, because the dynamics of the GI community have not been taken into consideration. Under stressed conditions, direct-fed microbials may be used to reduce the risk or severity of scours caused by disruption of the normal intestinal environment. The observable benefits of prebiotics may also be minimal in generally healthy calves, in which the microbial community is relatively stable. However, probiotic yeast strains have been administered with the aim of improving rumen fermentation efficiency by modulating microbial fermentation pathways. This review mainly focused on the benefits of probiotics/prebiotics on the GI microbial ecosystem in ruminants, which is deeply involved in nutrition and health for the animal.

Keywords: *rumen, gastrointestinal tract, yeast, oligosaccharide*

APPEARANCE CHARACTERISTICS AND PRODUCTIVITY OF THREE BREEDS CROSSBRED CHICKEN RAISED RI × F_1(VCN-Z15×LV) AND LAC THUY × F_1(VCN-Z15×LV) IN THAI NGUYEN

Vol 104. October, 2019. Pp. 18-30

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The experiment was conducted in Mountainous Animal Husbandry Research and Development Center from September 2016 to January 2017. The objective of the study is to determine some appearance characteristics and productivity of three-way crossbred chickens: RZL chicken was crossed between Ri cock and F1 hybrid hen (50% blood of LV, 50% blood of 11VCN-Z15 chicken); LZL chicken was crossed between Lac Thuy cocks and F1 hybrid hen. Experiments was designed as a completely randomized design with single factor. Three way crossbred chicken has cute appearance traits, delicious meat quality, suitable with consumers' trend. The survival rate is quite high, RZL chicken reached up to 95.0%; LZL chicken reaches up to 94.0%. The average body weight of male and female at 16 weeks of age is 1911.33 g with RZL chicken and 1888.75 with LZL chicken. The feed consumption for increasing one kg body weight of RZL and LZL chicken are similar (3.50 kg with RZL and 3.52kg with LZL). The economic index and production index of both hybrid chickens are higher than pure chickens. The RZL and LZL chickens are expanded which will bring economic benefits for farmers, gradually improving the quality of life.

Keywords: *Chicken, growing, crossbred, feed consumption, economic index, production index.*

PERFORMANCE OF MEO PIG NUCLEUS HERDS IN THE ORIGINAL GENERATION AND THE FIRST GENERATION

Vol 104. October, 2019. Pp. 31-40

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The experiment was conducted at Nghe An Breeding Center in 2018 - 2019 to evaluate performance of Meo pig nucleus herds in the original generation and the first generation as a basis for selection, multiply nuclear herds, provide gilts with good breeding tips for production. Experiment I was studied 20 original generation sows and 20 first generation sows; In each generation, gilts and pregnant sows were randomly divided into 4 groups (corresponding to 4 replicates), 5 pigs per lot; gestation period II to farrowing stage, raising 1 sow per lot; Experimental pigs are kept in barn with a yard, ensuring uniformity in age, weight and care and nurturing regime. Experiment II was conducted on 20 young boars and 20 gilts. The boars and gilts are randomly divided into 4 lots (corresponding to 4 replicates), each group consists of 5 pigs, the pigs are raised in barn with a yard, ensuring uniformity in age, weight and nurturing care; The follow-up time starts when the boars and gilts are 60 days old until they are 8 months old.

The results showed that the nuclear Meo pigs had first estrus age, first mating age, first farrowing age in generation I at 212.12; 244.67 and 359.21 days old respectively, down from 3.49 to 4.93% compared to the original generation. The first mating body weight in the generation I reached 41.88 kg/head, increased 10.1% compared to the original generation; the number of newborns piglets/litter, number of newborns living piglets/litter, number of weaned piglets/litter increased from 4.51 to 6.32%; the newborn piglets weight, the newborn piglets weight/litter and weaning piglets weight/litter in generation I increased from 11.38 to 19.43% compared to the original generation. The Meo pig nucleus herds had good growth capability, increasing the average daily weight in the period of 2 - 8 months of age was 207.50 g/day for boars and 203.11 g/day for gilts.

Keywords: *reproductive, performance, growth, Meo pig*

EFFECT OF FUBON BIO-PRODUCT ON THE GROWTH PERFORMANCE AND THE PREVENTION OF DIARRHEA IN SUCKING PIGLETS

Vol 104. October, 2019. Pp. 41-48

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This study aimed to evaluate the effect of Fubon (Probiotic) supplementated on suckling piglets. 297 sucking pigs from 27 foreign sows F_1(L×Y) were selected with similar condition of the day of ages and farrows. The experiment was distributed into 3 groups: Group 1 and group 2 were fed by feed diets adding Fubon with the percentage of 0.03% and 0.05%, respectively while non-supplemented Fubon diets were used for control group. The effect of Fubon bio-product on sucking pig was evaluated by the growth performance and the rate of diarrhea indcidence. The results indicated that, the growth performance of experimental groups was higher than control group (Group 1 as 264.00 and Group 2 as 268.33 gram/pig/day, respectively; compared with 260.00 gram/pig/day in control group). The rate of diarrhea in experimental groups performed lower than that of control group (Group 1 and group 2 as 16.16% and 12.12%, respectively; control group as 19.19%). The supplementation of Fubon bio-product showed the significant increase of productivity in sucking pig, shown in the increase of weight and the decrease of the rate of pigs suffering from diarrhea compared to the group without added preparations.

Keywords: *Fubon, sucking pig, growth performance, diarrhea.*

EFFECT OF DIETARY METABOLIZABLE ENERGY AND CRUDE PROTEIN LEVELS ON QUANTITY AND QUALITY OF BRAHMAN'S SEMEN RAISED AT MONCADA STATION FOR RESEARCH AND FROZEN SEMEN PRODUCTION

Vol 104. October, 2019. Pp. 49-58

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The objective of this study was to determine the effects of dietary metabolizable energy (ME) and crude protein (CP) levels on the quantity and quality of Brahman bull's semen. A total of 16 Brahman bulls (4-5 years old) was grouped into 4 blocks according to their bodyweight, semen quantity and quality which then was randomly allocated to 4 treatments with 4 different levels of ME and CP: 100% NRC 1996 (Level I), 105% of NRC 1996 (Level II), 110% of NRC 1996 (Level III), and control diet (normal diet in Moncada station). Ejeculate volume, sperm concentration, sperm motility, live sperm rate and total mobility sperms were measured for each collected semen samples. The results show that ME and CP levels affected quantity and quality Brahman bulls semen. Statistically significant differences ($P<0.05$) in semen quantity and quality were found between bulls fed level II and level III compared to level I and control diet. The total number of mobilized sperms reached 6.97, 7.04 and 6.72 và 6.46 billion sperms/collection. However, there was no significant difference in both semen quantity and quality traits between bulls fed level II and III ($P>0.05$).

Keywords: *metabolizable energy, crude protein, semen quality, sperm quantity, Brahman*

EFFECT OF ZINC AND SELENIUM SUPPLEMENTATION LEVELS TO SEMEN QUANTITY, QUALITY OF BRAHMAN

Vol 104. October, 2019. Pp. 59-66

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The experiment was conducted on 16 Brahman bulls (4-5 years old, with an average body weight of 877.8± 24.15kg) divided into 4 groups to study the effects of zinc and selenium supplementation levels to semen quality. Bulls in 4 groups were supplemented with 4 levels of Zn and Se 100% NRC (Level I), 105% of NRC (Level II), 110% of NRC (Level III), and control diet (without supplementation). Ejeculate volume, sperm concentration, sperm motility, live sperm rate and total mobility sperms were measured for each collected semen samples. The results showed that, sperm concentration, live sperm rate, total mobility sperms and rate of abnormal sperms were significant different when diets were supplemented with zinc and selenium after of experiment ($P<0.05$). Statistical significant different ($P<0.05$) of semen quantity and quality were found in bulls fed level II and level III compared to control diet. However, there was no significant different between level II and III ($P>0.05$). Total number of mobilized sperms reached 6.94; 7.01; 7.27; 7.26 billions/collection, respectively for supplemental level control diet, I, II and III ($P<0.05$).

Keywords: *Brahman, zinc, selenium, semen quality, sperm*

EFFECT OF COTTONSEED OIL AND GREEN TEA POWDER SUPPLEMENT ON MILK INTAKE, MILK PRODUCTION AND METHANE EMISSIONS DURING LACTATION

Vol 104. October, 2019. Pp. 67-77

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The effects of supplementation of cottonseed oil and tannin from tea residue on intake, performance and enteric methane emission of dairy cattle were studied using 24 lactating cows at 3-5th lactating months, 2-6th lactation

cycles. The experimental animals were allocated to a completely randomized design (CRD) with 4 groups. Each group has six replications. The experimental diets comprised basic diet supplemented with and the experimental diets were supplemented with different combination of cotton oil and tea tannin: 1.5% oil + 0.3% tannin (D1.5T0.3), 1.5% oil + 0.5% tannin (D1.5T0.5), 3.0% oil + 0.3% tannin (D3.0T0.3) and 3.0% oil + 0.5% tannin (% DM intake). Results showed that the supplement of cottonseed oil and tannin from tea residue at 1.5% oil + 0.5% tanin did not affect on nutrient digestibility but increased CP intake, reduce FCR. This combination level also reduce total methane emission and methane emission intensity. It may be concluded that the supplementation of cottonseed oil and tannin from tea residue at 1,5% and 0.5%, respectively has beneficial effect on the performance of crossbred lactating cows and a persistent reduction in CH4 emissions.

Keywords: *Methane emission, lactating dairy cows, tanin from tea residue*

THE RESULTS OF *IN VIVO* EMBRYO PRODUCTION IN CATTLE BASED ON JAPANESE TECHNIQUES IN VIETNAM

Vol 104. October, 2019. Pp. 78-88

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The objective of this study is to apply Japanese technology to produce *in vivo* embryos in cattle in Vietnam. The study was conducted on 50 cows included 35 crossbred Holstein Friesian cows and 15 Brahman cows, using the Japanese superovulation protocol include 8 FSH injections with a total of 30 AU of FSH for one dairy cows and 20 AU for one beef cow, the interval between two injections is 12 hours in 4 days with the dose gradually decreasing from day 4 of the procedure. The cows were artificially inseminated twice in 12 hours intervals beginning on day 9 of the procedure using straw frozen semen. Embryo collection was conducted after artificial insemination 7 days. The total number of embryos collected was 380, with average was 7.6 ± 2.3 of the collected embryos /cow, transferable embryo was 219, with average of 4.4 ± 1.7 embryo/cow (57.6% of the total number of embryos collected); total freezable embryo was 187 embryos, an average of 3.7 ± 1.4 embryos/cow (49.2% of the total number of embryo collected). The results of superovulation in dairy donor cow group were higher than that of beef donor cow groupwith average embryo collected was 8.2 ± 2.4 and 6.3 ± 1.6, respectively and tranferable embryo was 4.6 ± 1.9 compared to 3.9 ± 1.3; freezable embryo was 4.0 ± 1.4 and 3.2 ± 1.1, respectively. In addition, superovulation results in cows were higher than that in heifers in both beef and dairy donor cattle groups. In beef donor cow group with the total number of embryos collected in cows and heifers was 6.6 ± 1.6 embryo/cow and 5,6 ± 1,3 embryo/cow respectively; transferable and freezable embryos of cows and heifers were 4.2 ± 1.3 versus 3.4 ± 1.4 and 3.5 ± 1.1 compared to 2.6 ± 0.9 respectively. This trend was the same in group of dairy donor cow with averge embryos collected in cows compared to heifers were 8.4 ± 2.5 and 7.3 ± 1.5, respectively;transferable embryos was 4.9 ± 1.8 compared to 3.6 ± 1.7 and freezable embryos was 4.1 ± 1.3 and 3.4 ± 1.7, respectively. In conclusion, the application of Japaneseexpert's experiences in *in vivo* embryo production modified to suit Vietnam conditions by prolonging the time of FSH injection from 3 days to 4 days initially gave good results.

Keywords: *Dairy cattle, beef cattle, superovulation, in vivo embryo production*

PRODUCTION AND MEAT QUALITY OF THREE BREEDSCROSSBRED CHICKEN RAISED RI×F_1(VCN-Z15×LV) AND LAC THUY×F_1(VCN-Z15×LV) IN THAI NGUYEN

Vol 105. November, 2019. Pp. 2-12

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The experiment was conducted at the Mountainous Animal Husbandry Research and Development Center with the aim of evaluating the performance and quality of meat of three breeds crossbred chicken. Experiment was designed as a completely randomized design with single factor. Slaughtering to determine of crossbred chicken at 16 weeks of age showed the results: the live weight of RZL chicken at 16 weeks of age reached 1899.67g, the LZL reached

1740.29g; The percentage of carcasses of RZL chicken reached 75.46%, LZL chicken reached 74.68%. The weight of thigh meat and breast meat of crossbred chicken are quite high, respectively: RZL chicken is 505.33g; LZL chicken is 437.0g, equivalent to 35.25%, 33.62% of carcass weight. The percentage of stomach fat is very low, for RZL chicken is 1.97%, LZL chicken is 2.75%. Analysis of meat quality and nutritional composition of crossbred chicken which are similar to Ri and Lac Thuy chicken. The pH, brightness, redness, yellowness, dehydration rate and toughness of crossbred chicken are within the limit of high quality chicken meat.

Keywords*:live weight, meat quality, carcass, fat, crossbred*.

DETERMINING APPROPRIATE METABOLIZABLE ENERGY LEVELS IN THE RATION OF REPRODUCTIVE CO AND MEO PIGS

Vol 105. November, 2019. Pp. 13-27

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For the purpose of identifying suitable ME level for Co and Meo in gilts, gestation and farrowing periods, a study was implemented at the Research and Development Institute - Hue University of Agriculture and Forestry (for Co pig) and Nghe An Breeding Center (for Meo pig) from 2017 to 2018. Experiment 1 was conducted on 36 Co pigs and 36 Meo pigs, weight of 20 ± 1.0 kg/head (150 days of age). In each breed, pigs are randomly divided into 3 groups which have ME level of 2700, 2800 and 2900 kcal/kg of feed respectively, and the same crude protein levels of 13%. Experiment 2 was conducted on 30 Co and 30 Meo pigs during pregnancy. In each breed, the pregnant sows were randomly divided into 3 groups which have ME levels of 2850, 2950 and 3050 kcal/kg of feed respectively, and the same crude protein levels of 14.5%. Experiment 3 was conducted on 30 farrowing Co sows and 30 farrowing Meo sows. In each breed, they were randomly divided into 3 groups that have the following ME level of 2900, 3000 and 3100 kcal/kg and the same crude protein level of 16.0%. Dietary nutrient ratio were analyzed before and after preparation. The results show that, the most suitable ME level for gilts from 20 kg to mating stage is 2800 kcal/kg of feed; 2950 kcal/kg of feed for pregnant sows, and 3000 kcal/kg of feed for farrowing sows.

Keywords: *Energy level, performance, growth ability, Co pig, Meo pig.*

EFFECTS OF MANURE OF PIG FED DIETARY CRUDE PROTEIN AND CRUDE FIBER LEVELS ON METHANE PRODUCTION *IN VITRO*

Vol 105. November, 2019. Pp. 28-36

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Slurry of pigs fed on six diets, so-called diet 1 (17% crude protein (CP), 8% crude fiber (CF)), diet 2 (17% CP, 10% CF), diet 3 (15% CP, 8% CF), diet 4 (15% CP, 10% CF), diet 5 (13% CP, 8% CF), diet 6 (13% CP, 10% CF) were used as substrates in the batch test to measure biogas and methane production. The batch test was carried out according to Møller et al. (2004). The batch test was monitored by triplicate measurements of gas production from each of the substrate as mentioned above. The digester glass bottles (fermenters) containing 1100 mL substrate were used. The inoculum and substrate was added at a ratio of 1:1 (w:w on VS base), and the fermentors were incubated into dried oven at 37^{o}C until the full degradation of the degradable organic matter inside occurred. The volume of produced biogas was measured with a 1000 ml syringe and the CH_4 concentration is determined with the liquid replacement method (Demirer et al., 2000). Methane and biogas production of slurry of diet 4 (15%CP, 10%CF) was highes 248.83 ± 36.30 l/kgVS CH_4 and 357.28 ± 61.67 l/kgVS biogas. Biogas and methane production of the diet 5 (13%CP, 8%CF) was low 105,79 ± 3,34 l/kgVS and 155.08 ± 4.12 l/kgVS. In addition, there was not significant difference between diet 1 and diet 2, and between diet 5 and diet 6 in methane and biogas production. These results conclude that methane and biogas production was the highest at slurry of pig fed high CP and high CF, but the lowest at slurry of pig fed low CP and low CF.

Keywords: *slurry, pig, diet, biogas, methane*

EFFECTS OF DRYING METHOD, PRESERVATION CONDITION AND TIME ON CHEMICAL COMPOSITION OF PANGOLA HAY

Vol 105. November, 2019. Pp. 37-47

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The objective of this study was to investigate the effects of drying method, preservation condition and time on chemical composition and economic efficiency of Pangola hay (*Digitaria decumbens)*. Approximately 15 tons of fresh grass (1 ton of fresh grass/method × 5 cutting times × 3 replicates) of Pangola grass were randomly allotted in 1 of 2 drying methods (sun-drying and electrical heating). After drying, hay was rolled into seperate round bales (20 – 25 kg/bale). The hay bales were randomly allocated in 1 of 2 storing conditions: in an open-air-with-roof storage and in a warehouse. Hay was accessed chemical compositions at 4 different storing time (first storing time, 3, 4 and 5 months). The result show that, pangola at sun-drying method was 20.63 hours, while electrical heater method was 5.54 hours in order to moisture hay reduced <15%. However, there was no differences in chemical composition between two drying methods. The results also indicate that dry matter, crude protein contents in hay was reduced when the storing time increased. The decrease in dry matter, crude protein contents in hay stored in the warehouse is lower than in hay stored in open-air-with-roof storage. After 5 months storing in the warehouse, the dry matter and crude protein contents of Pangola hay decreased 1.86% and 3.50% respectively compared to the hay at the beginning of preservation progress. In contrast, the contents of crude fiber, ADF and NDF in hay increased when the storing time increased. It is suggested that drying hay by sunlight is more suitable and economic than by electrical heater. A warehouse seems to be a better place to store hay than an open-air-with-roof storage.

Keywords: *hay processing, storage, Pangola*

EFFECTS OF FEEDING DIFFERENT LEVELS OF COTTONSEED OIL AND TANNIN FROM TEA RESIDUE ON INTAKE, PERFORMANCE AND ENTERIC METHANE EMISSION OF DRYING COWS

Vol 105. November, 2019. Pp. 48-57

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The effects of supplementation of cottonseed oil and tannin from tea residue on intake, performance and enteric methane emission of dairy cattle were studied using 24 dry cows at 2-6th lactation cycles. The experimental animals were allocated to a completely randomized design (CRD) with 4 groups. Each group has six replications. The experimental diets compriesed basic diet supplemented with and the experimental diets were supplemented with different combination of cotton oil and tea tannin: 1.5% oil + 0.3% tannin (D1.5T0.3), 1.5% oil + 0.5% tannin (D1.5T0.5), 3.0% oil + 0.3% tannin (D3.0T0.3) và 3.0% oil + 0.5% tannin (%DM intake). Results showed that the supplement of cottonseed oil and tannin from tea residue at 1.5% oil + 0.5% tanin did not affect on nutrient digestibility but increased CP intake, reduce FCR. This combination level also reduce total methane emission and methane emission intensity. It may be concluded that the supplementation of cottonseed oil and tannin from tea residue at 1.5% and 0.5%, respectively has beneficial effect on the performance of cattle in dry period and a persistent reduction in CH_4 emissions.

Keywords: *Methane emission, dry cows, tanin from tea residue*

APPLICATION OF FIXED-TIME EMBRYO TRANFER TECHNIQUEIN CATTLE

Vol 105. November, 2019. Pp. 58-63

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The study was conducted with 20 recepientcows which were selected according to the standards of recepient cows included 15 dairy cows and 5 beef cows. Recepient cows were estrus synchronization, ovulation, corpus luteum induced synchronization and fixed time embryo transfer using Ovsynch + CIDR protocol. Recipient cows were conducted non-surgical embryo transfer using a new generation embryo gun with 8 cows receiving fresh embryos and 12 cows receiving frozen embryosinday 16 of the Ovsynch + CIDR protocol. After embryo transfer, recepient cows was pregnancy diagnosed by observation of estrus at average 14 days after embryo transfer and ultrasonography at 30 and 45 days after embryo transfer. The results of pregnancy rates ofrecipient cows was 50% in average (10/20) and beef recipient cow group had pregnancy rate with 60% (3/5) higher than that of dairy recipient cow group with 46.7% (7/15) but not significantly (P>0.05). In addition, when using fresh embryos for transfer, the pregnancy rate in cows receiving embryos was higher significantly than using frozen embryos (62.5% compared to 41.7%) (P<0.05).

Keywords: *Embryo transfer, recipient cow, fresh embryo, frozen embryo, estrus synchronization, fixed-time embryo transfer*

DETERMINE THE METHOD OF RAISING CO AND MEO SOWS

Vol 105. November, 2019. Pp. 64-73

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The study was conducted at the Research and Development Institute - Hue University of Agriculture and Forestry (for Co pig) and Nghe An Breeding Center (for Meo pig) in 2018 to determine suitable raising methods for reproductive sows. Experiment was conducted on 60 gilts, including 30 gilts of pure Co breeds and 30 gilts of pure Meo breeds. In each breed, the gilts were randomly divided into 2 groups: in the treatment group: pigs were kept completely, cages with brick or cement floor with an area of 1.0 - 1.5 m^2/ head. In the control group: pigs are raised in a house with brick or cement floor with an area of 1.0 - 1.5 m^2/ head and a backyark on an area of 2.0 - 3.0 m^2/head. The experiment time started from the gilts stage (20 kg) to the next pregnancy and pigs in 2 groups ensuring uniformity in age and body weight. Pigs are raised with the same nutrition suitable for each age stage, fully vaccinated as prescribed. Pigs in both groups were fed the same diet, meeting the nutritional needs of both Co and Meo sows. The results showed that the method of raising did not significantly affect the reproductive performance of the sows. If you use a suitable housing area and a balanced diet, full of nutrients according to the needs of each stage of development of each gilts and sows, then it is possible to comletly keep or keep in the house with the backyark, the Co and Meo without affecting their reproductive performance.

Keywords: *raising method, reproductive performance, Co pig, Meo pig.*

PREVALENCE AND ATIBIOTIC RESISTANCE OF *CAMPYLOBACTER SPP.* IN THE CHICKEN FARMS IN HAI PHONG PROVINCE

Vol 105. November, 2019. Pp. 74-84

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The aim of this study is to investigate the prevalence and antibiotic resistance of *Campylobacter* infection in chicken farms. 200 samples of chicken feces were collected from chicken farms in Hai Phong province. The rate

of isolation of *Campylobacter* is 80% (160/200), of which *Campylobacter jejuni* is 60.63%, *Campylobacter coli* is 32.5% and other *Campylobacter* strains (6.87%). The highest rate of antibiotic resistance of *Campylobacter jejuni* strains was tetracyline (86.6%), followed by ciprofloxacin (80.41%) and amoxcicilline (75.26%). The highest rate of antibiotic resistance of *Campylobacter coli* strains was tetracyline (84.62%), followed by amoxicilline (80.77%) and ciprofloxacin (76.92%). Research results indicate that chicken meat is a potential source for transmitting antibiotic-resistant strains of *Campylobacter* to humans through infection with chicken feces during breeding or slaughter.

Keywords: *Campylobacter*, chicken, antibiotic resitance, prevalence.

ROLE OF PROBIOTIC MICROORGANISMS IN GASTROINTESTINAL ECOSYSTEM AND EFFECTIVENESS OF USING PROBIOTICS IN LIVESTOCK PRODUCTION

Vol 106. December, 2019. Pp. 2-17

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Probiotics are live microorganisms which when administered in adequate amounts will bring a beneficial effects for the host. In animal nutrition, probiotics are used as a feed additive in order to improve of the intestinal microbial balance, increase feed conversion rate especially in young animals when their intestinal microbiota is not fully developed. This review paper summarized literatures on the role of probiotics in modulation of the balance of intestinal microbiota and the effects of using probiotics in pig, poultry and ruminant production as well. We reviewed the research results regarding with the effectiveness of probiotics inincreasing digestibility, improving feed conversion rate and preventing diarrhea in pig production. The effects of probiotics supplementation in poultry diets for purposes of inhibiting pathogenic bacteria such as *Salmonella, E. coli, Clostridium perfringens, Campylobacter jejuni*; decreasing the smell in the poultry farms and improving the feed conversion rate were also reviewed. Moreover, this paper has also assessed the effects of using probiotics in ruminant production in the fields of increasing of milk production, reducing of rumen acidosis, improving body weight gain and preventing intestinal diseases. Recently, increasing antibiotic resistence in communityhas been showed to be associated with the overuse of antibiotics in animal feed as a growth promoter and for preventing purposes. Therefore, this review paper aims to provide some up-to-date knowledge and references for animal nutrionists and producers before making decsions of using probiotics as an alternative to antibiotics to improve animal health and productivity in livestock production.

Keywords: *Probiotics, feed conversion rate,pig production, poultry production, ruminant production*

DETERMINING APPROPRIATE CRUDE PROTEIN LEVELS IN THE RATION FOR REPRODUCTIVE CO AND MEO PIGS

Vol 106. December, 2019. Pp. 18-30

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For the purpose of identifying suitable protein level for Co and Meo in gilts, gestation and farrowing periods, a study was implemented at the Research and Development Institute - Hue University of Agriculture and Forestry (for Co pig) and Nghe An Breeding Center (for Meo pig) from 2017 to 2018. Experiment 1 was conducted on 36 Co pigs and 36 Meo pigs, weight of 20±1.0 kg/head (150 days of age). In each breed, pigs are randomly divided into 3 groups which have crude protein level of 12.0%, 13.0% and 14.0% respectively, and the same ME levels of 2800 Kcal/kg. Experiment 2 was conducted on 30 Co and 30 Meo pigs during pregnancy. In each breed, the pregnant sows were randomly divided into 3 groups which have protein levels of 13.5%, 14.5% and 15.5% respectively, and the same ME levels of 2950 Kcal/kg. Experiment 3 was conducted on 30 farrowing Co sows and 30 farrowing Meo sows. In each breed, they were randomly divided into 3 groups that have the following protein level of 15.0%, 16.0% and 17.0% and the same ME level of 3000

Kcal/kg. Dietary nutrient ratio were analyzed before and after preparation. The results show that, the most suitable protein level for gilts from 20 kg to mating stage is 13.0%; 14.5% for pregnant sows, and 16.0% for farrowing sows.

Keywords: *Protein level, performance, growth ability, Co pig, Meo pig.*

GENETIS POLYMORPHIRMS OF HSP70 GENE IN SOME CHICKEN BREEDS RAISED IN VIET NAM

Vol 106. December, 2019. Pp. 31-40

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The Hsp70 gene encodes a heat shock protein with 70kDa molecule weigh. The Hsp70 protein is a family of chaperone molecules that promote protein foiding and participate in many cellular functions, in particular they protect certain proteins and cells from environmental stressors. This study was conducted to evaluate the genetic polymorphism of Hsp70 gene in four chicken breeds (Ri, TP, HA and LV chicken). Two polymorphic sites in the beginning of coding region of Hsp70 gene, one transition from A (Adenine) to G (Guanine) on position 258 and one transversion from C (Cytosine) to G (Guanine) on position 276, were analyzed by sequencing method. The 648 base pairs fragment of the Hsp70 gene was amplified from four chicken breeds (500 samples/breed) and sequenced directly. The results identified 4 haplotypes (H1, H2, H3 and H4) and 9 genotypes in total samples. Genetic diversity at position A258G and C276G showed the highest in Ri chicken with 9 genotypes: H1H1(2,9%), H1H2 (8,2%), H1H3 (7,5%), H1H4/H2H3 (34,4%), H2H2 (6,8%), H2H4 (3,2%), H3H3 (27,2%), H3H4 (7,5%), H4H4 (2,2%); followed by TP chicken with 9 genotypes: H1H1(2,1%), H1H2 (5,3%), H1H3 (7,4%), H1H4/H2H3 (57,9%), H2H2 (2,1%), H2H4 (1,1%), H3H3 (24,2%); LV chicken with 9 genotype: H1H1(8,4%), H1H2 (3,7%), H1H3 (11,6%), H1H4/H2H3 (31,6%), H2H2 (5,3%), H3H3 (27,2%), H3H4 (11,6%); and the lowest genetic diversity in HA breeds with four genotypes: H1H4/H2H3 (64,2%), H2H2 (9,0%), H3H3 (26,8%).

Keywords*: Hsp70 gene, genetic diversity, sequencing*