

on litter size in gilts (Spencer, et.al. JAS 82, Suppl. 2, p81) and sows (Webel, et.al. 2003, JAS 81, Suppl 1, p18). Improved embryo and fetal survival is the hypothesis for the observed increase in litter size. Additional recent research has demonstrated alteration in tissue concentrations and ratios of specific omega3 FA's in the fetus and newborn piglets, when gestation diets of dams were supplemented

with dietary sources of marine omega-3 FA's. This enrichment of tissue omega-3 has been associated with increased preweaning survival, weaning weight, immune function and grow-finish performance. The authors will review and discuss relevant literature as well as additional unpublished research.

Key Words: Omega-3, Reproduction, Swine

Production, Management & the Environment - Livestock and Poultry: Poultry Production and Reproduction

498 Influence of hatching egg weight and Japanese quail breeder flock age on embryonic mortality stages, hatchability and chick quality measurements. T. M. El-Sheikh*, *Sohag University, Sohag, Egypt.*

This study was carried out to determine the effects of the breeder age and the egg weight of the Japanese quail on the hatchability, the embryonic mortality, and one-day old chick quality. twenty-four hundred eggs were obtained from the hens at the age of 8 weeks, at the age of 16 weeks and at the age of 24 weeks. The eggs were grouped according to their weight as follows; 8.5-10.5, 10.51-11.5 and 11.51-13.5 g. The traits measured were embryonic mortality, fertility, hatchability and hatching chick quality. Pre-incubation, early, mid and late embryonic mortality were 3.18, 5.81, 7.35 and 9.76%; 3.35, 5.56, 7.62 and 10.41 and 1.85,3.02, 3.99 and 5.21% respectively, for 8, 16 and 24 weeks parents age. The percent of pre-incubation, early, mid and late embryonic mortality were 1.96, 4.55, 5.85 and 7.61%, respectively for the smaller eggs, 3.12, 4.79, 6.86 and 8.98 for mid egg weight and 3.31,5.04, 6.25 and 8.79% for the largest egg weight. Malformation and malposition of the embryonic dead and piped eggs were affected by breeder age and egg weight. Fertility was decreased as the parents age increase while the opposite trend was found with hatchability. Fertility, hatchability of set eggs and hatchability of fertile eggs were 81.44, 58.81 and 73.43%, respectively, for the youngest flock, 78.51, 61.48, 78.31% for mid flock age and were 73.73,62.68, and 85.12% for the oldest flock age. The breeder age and egg weight had significant effect on fertility, hatchability hatched and chick quality ($P<0.05$). Abnormal chicks, dead in shell and naval wet were increased with older parents and small egg weights. It was observed that the chick weight increased in parallel with increasing egg weight. The average chick weight was 10.94, 11.06, and 12.32 for parent flock of 8, 16, and 24 weeks of age, respectively. The average chick weight was 9.88, 11.01, and 12.23 grams for smaller, mid and bigger egg weight, respectively. The incubation period was shorter with increasing egg weight and breeder age.

Key Words: Quail Breeder Age, Chick Quality, Hatchability

499 WITHDRAWN BY AUTHOR.

500 Effects of supplemental dietary phytase and 25-hydroxycholecalciferol on the digestive and reproductive organ characteristics of commercial layers inoculated Before or at the Onset of Lay with the F-Strain of *Mycoplasma gallisepticum*. E. D. Peebles*¹, S.

L. Branton², M. R. Burnham¹, S. K. Whitmarsh¹, and P. D. Gerard¹, ¹Mississippi State University, Mississippi State, ²Poultry Research Unit, Agricultural Research Service, United States Department of Agriculture, Mississippi State, MS.

In 3 trials, the effects of dietary supplementation with phytase (PHY) and 25-hydroxycholecalciferol (25-D3) on the digestive and reproductive organ characteristics of commercial layers that were inoculated pre-lay (12 wk of age) or at the onset of lay (22 wk of age) with the F-Strain of *Mycoplasma gallisepticum* (FMG), were assessed at 58 wk of age. Experimental layer diets which included either a basal control diet or a control diet supplemented with 0.025 % PHY (600 FTU / kg of diet) and 25-D3 (34.5 µg pure crystalline / kg of diet) were fed from 20 through 58 wk of age. As a percentage of total oviduct weight, magnum weight was lower in birds that were inoculated (sham or FMG) at lay onset compared to those that were inoculated pre-lay, and in FMG-inoculated birds, relative duodenum length was greater in those inoculated at 12 compared to 22 wk. Also, as percentages of organ weight or length, infundibulum length and isthmus weight were increased, whereas duodenum length was decreased by dietary supplementation with PHY and 25-D3. The overall timing (12 versus 22 wk) of inoculation can affect the reproductive organ characteristics of layers; whereas, more specifically, the timing of an FMG inoculation may affect their digestive organ structure. Furthermore, independent of inoculation timing and type, both the reproductive organ and digestive systems of laying hens may be influenced by dietary supplementation with PHY and 25-D3.

Key Words: *Mycoplasma Gallisepticum*, Phytase, 25-Hydroxycholecalciferol

501 Validity of fertilization assessment of broiler hatching eggs. R. W. Keirs*, P. D. Gerard, and E. D. Peebles, *Mississippi State University, Mississippi State.*

Validation of broiler breeder flock hatching egg fertilization is important for monitoring the efficacy of breeder programs, a hatchery's efficiency including each incubational unit, the variability of a flock's hatch in different machines, inventory accountability, and in developing pragmatic hatching parameter baselines. This study included eggs from 6 flocks set in multi-stage incubators, and filling all 90 trays (15,120 eggs) of a single hatcher. Total egg residue (non-fertilized and all embryos) left on trays after hatch pull were accounted for by the Hatching Efficiency Analysis System (HEAS). Validation of fertilization levels were obtained utilizing only 4 trays of hatch residue which were pre-selected under the HEAS program. These residue

results, each which were from 1 breeder flock, were compared to the same results from the entire 90 hatcher trays (15,120 eggs) for the same flock and hatcher. The locations of all 4 of the pre-selected trays of hatch residue were within the first vertical row as one faces the hatcher. Starting at the top of the row and progressing downwards, tray levels 1, 5, 10, and 15 were selected. Also, through similar comparisons, the validity of using 2 or 8 trays rather than 4 was considered. A computer statistical model was generated in which the SD of non-fertilized eggs remaining on 2, 4, or 8 trays, which represented sub-samples of all 90 trays of a given flock, were used. The validity of fertilization level was found to be proportional to the computed SD, and increased as SD decreased with increasing fertilization and number of trays sampled. To test the validity of fertilization determination using only 4 trays, the 6 breeder flocks (28-59 wk of age) were arranged by increasing fertilization using the 90 tray results (85.7, 93.2, 95.2, 95.5, 96.6, and 97.5%). The validity of fertilization determination using 4 trays, when expressed as a percentage of their respective 90 tray results, were 99.8, 98.8, 98.0, 99.0, 98.9, and 99.4%. The collective validity of the 6 flocks and all 4 tray groups was 99.7%.

Key Words: Broiler Hatching Eggs, Fertilization, Incubation

502 Effectiveness of immersion of hatching eggs into disinfectant solutions in a commercial hatchery. J. M. Mauldin^{*1}, A. L. O'Shaughnessy², and M. T. Musgrove³, ¹*The University of Georgia, Athens*, ²*United Promotions, Inc, Atlanta, GA*, ³*ARS-USDA, Athens, GA*.

This study was conducted at a broiler hatchery and compared effects of immersing hatching eggs into disinfectant solutions. Treatments consisted of untreated control, Virkon (1000 ppm), and Timsen (400 and 800 ppm). Treatments were evaluated by comparing microbial recovery, incubation moisture loss, chick wt, and breakout analysis. Each of 30 egg trays within a farm buggy was randomly assigned to a treatment group. Eggs from treatment groups were immersed into a 114 L vat of 37°C disinfectant solution for 150 s. The untreated control group was not dipped. Each tray was weighed and marked by group and placed into setter buggy. Ten eggs from each group were sealed in bags and transported to the lab. Ten egg shells per treatment were crushed in diluent and individually analyzed for presence and level of aerobic microorganisms, Enterobacteriaceae, and fungi using standard cultural methods. The test egg buggy was then incubated. On d 17 eggs were transferred to hatcher, each tray was reweighed to determine % moisture weight loss. On d 21 the hatch was pulled and 100 chicks per tray were weighed. All unhatched eggs were subjected to breakout analysis. Results are listed for the four treatments: untreated controls, Virkon 1000 ppm, Timsen 400 ppm, and Timsen 800 ppm. Prevalence of aerobic microorganisms in treated eggs was 100%, 90%, 50%, and 40%, respectively. Enterobacteriaceae prevalence results were 30%, 10%, 10%, and 0% while fungi prevalence results were 70%, 40%, 30%, and 40%. Aerobic bacteria levels were 4.3, 2.9, 0.7, and 0.4 log cfu/mL egg sample. Enterobacteriaceae levels were 0.4, 0.4, 0.3, and 0 log cfu/mL egg sample. Fungi levels were 0.7, 0.3, 0.2, and 0.3 log cfu/ml. These results demonstrate that immersion of eggs into Timsen solutions at 400 and 800 ppm was superior for egg sanitation. No significant differences among treatments were noted for daily % moisture loss or in chick wt as % of initial egg wt. Small differences were noted in some hatchability and breakout analysis measurements.

Key Words: Hatching Eggs, Sanitation, Hatchability

503 Effects of multistage or single-stage incubation on broiler chick quality and performance. B. D. Fairchild^{*1}, J. M. Mauldin¹, and R. J. Buhr², ¹*University of Georgia Poultry Science Department, Athens*, ²*USDA, ARS, Athens, GA*.

Single-stage (SS) incubation has benefit over multistage (MS) incubation by matching incubator environment to embryo needs. Eggs from a young breeder flock may be incubated differently than eggs from old flocks. Information on chick quality and performance are scarce. The objective of this study was to compare quality and performance of chicks of three breeder flock ages when incubated in MS or SS. Heritage chicks from young, prime and old flocks were incubated at a broiler hatchery in either Jamesway MS or SS incubators. Chicks (450) from each treatment were placed in floor pens and provided standard diets and water ad libitum. Each pen contained 55 chicks with 0.7 ft² per bird. Feed and BW were obtained at 0, 7, and 21 d and mortality monitored daily. On hatch day, BW with and without yolk, liver, heart and intestine wt and length were obtained from 10 chicks from each treatment. Data were arranged in a 2x3 factorial and analyzed by the GLM procedure of SAS. Chicks from SS were larger than MS chicks. Relative organ wt was not different. Residual yolk and intestinal wt per mm of intestine were greater in SS than MS. Chick BW from old breeders were larger than chicks from prime breeders which were larger than those from young breeders. An age difference in residual yolk was noted and followed the same trend as chick BW. There was an interaction between breeder age and incubation treatment for intestinal length and relative liver wt. MS incubation did not influence breeder age effects on either variable. However, SS incubation increased intestinal length in chicks from prime flocks compared to other ages. Relative liver wt were greater in SS chicks from young breeder flocks than the other ages. No differences in SS and MS treatments were noted after hatch. By 7 d, significant effects were due to breeder age in feed consumed, BW and feed conversion. At 21 d, no differences in BW were noted, but chicks from young breeder flocks had better feed conversion. SS incubation appears to improve some characteristics associated with chick quality and may improve 7 d performance. However, these differences were not observed at 21 d.

Key Words: Broiler Performance, Incubation, Breeder Age

504 Comparisons of hatchability measures in Jamesway Platinum single stage incubators with Jamesway Multistage incubators in broiler hatchery in Georgia. J. M. Mauldin^{*}, S. A. Kuzniak, and T. L. Gardino, *The University of Georgia, Athens*.

A research project was conducted at a broiler hatchery to compare 3 120,000 egg capacity Jamesway Platinum single stage (SS) incubators with multistage (MS) Jamesway incubators. Comparisons included hatchability, hatchability of fertile eggs, embryo mortality, contamination and other hatchability parameters. The study was divided into 3 periods because of an airflow problem during the first 7 mo of the study (May, 2005- Dec., 2005 -- period 1). During period 2 (Jan., 2005 – Dec., 2005) data were collected in SS incubators only while engineers corrected the airflow problem. These results are not given since there were no comparisons of incubator types. In Periods 1 and 3 (May, 2006 – Jan., 2007), eggs from the same flocks were divided into SS and MS. For all 3 periods, a breakout analysis was conducted on each Monday hatch day by selecting 2 trays per incubator buggy, SS and MS and examining all unhatched eggs. For period 1,

percentages for fertility, hatchability, hatch of fertiles (HOF) were 94.09, 82.26, and 87.43, respectively in MS. SS percentages for the same parameters were 93.54, 80.36, and 89.51. The differences between hatchability and HOF were significant ($p < .05$). Early and late embryo mortality percentages for MS were 4.52 and 2.31; SS, 4.05 and 2.97. Differences were significant ($p < .05$). SS had significantly higher percentages ($p < .05$) for pips and cull chicks than MS (1.15 vs. 0.57 and 0.84 vs. 0.43). SS had significantly fewer ($p < .05$) contaminated eggs than MS (0.17% vs. 0.25%). Changes in the airflow during period 2 resulted in a dramatic improvement in many hatchability percentages in period 3 for SS. For example, hatchability and HOF were significantly higher ($p < .05$) at 84.08% and 89.74% in SS than MS 83.05% and 89.12%. Also, significant improvements ($p < .05$) were noted in comparisons of embryo mortality in SS (early dead=3.59% and late dead=2.21%) vs. MS (4.34% and 2.86%). As in the first period, the period 3 incidence of contaminated eggs was significantly lower in SS incubated eggs than in MS (0.22%, SS; 0.28%, MS).

Key Words: Single Stage, Hatchability, Embryo Mortality

505 A comparison of effects of single stage vs. multistage incubation on hatching egg moisture weight loss and chick weights in a broiler hatchery in Georgia. J. M. Mauldin*, S. A. Kuzniak, and T. L. Gardino, *The University of Georgia, Athens.*

A Research project was conducted at a broiler hatchery in Georgia comparing 3 120,000 egg capacity Jamesway Platinum single stage (SS) incubators with existing multistage (MS) Jamesway machines. Comparisons were made between the two incubator types for incubation egg moisture wt loss, egg wt at transfer, and chick wt as a percentage of initial egg wt. The study was divided into 3 periods because an airflow problem was recognized during the first 7 mo of the study (May, 2005- Dec., 2005, period 1). During period 2 (Jan., 2005 – Dec., 2005) data were collected in SS incubators only while engineers adjusted airflow distribution. Consequently, there are no comparative data to present in this period. In period 3 (May, 2006 – Jan., 2007) data were collected for both types of incubators. In Periods 1 and 3, eggs from the same flocks were divided into SS and MS incubators. In the hatchery, 1 tray of eggs per setter buggy (168 eggs/tray) was weighed as initial egg wt. At transfer, the same trays were weighed for transfer wt and percent moisture loss. 100 chicks in each of 2 trays/buggy were weighed for chick wt as % of initial egg wt. In Period 1, the initial egg wt averaged 60.03 g in MS and 59.37 g in SS. Transfer wt during period 1 averaged 52.22 g/egg in MS and 53.66 g/egg in SS. Differences were significant ($p < .05$). Moisture wt loss means at transfer were significantly different ($p < .05$); 12.83% for MS and 9.60 % for SS. At hatch, MS incubated chicks averaged 66.84 g and SS, 68.27 g. Differences were significant ($p < .05$). Period 3 resulted in initial average wt/egg of 61.44 g for MS and 60.38 g, SS. Transfer wt means were 53.76 g, MS and 55.00 g, SS. Differences were significant ($p < .05$). Moisture wt loss was significantly different ($p < .05$) between MS, 12.51% and SS, 8.91%. Chick wts averaged 40.77 g, MS and 41.49 g, SS. Chick wts as % of initial egg wt were 66.36%, MS and 68.71% for SS. Differences were significant ($p < .05$).

Key Words: Single Stage, Incubation, Moisture Wt Loss

506 Effect of single-stage incubation temperature profile and delayed placement on broiler performance to 40 days of age. J. T. Brake*, E. O. Oviedo-Rondon, P. W. Plumstead, K. E. Brannan, N. Leksrisompong, and J. H. Small, *North Carolina State University, Department of Poultry Science, Raleigh.*

Eggs produced by a 57-wk-old Ross 344 x Ross 708SF broiler breeder flock were subjected to four temperature profiles during incubation. Air temperature was either 36.9°C (Early Cool (EC)) or 38.0°C (Early Hot (EH)) during E 0-E 3 and then 37.5°C to E 17. From E 17 to hatching at E 21 air temperature was either 36.9°C (Late Cool (LC)) or 38.0°C (Late Hot (LH)). Thus, four combinations (ECLC, ECLH, EHLA, and EHLH) were created. The chicks were sexed and half were placed within 2 h of removal from the hatcher at 504 h of incubation while half were held in the hatchery at 24-27°C for an additional 24 h before placement in the same facility. The chicks were then grown to 41 d of age to evaluate both live performance and carcass characteristics. The BW at placement followed the order of ECLC>EHLA>ECLH>EHLH for both sexes with an average BW of 45.1 g. The order completely reversed by 7 d in males but was no longer evident at 40 d. However, only the ECLC females were smaller than the other incubation groups at 7 d and there were no differences at 40 d. Delayed placement decreased 7d BW by 25 g in males and 19 g in females but only the males still exhibited a reduced BW at 40 d of age (2777 versus 2844 g) in conjunction with a reduced percentage dressed carcass. Surprisingly, the delayed placement chicks exhibited numerically reduced mortality at both 7 and 40 d of age.

Key Words: Incubation, Broilers, Chick Quality

507 The effect of flock age and egg storage period on organ development and broiler performance. A. Afsar¹, O. Elibol¹, and J. T. Brake*², ¹*Faculty of Agriculture, Department of Animal Science, Ankara University, Ankara, Turkey,* ²*North Carolina State University, Department of Poultry Science, Raleigh.*

This study investigated the effects of broiler breeder flock age and length of egg storage on d-old broiler chick organ weights and subsequent broiler performance. Hatching eggs were obtained from Ross 344 male x Ross 308 female broiler breeders at 34 and 59 wk of age. Eggs were stored for 1, 5, or 10 d at 18 C and 75% RH prior to setting in Petersime incubators in a commercial hatchery under standard conditions. Chicks were necropsied at hatching at 504 h of incubation to determine BW and weights of the heart, liver, gizzard, and yolk sac. There were 480 d-old male chicks assigned to 24 pens in a 3 x 2 factorial design with 4 replicates of 20 birds each. All chicks were reared in a floor pen experimental house under the same feeding, management, and immunization program with 20 chicks per square meter. Broiler BW, feed consumption, and livability were subsequently determined at 21 and 42 d of age. The percentage yolk sac was increased but percentage liver and gizzard were decreased by increased length of storage or greater flock age. Broiler BW was decreased at 21 and 42 d of age by increased length of storage ($P < 0.01$) but was negatively affected by greater flock age only at hatching and 21 d. These data demonstrate that extended periods of egg storage change the relative development of broiler chick organs and permanently reduce broiler growth.

Key Words: Broilers, Incubation, Egg Storage

508 Optimizing brooding temperatures for large high yield broilers. E. O. Oviedo-Rondón*, M. J. Wineland, S. Funderburk, H. Cutchin, and J. H. Small, *Department of Poultry Science, North Carolina State University, Raleigh.*

Brooding is one of the most critical phases of broiler life due to their inability to thermoregulate. During the first days of life, birds mature from poikilothermic to homeothermic entities, and their body temperature is directly affected by ambient temperature. Two experiments were conducted in a commercial farm to estimate the best brooding temperature profiles for Ross-708 broilers raised to 9 weeks. The company standard house target temperature recommendations (CON) were compared with brooding profiles chosen to optimize the flock average rectal temperature (OB). Two paired houses with a comparable composition of day old broilers were used. In the first experiment, 19,800 chickens were placed in each house and processed at 66 days of age, during Winter/Spring conditions. In the second experiment 21,000 chickens per house were placed and processed at 63 days during Fall/Winter conditions. Rectal temperatures of at least 25 chickens per house were taken daily for the first two weeks and once a week until 35 days of age. House target temperatures were slowly reduced to avoid flock average rectal temperatures increasing above 105°F during the first 5 days. After first week, house target temperatures were adjusted to avoid average rectal temperatures rising above 107.5°F. Total BW, FCR, mortality, propane gas consumption, and flock uniformity were evaluated. Final average flock BWs were 77 and 50 grams better in the OB compared to CON in the first and second experiment, respectively. The OB group had better FCR in the first trial (1.88 vs 1.92) and no difference in the second trial (1.96). Flock uniformities improved with OB and gas consumption was reduced in 39%. The remarkable improvements in live performance and propane gas usage obtained with the OB treatment indicated that brooding temperatures could be optimized to maximize broiler performance and profitability.

Key Words: Broiler, Brooding Temperatures, Thermoregulation

509 Influence of photoperiods and light intensities meeting American and European guidelines on broiler performance. R. J. Lien*, J. B. Hess, and L. M. Stevenson, *Auburn University, Auburn, AL.*

Broilers were subjected to photoperiods and intensities which independently meet US National Chicken Council (NCC) or European Union (EU) guidelines to determine effects on performance. Seventy broilers were placed in each of 12 light controlled rooms. Six rooms were subjected to NCC photoperiods (long) (wk 1, 23L:1D; wk 2-6 20L:4D; wk 7, 23L:1D) and six to EU photoperiods (short) (d 1-3, 23L:1D; d 4-46, 14L:4D:2L:4D; d 47-49, 23L:1D). Six rooms were subjected to a common US intensities (dim) (wk 1, 0.25 FC; wk 2-6, 0.025 FC; wk 7, 0.25 FC) and six to EU intensity (bright) (wk 1-7, 2 FC). BW and feed consumption were determined at 9, 23, 37 and 49 d. Ten birds/sex/room were processed at 49 d to determine parts weights and yields. Data were analyzed as a 2X2 factorial arrangement. Short-dim decreased 9 d BW; otherwise, BW were unaffected by treatment. Feed consumption was reduced by dim intensity at 9 and 23 d, and short photoperiod at 23 d. Feed conversion was reduced by dim intensity at 9 and 23 d, and in the long-dim treatment at 49 d. Uniformity was increased by short photoperiod at 23 d, and in long-dim and short-bright treatments at 49 d. Nine d mortality was increased by short-dim treatment. At 49 d, mortality was increased by short-dim, reduced by long-dim and short-bright, and intermediate in the long-bright treatment. Carcass yield was increased by bright intensity and long photoperiod. Wing weight was increased by dim intensity. Total breast and fillet weights were increased by long-bright, decreased by long-dim and short-dim, and intermediate in short-bright treatments. Front half and total breast yield were increased by long-bright treatment. Wing yield was increased by long-dim, reduced by long-bright and short-bright, and intermediate in the short-dim treatment. Fillet yields were increased by long-bright, slightly reduced by short-bright, and markedly reduced by long-dim and short-dim treatments. Results indicate differences in photoperiod and intensity specified by EU and NCC guidelines will influence both broiler live and processing performance.

Key Words: Broiler Chicken, Photoperiod, Light Intensity

Ruminant Nutrition: Acid:Base Balance/Metabolism - Dairy

510 Calcium homeostasis, acid-base balance, and health status in periparturient Holstein cows fed diets with low cation-anion difference. W. X. Wu^{1,2}, J. X. Liu^{*1}, G. Z. Xu¹, and J. A. Ye¹, ¹*Institute of Dairy Sciences, Ministry of Education Key Laboratory of Molecular Animal Nutrition, Zhejiang University, Hangzhou, China,* ²*College of Animal Science, Guizhou University, Guiyang, China.*

Forty multiparous Holstein dry cows on d 21 prepartum were randomly allocated to four blocks of 10 cows to examine the effects of reducing the dietary cation-anion difference (DCAD) on calcium homeostasis, acid-base balance, health status, and subsequent lactation performance. The reduced DCADs (Na + K - Cl - S, mEq/kg DM) of +150, +50, -50, and -150 were obtained by addition of anionic salts. Reducing DCAD resulted in mild metabolic acidosis indicated by the sharp decline of urinary pH, and minor reductions of blood pH and HCO₃⁻ concentration. Greater plasma calcium availability was sustained at the

highest level in cows fed -150 DCAD diet close to the time of calving, and the reduced DCAD had a close association with the means of plasma calcium from d 3 prepartum to d 3 postpartum. On d 1 and 2 postpartum, the highest colostrum composite calcium concentration was observed in cows receiving -150 DCAD diet. No case of milk fever occurred within any diets, but feeding negative DCAD diets improved cow health status over the two positive DCAD diets. The milk yield and fat, protein, and lactose compositions; and 4% fat-corrected milk production were not significantly affected by DCAD treatments. It is suggested that urinary pH is an effective indicator of extracellular fluid acid-base balance, and that feeding negative DCAD in late gestation period is beneficial for dairy cows in blood calcium homeostasis and improvement of health status.

Key Words: Dietary Cation-Anion Difference, Calcium Homeostasis, Periparturient Holstein Cows