

Companion Animals: Companion Animal Biology

T54 Student organization sponsored dog training classes provide experiential learning opportunity for students and community participants. L. K. Karr-Lilienthal*¹ and J. S. Morstad^{3,2}, ¹*University of Nebraska-Lincoln, Lincoln*, ²*Union College, Lincoln, NE*, ³*Prairie Skies Inc., Lincoln, NE*.

The goal of this project was to determine the effectiveness of dog training classes organized by a student organization offered to members of the community at large. Students contracted a local professional dog trainer to provide training services. Two different class types were offered: an 8-week Canine Good Citizen (CGC) class for dogs taking a CGC test upon completion of the class and a 4-week basic obedience course. Using exit surveys, community participants and student organization members ranked a series of items on a 1 (strongly disagree) to 5 (strongly agree) scale. Students ($n = 9$) indicated completion of the course provided a better understanding of dog training (mean = 4.67), could see the importance of dog training in their future career (mean = 4.44, SD = 0.73), and would be interested in applying similar concepts in the training of their own dog (mean = 4.89, SD = 0.33). Students also indicated an understanding of the need for organizational (mean = 4.33, SD = 0.71) and communication skills (mean = 4.56, SD = 0.73) when working with the public. Students indicated assisting with the course allowed them to apply class content (mean = 4, SD = 0.87) and a desire for more hands on opportunities (mean = 4.56, SD = 0.73). The community dog handlers ($n = 12$) indicated they felt the class improved their dog's behavior (mean = 4.7, SD = 0.6), the bond between them and their dog (mean = 4.7), and they would recommend it to others (mean = 4.8). They indicated that they felt the university was providing a valuable service by offering the class (mean = 4.75) and that they enjoyed interacting with the students (mean = 4.1). Participants in the 8-week course rated their interactions with the students higher than those in the 4-week course possibly due to both more students attending the 8-week course sessions and more time for interaction. Overall, providing community dog training classes improved student learning and improved community awareness and support of the companion animal programs offered at the University of Nebraska–Lincoln.

Key Words: dog, experiential learning, undergraduate

T55 Tail deflection as a measure of emotional state in canines. C. L. Terrill*, T. H. Friend, and J. E. Sawyer, *Texas A&M University, College Station*.

Previous research indicates that negative emotions may be processed in the right hemisphere of the brain and positive emotions in the left; which may be evident in lateral movement of the tail. Dogs and other species could use asymmetry of behavioral displays as a sign of dominance or aggression that is not normally noticed by people. If emotionally linked asymmetry of tail movement occurs, it may aid in reducing the nearly 4.7 million dog bites in the United States each year. The objective of this study was to determine if lateral tail movement in dogs varies with emotional state. Fourteen dogs (7 female, 7 male), ages 2 to 12 years old were selected for the study. Dogs were held in a wooden test box ($1.83 \times 0.91 \times 1.22$ m) with a 20 cm \times 20 cm viewing slot in one end to reduce distractions until a test stimulus was presented. The dogs were individually exposed to 2 negative stimuli (unknown person, α dog) and 1 positive stimulus (owner) for 0.5 min per stimulus, with a 2 min break between each stimulus to mitigate any potential overlap of emotional response. Still photos of the first 2 full responses of each dog's tail were captured from video, and the maximum angle during each response was

averaged to determine left and right deflection. Six of the 14 unknown person tests elicited barking and growling behaviors, indicating that tests were efficacious. Data were analyzed as a mixed model with stimulus as a fixed effect and subject as a random block. Orthogonal contrasts were used to compare positive with negative stimuli, and to compare the types of negative stimuli. Dogs' maximum tail deflections were markedly different among positive and negative stimuli ($P < 0.01$; 36.1° right, 36.0° left, and $34.6^\circ \pm 2.5^\circ$ left for owner, unknown person, and α dog, respectively). Responses to negative stimuli were similar (α dog with unknown person; $P < 0.69$). These results suggest that right and left-brain asymmetry is measurable by quantifying maximum tail deflection in canines, and this methodology may be useful in behavioral studies to estimate positive and negative emotions.

Key Words: emotional state, tail wagging, canine

T56 Galactoglucomannan oligosaccharide (GGMO) supplementation affects nutrient digestibility, fermentation end-product production, and large bowel microbiota of the dog. T. A. Faber*¹, A. C. Hopkins², I. S. Middelbos¹, N. P. Price³, and G. C. Fahey, Jr.¹, ¹*University of Illinois, Urbana*, ²*Temple-Inland, Diboll, TX*, ³*National Center for Agricultural Utilization Research, USDA, Peoria, IL*.

A galactoglucomannan oligosaccharide (GGMO) obtained from fiber-board production was evaluated as a dietary supplement for dogs. The GGMO substrate contained high concentrations of oligosaccharides containing mannose, xylose, and glucose, with the mannose component typically 46%. Adult dogs assigned to a 6x6 Latin square design were fed 6 diets, each containing a different concentration of supplemental GGMO (0, 0.5, 1, 2, 4, and 8%) that replaced dietary cellulose. Total tract dry matter (DM) and organic matter (OM) apparent digestibilities increased ($P < 0.0001$) linearly, while total tract crude protein (CP) apparent digestibility decreased ($P < 0.0001$) linearly as the dietary GGMO substrate concentration increased. Fecal concentrations of acetate, propionate, and total SCFA increased ($P \leq 0.0001$) linearly whereas butyrate concentration decreased ($P < 0.0009$) linearly with increasing dietary concentrations of GGMO. Fecal pH decreased ($P \leq 0.0003$) linearly as dietary GGMO substrate concentration increased whereas fecal score increased quadratically ($P \leq 0.0001$). Fecal phenol ($P \leq 0.05$) and indole ($P \leq 0.01$) concentrations decreased linearly with GGMO supplementation. Fecal biogenic amine concentrations were not different among treatments except for phenylethylamine, which decreased ($P < 0.0001$) linearly as dietary GGMO substrate concentration increased. Fecal microbial concentrations of *E. coli*, *Lactobacillus* spp., and *Clostridium perfringens* were not different among treatments. A quadratic increase ($P \leq 0.01$) was noted for *Bifidobacterium* spp. as dietary GGMO substrate concentration increased. Data suggest positive nutritional properties of supplemental GGMO when incorporated in a high quality dog food.

Key Words: dog, galactoglucomannan oligosaccharide, fermentation end-products

T57 Evaluation of cellulose and beet pulp as dietary fibers for use in raw meat-based diets fed to captive exotic felids. K. R. Kerr*¹, C. Morris², S. Burke², and K. S. Swanson^{1,3}, ¹*Division of Nutritional Sciences, University of Illinois, Urbana*, ²*Henry Doorly Zoo, Omaha, NE*, ³*Department of Animal Sciences, University of Illinois, Urbana*.

The optimal fiber type and level of inclusion in raw meat-based diets for captive exotic felids has not been determined. The effects of fiber type and level on total tract digestibility, fecal characteristics, and fecal fermentative end products were evaluated using jaguars ($n = 4$), cheetahs ($n = 4$), Malayan tigers ($n = 4$), and Siberian tigers ($n = 4$) using a factorial design. Dietary fibers [cellulose (C); beet pulp (BP)] were added to diets at 2% or 4% (as-is). Statistical analyses were conducted using Mixed Models procedure of SAS. Dry matter (DM) and organic matter (OM) digestibilities were lower ($P < 0.05$) in cats fed 4C (76.7%; 80.6%) compared with those fed 2C (81.9%; 86.3%), 2BP (80.39%; 85.2%), and 4BP (82.3%; 87.9%). Fecal DM percentage was higher ($P < 0.05$) and fecal scores were lower ($P < 0.05$; i.e., stools were drier) in cats fed C compared with cats fed BP, and in cats fed 2BP compared with cats fed 4BP. The ratio of fecal DM output to DM intake (g DM feces/g DM intake) was higher ($P < 0.05$) in cats fed 4C compared with those fed 2C, 2BP, and 4BP. The ratio of fecal output as-is to DM intake (g feces as-is/g DM intake) was higher ($P < 0.05$) in cats fed C compared with those BP. Fecal acetate, propionate, butyrate, total short chain fatty acid, and ammonia concentrations were lower ($P < 0.05$) in cats fed C compared with cats fed BP. The proportion of acetate was greater ($P < 0.05$) and the proportion of butyrate was lower ($P < 0.05$) in cats fed BP compared with cats fed C. Total fecal branched-chain fatty acid concentrations were higher ($P < 0.05$) in cats fed 2BP than cats fed 4BP and 2C, and higher ($P < 0.05$) in cats fed 4C compared with cats fed 4BP. To conclude, cellulose at the 4% level decreased diet digestibility and increased fecal DM output, thus beet pulp (2% and 4%) or cellulose (2%) may be preferred dietary fiber options for raw meat-based diets for captive exotic felids. However, cats fed beet pulp had wetter/looser stools, increased fecal as-is output, and higher concentrations of fecal fermentative end products, which may have implications for animal management and gut health.

Key Words: exotic felids, digestibility, fiber

T58 The influence of fish versus mammalian and avian protein sources on satiety hormone response in dogs. B. M. Vester Boler^{*1}, T. A. Faber¹, L. L. Bauer¹, K. S. Swanson¹, S. Smiley², P. J. Bechtel^{2,3}, and G. C. Fahey Jr.¹, ¹University of Illinois, Urbana, ²University of Alaska, Fairbanks, ³USDA/ARS, Fairbanks, AK.

Satiety is affected by macronutrient composition of the diet. Proteins, specifically, are the most satiating, and fish proteins have been reported to be more satiating than meat proteins. The objective of this study was to determine the effect of beef, chicken, pork, or fish protein pre-meals on postprandial satiety hormone and 24 h food intake responses. Ten purpose-bred, intact female hounds were used. Pork loin, beef loin, chicken breast, salmon fillet, and pollock fillet were tested. During phase I, dogs were fed 100 g of protein from each substrate mixed with 200 mL of water. Blood was collected before feeding the substrate (0 min), and at 5, 15, 30, 60, 90, and 120 min postprandial, and analyzed for glucose, insulin, total ghrelin, and glucagon-like peptide-1 (GLP1). Dogs were fed 2-times their metabolizable energy (ME) requirement of food 3 h following the feeding of the protein substrate, and orts were weighed at 30, 60, and 180 min, and 24 h, after food presentation to determine intake. During phase II, dogs were fed 100 g of substrate mixed with 200 mL of water. Two-times the ME requirement of food then was offered 3 h following the protein meal and orts were weighed at 30, 60, and 180 min, and 24 h, after food presentation. In phase I, glucose decreased over time ($P < 0.001$), but was lowest ($P = 0.01$) when dogs were fed pollock or chicken substrates. Insulin increased ($P < 0.0001$) over time, and tended to be greater ($P = 0.09$) when dogs consumed the salmon treatment. Food intake and GLP1 increased (P

< 0.001) over time, but did not differ due to treatment ($P = 0.60$ and $P = 0.33$, respectively). Total ghrelin decreased ($P < 0.01$) over time, but did not differ ($P = 0.86$) due to diet. In phase II, food intake tended to be greater ($P = 0.06$) when dogs consumed the beef pre-meal compared with when dogs consumed the pork or pollock pre-meals. Protein source appears to influence blood markers of satiety in dogs, but has little effect on decreasing food intake.

Key Words: satiety, dog, protein source

T59 Dietary magnesium alters urinary histamine excretion in domestic felines. S. K. Martin^{*1}, C. E. Conway¹, M. R. C. de Godoy¹, D. L. Harmon¹, E. S. Vanzant¹, S. Zicker², R. M. Yamka², and K. R. McLeod¹, ¹University of Kentucky, Lexington, ²Hill's Pet Nutrition, Inc., Topeka, KS.

Magnesium (Mg) deficiency has been associated with increased histamine production in rats. Limitation of Mg with acidifying foods is common practice for management of urinary tract health in domestic cats. Nine healthy adult female shorthair cats were used in a 3 period random crossover experiment with fixed treatment sequences to test the effects of dietary Mg (0.06, 0.12, and 0.18% DM) on histamine in blood and urine. The dry-extruded test foods were fed in sufficient amounts to maintain ideal body weight and obtain a target urine pH of 6.3. Each experimental period was preceded by a 7d wash out period, in which the 0.06% Mg was fed, followed by a 14d feeding period of the appropriate food. Two 24h total urine collections were performed (d13: acidified, d14: unacidified; immediately iced) and blood was collected on d14. Dry matter intake ($P = 0.70$) and BW ($P = 0.30$) were not affected by treatment. Plasma Mg increased linearly with increasing dietary Mg (0.54, 0.56, 0.58 mM; $P = 0.001$). Urinary histamine excretion responded quadratically ($P = 0.02$) to treatment (3483, 3369, 3986 ng/d), whereas plasma histamine concentration ($P = 0.8$) was unaffected. Differences were not detected among treatments in total histamine, cellular + noncellular histamine, ($P = 0.70$) or antigen-induced ($P = 0.21$) histamine release in whole blood. Urine output ($P = 0.48$), pH ($P = 0.95$), NH₃ ($P = 0.21$), and titratable acidity of urine ($P = 0.78$) were similar across treatments. These data suggest that dietary Mg concentration at 0.06- 0.12% has little effect on histamine in blood or urine, however, supplying Mg at 0.18% increased urinary histamine.

Key Words: cat, magnesium, histamine

T60 Dietary effects of dietary cation anion balance on histamine metabolism and urine acidity in domestic felines. S. K. Martin^{*1}, C. E. Conway¹, M. R. C. de Godoy¹, D. L. Harmon¹, E. S. Vanzant¹, S. Zicker², R. M. Yamka², and K. R. McLeod¹, ¹University of Kentucky, Lexington, ²Hill's Pet Nutrition, Inc., Topeka, KS.

Dietary cation anion balance (DCAB) has been extensively studied in relation to urinary pH and stone formation. However, there is a paucity of data concerning the relationship between DCAB and histamine; the latter has been suggested as a mediator of inflammation in human interstitial cystitis which displays similarities with feline idiopathic cystitis. Eight healthy adult female shorthair cats were used in a 3 period random crossover with fixed treatment sequences to test the effects of DCAB (6.3, 6.6, and 6.9 target urine pH) on histamine kinetics and urine acidity. Dry-extruded test foods were fed to maintain ideal body weight. Each experimental period (14d) was preceded by 7d wash out period in which the low DCAB diet was fed. Two 24hr total urine collections were performed (d13: acidified, d14: unacidified; immediately iced) and blood was collected on d14. Dry matter intake ($P = 0.73$), BW ($P = 0.62$), and urine output ($P = 0.50$) were similar across treat-

ment. Urinary pH (6.11, 6.37, 6.69) increased linearly ($P = 0.004$), while titratable acidity of urine (0.14, 0.13, 0.10 mL 0.1 M NaOH to achieve 7.4 pH) tended to decrease linearly ($P = 0.09$) with increasing DCAB. Urine NH_3 decreased linearly ($P = 0.03$) with increasing DCAB (445.7, 418.6, 324.5 mmol/L). Urinary histamine excretion ($P = 0.03$) and concentration ($P = 0.02$) increased linearly with increasing DCAB (6164, 8513, 8356 ng/d; 113.8, 129.9, 135.2 ng/mL); where as plasma histamine concentration ($P = 0.42$) was unaffected. Differences were not detected among treatments in antigen-induced ($P = 0.21$) histamine release in whole blood, however total, cellular + noncellular histamine release ($P = 0.07$) demonstrated a quadratic trend with treatment (12.7, 6.9, 11.2 ng/mL). These data indicate that DCAB alters urinary acidity and histamine excretion, but does not affect circulating plasma concentrations or antigen-induced release of histamine.

Key Words: cat, dietary cation anion balance, histamine

T61 The effects of graded arginine levels on nitrogen metabolism in the lean adult dog. C. E. Conway^{*1}, M. R. C. de Godoy¹, S. K. Martin¹, K. R. McLeod¹, N. Z. Frantz², R. M. Yamka², and D. L. Harmon¹, ¹University of Kentucky, Lexington, ²Hill's Pet Nutrition, Inc., Topeka, KS.

Arginine (ARG) is considered to be conditionally essential in the diet of adult omnivores, indicating that addition of supplemental ARG may be beneficial. These potential benefits include enhanced hepatic urea synthesis aiding ammonia clearance and increased glomerular flow rates via the vasodilatory effects of nitric oxide. The objectives of this study were to determine if feeding increased supplemental ARG affects indices of renal function, inflammation, and whole body nitrogen metabolism in the adult dog. Three isocaloric foods were used in this study: a control (0.99% total ARG on a DMB), control plus 0.5% supplemental ARG (1.42% total ARG on a DMB), and control plus 1.0% supplemental ARG (1.85% total ARG on a DMB). The foods were fed to maintain ideal body condition of 9 adult (ages 2–3 years) spayed Beagles (7.62 ± 0.67 kg) in a replicated 3x3 Latin Square design. Experimental periods were 28 d in length with blood collection on d 14 and 28, and total urine and fecal collections for the final 6 d of each period. Nitrogen intake was increased ($P < 0.0001$) by increasing supplemental ARG. Dry matter digestibility was 1.7% lower ($P = 0.0025$) for the 1.0% ARG food. Nitrogen digestibility was greatest ($P = 0.0013$) for the 0.5% ARG food. Nitrogen absorbed was greater ($P < 0.0001$) for both the 0.5% and 1.0% ARG foods than control, yet nitrogen retained ($P = 0.3188$) and urea excretion ($P = 0.3153$) did not differ between treatments. Inflammatory biomarkers, PGE2 and HMGB1, hormone IGF1, and kidney markers, ADMA, albumin, and MCP1, were evaluated in urine or serum samples. No differences were detected in any of these biomarkers indicating that increased supplemental ARG did not have an anti-inflammatory effect or improve markers of kidney function at the levels tested. Despite some subtle changes in N metabolism, it does not appear, based on the variables measured, that addition of dietary arginine to the adult dog at maintenance is beneficial.

Key Words: arginine, dog, nitrogen metabolism

T62 The effects of carob (*Ceratonia siluqua*) on some reproductive parameters of male New Zealand White rabbits. A. Ata, M. S. Gulay*, O. Yildiz-Gulay, and S. Gungor, Mehmet Akif Ersoy University, Faculty of Veterinary Medicine, Burdur, Turkey.

Carob is used locally in many Mediterranean countries for its aphrodisiac properties. Thus, the aim of this study was to determine the effect of carob on reproductive parameters of male New Zealand White rabbits.

The experiment consisted of 2 stages. The first stage was the adaptation period which 6–8 mo old rabbits were trained for the semen collection for 15 d. At the end of the first stage rabbits were divided into 2 groups of 8; a control and treatment groups administered daily with 10cc tap water and carob extract by oral gavages, respectively. Second stage of the experiment was 49 d (1 spermatogenesis duration). During second stage semen samples were collected weekly from all rabbits and samples taken at wk 1 and wk 7 were analyzed separately. There were no differences in control and treatment groups for ejaculate volume (0.71 ± 0.06 vs. 0.64 ± 0.03 mL), ejaculate pH (7.01 ± 0.02 vs. 7.00 ± 0.01), sperm concentration (347.5 ± 45.1 vs. 380.9 ± 29.4 × 10⁶ mL), percent progressive motility (78.9 ± 1.44 vs. 79.1 ± 0.91%), percent live spermatozoa by eosin-nigrosine staining mixture (EET; 82.5 ± 1.25 vs. 78.3 ± 3.06%), percent sperm membrane response by hypo-osmotic swelling test (HOS; 79.0 ± 1.21 vs. 74.9 ± 2.54%) and seminal plasma protein levels (2.6 ± 0.3 vs. 2.9 ± 0.3 gr/dL) at the beginning of stage 2 ($P > 0.1$). Similarly, there were no differences in control and treatment groups for ejaculate volume (0.68 ± 0.06 vs. 0.63 ± 0.03 mL), ejaculate pH (7.06 ± 0.03 vs. 7.02 ± 0.02), percent progressive motility (78.0 ± 2.9 vs. 84.0 ± 2.12%), EET (80.1 ± 3.51 vs. 80.4 ± 2.41%), HOS (77.5 ± 2.37 vs. 80.9 ± 2.54%) and seminal plasma protein levels (2.6 ± 0.19 vs. 2.4 ± 0.25 g/dL) at the end of stage 2 ($P > 0.1$). However, sperm concentration (337.6 ± 43.4 vs. 460.7 ± 44.1 × 10⁶ mL, $P < 0.05$) and percent changes on spermatozoa concentrations between groups (percentage of spermatozoa at the end of stage 2 ÷ percentage of spermatozoa at the beginning of stage 2; 98.9 ± 6.38 vs. 122.9 ± 6.56%, $P < 0.02$) were affected by the treatment at the end of stage 2. Data suggested that use of carob cures by boiling the fruit of carob has beneficial influences on sperm concentration in rabbits.

Key Words: carob, rabbit, spermatological parameters

T63 The effects of carob (*Ceratonia siluqua*) on some hematological parameters and organs of male New Zealand White rabbits. M. S. Gulay*, O. Yildiz-Gulay¹, A. Ata¹, A. Balic², and A. Demirtas¹, ¹Mehmet Akif Ersoy University, Faculty of Veterinary Medicine, Burdur, Turkey, ²Sakarya Toyota Hospital, Sakarya, Turkey.

Carob, also known as St. John's Bread, is used locally in many Mediterranean countries for its curative properties. However, the long-term use of carob may also have toxic effects. Thus, the present study was conducted to determine the effects of dietary carob on some hematological parameters and organs of male New Zealand White rabbits. Rabbits (6 to 8 mo old) were divided into 2 groups of 8 rabbits. Rabbits in the control group received 10cc tap water for 49 d. Rabbits in the treatment group received the same amount of carob cures by boiling the fruit of carob for 49 d. All treatments were given by oral gavage. At the end of the experiment, 10 mL of blood was withdrawn from the ear arteries of each rabbit and sacrificed. Total erythrocyte, leukocyte, plasma protein, percent hemoglobin, hematocrit, mean corpuscular volume, mean corpuscular hemoglobin, mean corpuscular hemoglobin concentration, percent neutrophil, eosinophil, basophil lymphocyte and monocyte for rabbits in control and treatment groups did not differ and were 5.77 ± 0.22 and 6.37 ± 0.31 × 10⁶/μL, 6.7 ± 0.99 and 7.34 ± 0.34 × 10³/μL, 6.51 ± 0.20 and 6.48 ± 0.30 g/dL, 13.8 ± 0.32 and 13.7 ± 0.24 g%, 41.0 ± 1.59 and 40.8 ± 0.96%, 71.4 ± 2.8 and 64.6 ± 3.3 μm³, 24.0 ± 0.7 and 21.8 ± 1.3 μg, 33.8 ± 1.18 and 33.7 ± 0.96%; 33.6 ± 4.54 and 38.4 ± 1.20%, 3 ± 0.89 and 2.8 ± 0.20%, 58.7 ± 4.73 and 53.8 ± 5.14%, and 4.7 ± 1.05 and 5 ± 1.04%, respectively. Liver, kidney, lung, heart and body weights between control and treatment groups were not significant ($P < 0.1$). Moreover, no apparent changes in liver, kidney, liver, heart, testis and brain were detected by gross post mortem and histopathologi-

cal examination to suggest toxic effect of oral use of carob extract for 49 d. Thus, the results suggested no toxic effect subacute use of carob extract in male New Zealand White rabbits.

Key Words: carob, rabbit, hematological parameters

T64 The effects of feeding *Pinus pinea* seeds on some blood values in male New Zealand White rabbits. O. Yildiz-Gulay*¹, M. S. Gulay¹, A. Ata¹, A. Balic², and A. Demirtas¹, ¹Mehmet Akif Ersoy University, Faculty of Veterinary Medicine, Burdur, Turkey, ²Sakarya Toyota Hospital, Sakarya, Turkey.

A trial involving 16 male New Zealand White rabbits was conducted to determine whether there is any effect of *Pinus pinea* seed supplementation on hematological parameters and organs. Rabbits (6 to 8 mo old) were divided into 2 groups of 8 rabbits. Rabbits in the control group received 10cc tap water for 49 d. Rabbits in the treatment group received 1 g/kg of *Pinus pinea* seeds in 10 mL of tap water for 49 d. All treatments were given by oral gavage. At the end of the experiment, 10 mL of blood was withdrawn from the ear arteries of each rabbits and sacrificed. No significant differences were detected in mean hemoglobin (13.8 ± 0.31 vs. 13.5 ± 0.25 g%), hematocrit (41.0 ± 1.59 vs $40.4 \pm 0.87\%$), red blood cell count (5.8 ± 2.24 vs. $5.7 \pm 2.51 \times 10^6/\mu\text{L}$), white blood cell count (6.70 ± 9.94 vs. $6.54 \pm 3.54 \times 10^3/\mu\text{L}$), plasma protein (6.5 ± 0.20 vs. 6.3 ± 0.12 g/dL), mean corpuscular hemoglobin concentration (33.8 ± 1.18 vs. 33.5 ± 1.20 g/dL) percent neutrophil (34.5 ± 4.01 vs. $38.5 \pm 3.66\%$), eosinophil (3.0 ± 0.89 vs. $2.0 \pm 0.40\%$), basophil (0.60 ± 0.33 vs. $0.50 \pm 0.29\%$), lymphocyte (57.2 ± 4.17 vs. $53.2 \pm 2.92\%$) and monocyte (4.7 ± 1.05 vs. $5.8 \pm 0.85\%$) of rabbits in control and treatment groups, respectively. Overall blood parameters remained within the physiological range in both groups. Liver, kidney, lung, heart and body weights between control and treatment groups did not differ. Moreover, no apparent changes in liver, kidney, liver, testis and brain were detected by gross post mortem and histopathological examination to suggest toxic effect of oral use of *Pinus pinea* seeds for 49 d. In conclusion, 49 d of *Pinus pinea* seed supplementation did not cause any negative effects on the parameters tested in this study.

Key Words: *Pinus pinea* seeds, hematological parameters, histopathology

T65 Spermatological parameters of male New Zealand White rabbits supplemented with *Pinus pinea* seeds. A. Ata, M. S. Gulay*, O. Yildiz-Gulay, S. Avki, and S. Gungor, Mehmet Akif Ersoy University, Faculty of Veterinary Medicine, Burdur, Turkey.

The experiment was designed to evaluate whether supplementing male New Zealand White rabbits with *Pinus pinea* seeds affected spermatological parameters. Six to 8 mo old male rabbits ($n = 16$) were trained for semen collection for 15 d. Rabbits were assigned randomly to control and treatment groups (8 per group). Control and treatment groups were administered daily with 10cc tap water and 1 g/kg of *Pinus pinea* seeds in 10 mL tap water by oral gavage, respectively for 1 spermatogenesis duration (49 d). During the entire experimental period semen samples were collected weekly from all rabbits. During the experiment, 2 semen samples taken at wk 1 and wk 7 were combined and analyzed separately. There were no differences in control and treatment groups for initial values for ejaculate volume, ejaculate pH, progressive motility, head defect, tail defect, sperm concentration, percent live spermatozoa by eosin-nigrosine staining mixture (EET), percent sperm membrane response by hypo-osmotic swelling test (HOS) or seminal plasma protein levels ($P > 0.1$). Similarly, there were no differences in control and treatment groups for ejaculate volume (1.02 ± 0.13 vs. 0.90 ± 0.18 mL), ejaculate pH (7.02 ± 0.04 vs. 7.00 ± 0.02), progressive motility (75.7 ± 2.63 vs. $79.8 \pm 1.94\%$), head defect (2.02 ± 0.09 vs $2.12 \pm 0.09\%$), tail defect (13.0 ± 0.99 vs. $10.9 \pm 1.22\%$), EET (73.3 ± 2.26 vs. $81.6 \pm 4.98\%$), HOS (73.1 ± 2.28 vs. $77.1 \pm 3.15\%$) and seminal plasma protein levels (2.3 ± 0.23 vs. 2.8 ± 0.34 g/dL) at the end of experiment ($P > 0.1$). However, sperm concentration (327.6 ± 44.3 vs. $464.7 \pm 45.8 \times 10^6$ mL, $P < 0.05$) and percent changes on spermatozoa concentrations between treatment groups (percentage of spermatozoa at the end of experiment \div percentage of spermatozoa at the beginning of experiment; 97.2 ± 8.05 vs. $124.9 \pm 5.74\%$, $P < 0.02$) were affected by the treatment at the end of experiment. Data suggest the daily dietary supplementation of *Pinus pinea* seeds to rabbits may improve sperm concentration in rabbits.

Key Words: *Pinus pinea* seeds, rabbit, spermatological parameters