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Generation of Reference Intervals and Evaluation of Seasonal Variation in Clinical Pathology Parameters of Backyard Laying Hens

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Abstract: Backyard poultry have seen significant gains in popularity in the United States in recent years. Backyard chicken (*Gallus gallus domesticus*) breeds, selected for high egg production and friendly temperament, differ from those typically used in commercial egg and meat production, as well as in veterinary research studies. This increased interest in chickens as pets has led to a growing need for more breed-specific veterinary care, including clinical pathology references. In the present study, 48 clinically healthy, young laying hens from 4 different flocks, representing 7 popular backyard breeds, were evaluated. Reference intervals for complete blood count, plasma biochemistry panel, and plasma protein electrophoresis were established per the guidelines of the American Society for Veterinary Clinical Pathology. Paired samples (summer vs winter) were used to assess the effect of season on these results. Notably, significant seasonal differences were seen in all measured values of the complete blood count as follows: estimated white blood cell count ($P < 0.0001$) and lymphocyte ($P < 0.0001$), monocyte ($P = 0.0298$), eosinophil ($P = 0.0169$), and basophil ($P < 0.0001$) absolute counts were higher in the summer months, while packed cell volume ($P = 0.0006$) and heterophil count ($P = 0.0096$) were lower. When evaluating the results of the plasma biochemistry panel, samples from the summer months exhibited lower concentrations of glucose ($P < 0.0001$) and calcium ($P = 0.0008$) and aspartate transaminase activity ($P = 0.0046$), but higher creatine kinase activity ($P = 0.0069$) and phosphorus concentrations ($P = 0.006$). The plasma protein electrophoresis results demonstrated a lower albumin-to-globulin ratio ($P = 0.0012$) in the summer, with higher concentrations of alpha-1 ($P < 0.0001$) and gamma ($P < 0.0001$) globulins. These findings support the need for season-specific reference intervals when evaluating clinical pathology test results from backyard chickens.