Hematologic Reference Intervals and Comparison of Natt-Herrick Technique and Smear-Based Leukocyte Estimation in Cockatiels (Nymphicus hollandicus)

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Abstract: Although cockatiels are among the most common avian species maintained as companion animals in the United States, information on standard hematologic reference values for this species is limited. The objectives of this study were to establish hematologic reference intervals (RI) for cockatiels, compare methods using both the Natt-Herrick technique (NHT) and the smear-based estimation technique (SBT), explore age and sex differences in the hematologic findings for this species, and produce the first cockatiel RI for fibrinogen concentration and thrombocyte estimate. Healthy cockatiels (60 males and 60 females, 2–11 years old) from a research colony were included in this study. Blood samples were placed in dipotassium ethylenediaminetetraacetic acid tubes, and erythrocyte counts and thrombocyte estimates were determined via automated analyzer (ADVIA 120) and SBT, respectively. Moreover, leukocyte concentrations were determined using both NHT and SBT to compare these common methods for measuring a complete blood count in cockatiels. Data were analyzed for outliers, distributions, descriptive statistics, and RI via Reference Value Adviser, a set of macroinstructions for Microsoft Excel (Microsoft, Redmond, WA, USA). Lymphocytes were the predominant leukocyte across both methods. According to the NHT, females had significantly higher concentrations of total leukocytes, heterophils, bands, lymphocytes, basophils, and total plasma protein compared with males. Significant inverse polynomial relationships were noted between total leukocyte count and age and lymphocyte counts and age for NHT. Total leukocyte count produced via NHT and SBT were compared using Passing-Bablok and Bland-Altman plots, and no significant constant or proportional biases were found. However, these methods showed wide limits of agreement. While the RI were interchangeable between methods from a clinical standpoint, the same method should be used to assess changes in an individual. The reported RI are uniquely robust given the sample size, balanced sex and age distributions, inclusion criteria, and control over sample collection.