Sequence-based genotyping clarifies conflicting historical morphometric and biological data for 5 Eimeria species infecting turkeys

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Abstract:

Unlike with Eimeria species infecting chickens, specific identification and nomenclature of Eimeria species infecting turkeys is complicated, and in the absence of molecular data, imprecise. In an attempt to reconcile contradictory data reported on oocyst morphometrics and biological descriptions of various Eimeria species infecting turkey, we established single oocyst derived lines of 5 important Eimeria species infecting turkeys, Eimeria meleagrimitis (USMN08/01 strain), Eimeria adenoeides (Guelph strain), Eimeria gallopavonis (Weybridge strain), Eimeria meleagridis (USAR97/01 strain), and Eimeria dispersa (Briston strain). Short portions (514 bp) of mitochondrial cytochrome c oxidase subunit I gene (mt COI) from each were amplified and sequenced. Comparison of these sequences showed sufficient species-specific sequence variation to recommend these short mt COI sequences as species-specific markers. Uniformity of oocyst features (dimensions and oocyst structure) of each pure line was observed. Additional morphological features of the oocysts of these species are described as useful for the microscopic differentiation of these Eimeria species. Combined molecular and morphometric data on these single species lines compared with the original species descriptions and more recent data have helped to clarify some confusing, and sometimes conflicting, features associated with these Eimeria spp. For example, these new data suggest that the KCH and KR strains of E. adenoeides reported previously represent 2 distinct species, E. adenoeides and E. meleagridis, respectively. Likewise, analysis of the Weybridge strain of E. adenoeides, which has long been used as a reference strain in various studies conducted on the pathogenicity of E. adenoeides, indicates that this coccidium is actually a strain of E. gallopavonis. We highly recommend mt COI sequence-based genotyping be incorporated into all studies using Eimeria spp. of turkeys to confirm species identifications and so that any resulting data can be associated correctly with a single named Eimeria species.

Keywords:
coccidiosis oocyst mitochondrial cytochrome c oxidase subunit I turkey Eimeria morphometrics

Published In:
Poultry Science , , peu007