

Cochlosoma anatis

THE LAST 5 YEARS

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Overview

- History
- Review of 2003 field study
- Flock to flock transmission
 - Pseudocyst?
- Seasonality

Introduction

- Kotlan 1923 (Bermudez, 2003 – Diseases of Poultry)
- Mortality in naturally infected finches (Macwhirter, 1994)
- Runting and stunting in waterfowl (Bollinger & Barker, 1996)
- *Cochlosoma* found in birds, bats, and shrews (Kulda & Nohynkova, 1978; Macwhirter, 1994; and Vrtik et al, 2002)
- Similar to *Trichomonas* (Vrtik et al, 2002) and *Giardia* (Kimura, 1934; McNeil & Hinshaw, 1942; Pecka, 1991 and Cooper et al, 1995)

Introduction (cont.)

- A cause of non-cocci protozoal diarrhea?
- Enteritis in commercial turkey poults (Cooper et al, 1995)
- Limited to no gross pathology (Kimura, 1934 and Travis, 1938)
- Reported increased prevalence in brooder phase
 - 3 to 6 weeks of age
- Reported seasonality – worse in summer months
- Effective disinfectants – quaternary ammonium, phenol, and formalin (Boucher & Bermudez)

2003 Field Investigation

- To determine the prevalence of naturally occurring *Cochlosoma anatis* in turkeys
- Does *Cochlosoma* adversely affect production?
- What management practices might influence the incidence and prevalence of Cochlosomiasis?

Hockett et al., 2004

2003 Field Investigation

- August through October 2003
- 8 brooder hub farms (8 groups)
- 2 single-age brood and grow farms (1 group)
 - 1 sub-divided into four groups (4 groups)
- 2 multi-age brood and grow farms
 - Sub-divided into four groups (8 groups)

- Total number of groups = 21 groups

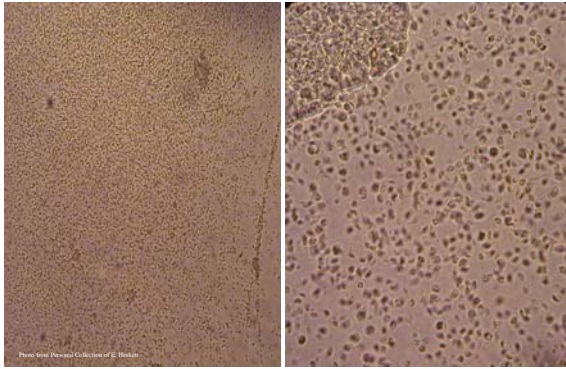
Hockett et al., 2004

2003 Field Investigation

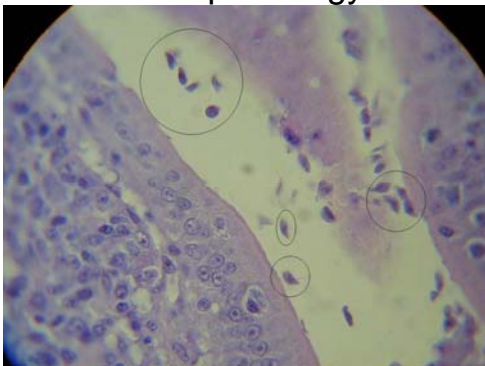
- Sample birds weekly from 1 week to 10 weeks of age.
- Randomly sample 6 live, **healthy** birds per group per week. (Total sampled = 1,192 birds)
- Obtain fresh intestinal scrapings from the upper, mid and lower regions of intestine.
- Immediate microscopic examination of wet mount slides.
- Record any gross necropsy findings.

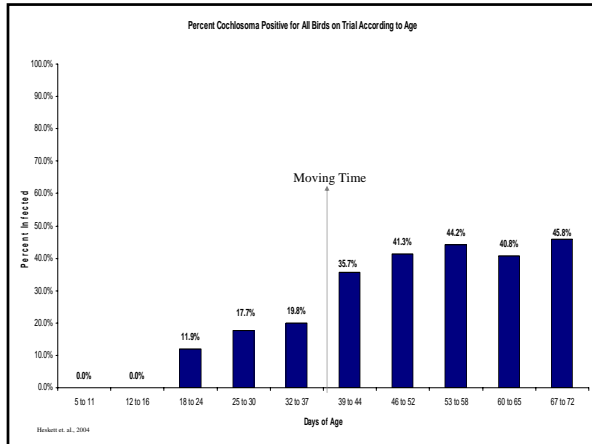
Hekken et al., 2004

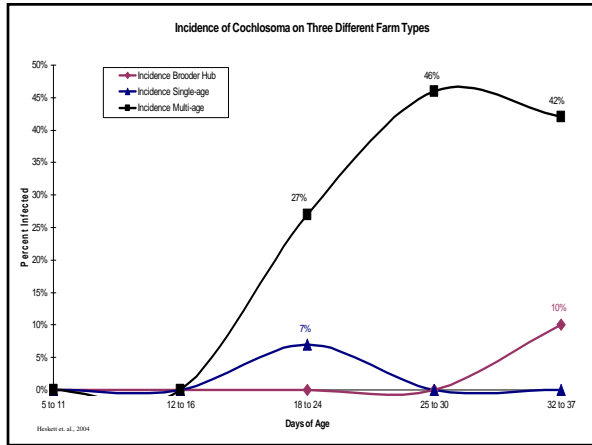
2003 Findings

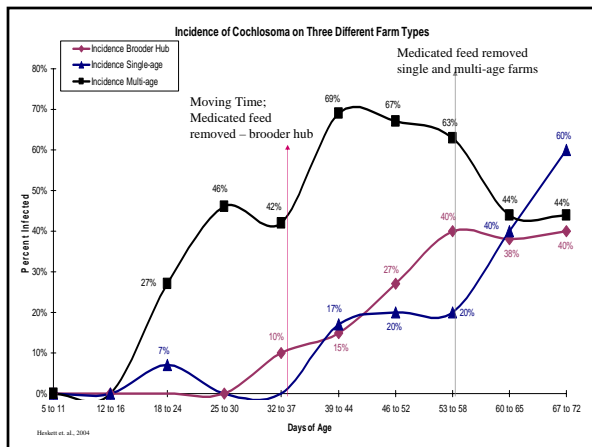


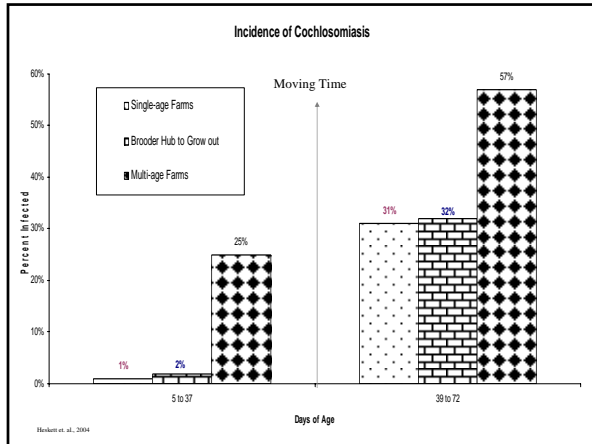
Histopathology

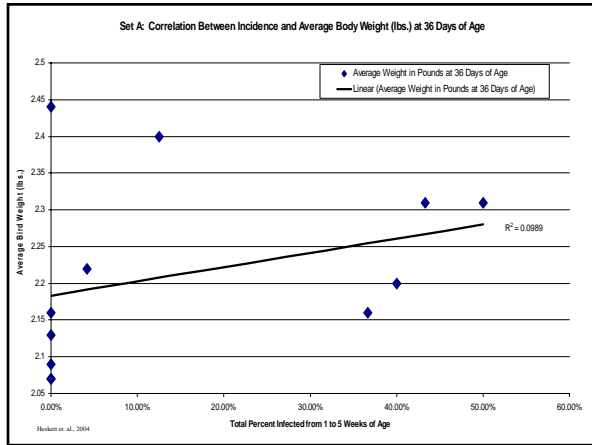


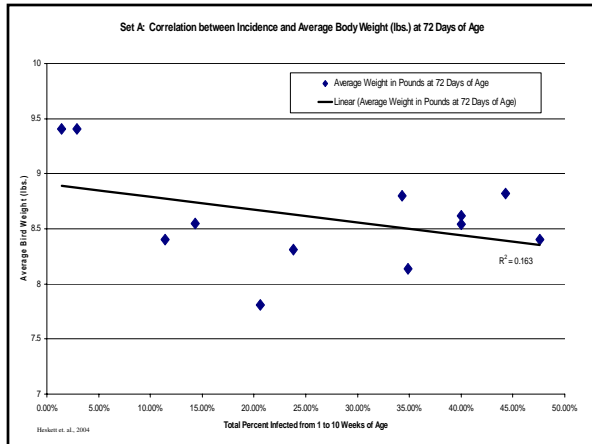












Conclusions

- Data suggests that there is no correlation between infected and non-infected birds and weight gain.
- Data suggests that age of onset of *Cochlosomiasis* in a flock has little to no impact on 10 week weights.
- Infection increased independent of feed medication program.

Hobbs et al., 2004

Transmission

- Exciting new research
- First description of inoculation of intestinal scrapings of *Cochlosoma anatis* infected birds without ANY evidence of viable or recognizable organisms
- Birds infected at 1 day of age with above inoculum
 - Both the inoculated bird and 5 pen mates all positive for *Cochlosoma anatis* 48 hours post infection.
- HOW?

Evans, NP et al. - 2006

Transmission

- Fecal – oral (Bollinger, T. K. et al., 1996; Lindsay, D. S., 1999)
- Flock to flock? Evans, NP et al. - 2006
 - Via pseudocyst
 - When organism perceives a stressful environment or subphysiological temperatures it folds on itself (rounding)
 - Decreases surface area exposed to hostile environment
 - Also seen with *Trichomonas foetus* (Granger, B. L., 2000)
 - Vulnerable structures internalized:
 - Adhesive disc, undulating membrane and flagella

Pseudocyst

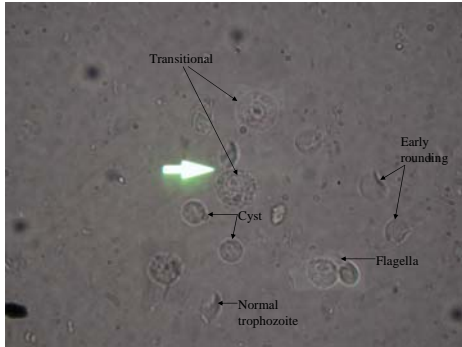


Photo courtesy of N. Evans

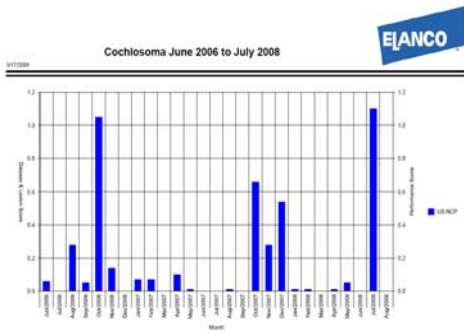
Composite slide viewed at 1,000X with 5X camera. Various stages of *Cochlosoma anatis* in intestinal scraping from proximal jejunum of 14 day old poult inoculated with only the cyst stage at one day of age.

Conclusions

- Pseudocyst
 - Compact, non-motile, lacks true cyst wall (Evans, NR, 2006)
 - Reversible event (Evans, NR, 2006)
 - Allows for flock to flock transmission
- *Cochlosoma anatis* may remain on a premise once infected as a result of the pseudocyst formation

Seasonality

- Originally believed to be greater in Summer months



Truly Seasonal?

- Probably not
- Until recently we only looked for mature trophozoites
- Pseudocysts look very similar to other intestinal debris and feedstuffs
 - Difficult to positively differentiate using standard light microscopy
- RAPID examination of intestinal smears essential
 - Winter time, slides and saline are cold (subphysiological temperatures)
 - Rapid induction of pseudocyst
 - *Trichomonas foetus* can begin pseudocyst formation within 3 minutes (Granger, B.L., 2000)

Conclusions

- Possibly a year round condition
- Diagnostic procedures may inadvertently artificially lower the incidence rate we observe
- RAPID examination is essential to “catch” *Cochlosoma anatis* in its mature trophozoite stage

Summary

- A recent study under commercial conditions suggest this is an opportunistic organism
 - Seen more when there is an intestinal flora imbalance
- The organism when found alone has little to no impact on commercial production parameters
- Pseudocyst
 - Flock to flock transmission
- Possibly a year round condition
 - Diagnostic practices can impact observation of mature trophozoite
