Incidence of Bovine Coccidia in Western Oregon

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Eleven or more species of coccidia of the genus *Eimeria* are currently recognized as occurring in bovine animals. At least 9 species are known to occur in this country, their incidence having been determined through field surveys of cattle conducted in various parts of the United States, particularly the South-eastern, North-Central, and Western states (Christensen, 1941; Davis, et al., 1955; Hasche and Todd, 1959; Fitzgerald, 1962). These species include *E. bovis, E. zurni, E. ellipsoidalis, E. auburnensis, E. cylindrica, E. subspherica, E. canadensis, E. bukidnonensis*, and *E. alabamensis*. Two species, *E. bovis* and *E. zurni*, are consistent pathogens and cause acute coccidiosis (Hammond, et al., 1944; Boughton, 1945; Davis and Bowman, 1951). *Eimeria ellipsoidalis* and *E. alabamensis* may produce no observable symptoms unless large numbers of sporulated oocysts are ingested or unless the calf is weakened from other predisposing conditions (Davis and Bowman, 1956). *Eimeria cylindrica* was reported by Wilson (1931) (as cited by Levine, 1961, p. 172), to be moderately pathogenic while *E. auburnensis, E. bukidnonensis*, and *E. canadensis* have a relatively low degree of pathogenicity (Hammond, et al., 1961; Levine, 1961). The pathogenesis of *E. subspherica* is unknown.

Although bovine coccidia have been found in Pacific Northwest livestock, no incidence report for the various species has been made. It was for this reason that the present study was undertaken.

**Materials and Methods**

Tared sample bottles containing 2.5% potassium dichromate were distributed among three veterinary offices in Tillamook County, Oregon. This geographic location was selected because of the concentrated dairy industry there, and because it has climatic conditions representative of other Pacific Northwest dairy areas. Practitioners were asked to randomly collect fecal samples from two-week to one-year-old dairy calves between August and November, 1965. They were also asked to record the animal's sex, age, and fecal consistency for each sample submitted.

The approximate number of oocysts per gram of feces was determined using a modified McMaster method (Whitlock, 1948). After weighing, contents of each tared sample bottle were emptied into a beaker and water added to make a total volume of 100 ml. Following thorough mixing, a 1.0 ml aliquot (1/100 of original sample) was combined with 2.0 ml Sheather's sugar solution. After vigorous shaking, the oocysts in 1/20 (0.15 ml) of this 3.0 ml mixture were counted, using a McMaster counting chamber (representing 1/2,000 of the fecal material in the original sample).

**Results and Discussion**

**Incidence and identification of species**

Of a total of 86 fecal samples examined, 62 (72%) contained oocysts of either a single or a mixture of species. From these samples, 8 species of coccidia were identified (Christensen and Porter, 1939; Christensen, 1941; Nyberg and Hammond, 1965). In order of their decreasing frequency, they were: *Eimeria bovis, E. ellipsoidalis, E. zurni, E. auburnensis, E. cylindrica, E. subspherica, E. bukidnonensis*, and *E. alabamensis*.

Table 1 shows the majority of positive samples contained mixtures of the various species; however, *E. bovis, E. ellipsoidalis, E. auburnensis, E. zurni, E. cylindrica*, and *E. bukidnonensis* were found occurring as single infections, representing 28% of the total samples.

**Discharge of oocysts**

The number of oocysts per gram of feces ranged from 500 to over 10 million for the various species present. The range for the
two most pathogenic species (*E. bovis* and *E. zurni*) was from 425 to 2 million, and 370 to 8 million, respectively. A previous report (Horton-Smith, 1958), stated that a discharge rate in excess of 5,000 oocysts per gram is indicative of clinical coccidiosis. We found 36 of the 62 positive animals (58%) passing 5,000 or more oocysts of *E. bovis* or *E. zurni*, per gram of feces. Of these, 21 (59%) had normal stools, 9 (25%) were loose or scouring, and no history was given for 6 animals.

Twenty of 22 negative animals, for which the age, sex, and consistency of feces was known, were 4 months old or older. Perhaps this finding is related to the immunity observed in older animals that have been previously exposed to bovine coccidia.

**Summary**

Sixty-two (72%) of 86 fecal samples collected randomly from dairy calves in Tillamook County, Oregon, contained oocysts of the genus *Eimeria*. Eight species were identified. Listed in order of their decreasing frequency, they were: *Eimeria bovis* (62%), *E. ellipsoidalis* (33%), *E. zurni* (23%), *E. auburnensis* (14%), *E. cylindrica* (10%), *E. subspherica* (8%), *E. bukidnonensis* (6%), and *E. alabamensis* (1%). Twenty-eight per cent of the 86 samples contained single species, of which *E. bovis* comprised 21%. All species except *E. subspherica* and *E. alabamensis* occurred singly.

Oocyst discharge, involving all samples, ranged from 500 to over 10 million per gram of feces. Fifty-eight per cent of the animals harboring *E. bovis* and *E. zurni* were passing 5,000 oocysts or more per gram of feces, however, only 25% were scouring.

**Literature Cited**


Christensen, J. F. 1941. The oocysts of coccidia from domestic cattle in Alabama (USA) with descriptions of two new species. J. Parasit. 27: 203-220.


