

EIMERIA DICROSTONICIS N. SP., A PROTOZOAN
PARASITE OF THE LEMMING, AND OTHER
PARASITES FROM ARCTIC RODENTS

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This report is based upon a study of material collected by Harold C. Hanson on the Perry River Expedition which was carried out in the summer of 1949 under the auspices of the Arctic Institute of North America with funds furnished by the Office of Naval Research. The Perry River flows into Queen Maud Gulf, which lies on the Arctic Ocean, west of Hudson Bay. The river is near the dividing line between Mackenzie and Keewatin Districts, Canadian Northwest Territories, at approximately 102° W. longitude and 68° N. latitude.

Mr. Hanson brought back fecal specimens from two red-backed mice (*Clethrionomys rutilus*), seven Parry's ground squirrels (*Citellus parryi*), three brown lemmings (*Lemmus t. trimucronatus*), and 14 varying lemmings (*Dicrostonyx groenlandicus richardsoni*). The fecal samples were placed in vials in 2.5 percent potassium bichromate solution immediately on collection, and were examined in the laboratory several months later. Prior to examination, the contents of each vial were mixed well, placed in a thin layer in a petri dish, and allowed to incubate at room temperature for at least a week. The material was then ex-

amined under the microscope both directly and after sugar flotation. Further details on the handling of the vials are given by Levine (1951).

In one varying lemming, a few nematode eggs (possibly oxyurid) were found in the flotation preparation. They measured approximately 95 x 40 microns. In another varying lemming a single tapeworm egg was seen in the flotation preparation. No other helminth eggs were seen in any of the fecal samples.

No parasites were found in the fecal samples from the red-backed mice or the brown lemmings. Coccidian oöcysts were found in five of the seven Parry's ground squirrels. Unfortunately, despite repeated attempts to induce sporulation by keeping the fecal suspensions in thin layers in petri dishes for as long as a month, not a single sporulated oöcyst was seen in any of the ground squirrel specimens. Ten unsporulated oöcysts measured 19-21 x 21-25 microns, with a mean of 20.4 x 23.3 microns. Their length-width ratio ranged from 1.1 to 1.2, with a mean of 1.1. The oöcyst wall was smooth; it was composed of two layers, of which the inner was dark yellowish and the outer was colorless. There was no micropyle.

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Since all the species of coccidia so far described from the genus *Citellus* belong to the genus *Eimeria*, the form found in *C. parryi* may be tentatively presumed to belong to this genus also. The following species of *Eimeria* have been described from members of the genus *Citellus*.

- E. beckeri* Yakimoff and Sokoloff, 1934 from *C. pygmaeus*
E. beecheyi Henry, 1932 from *C. beecheyi* and *C. variegatus grammurus* (= *Otospermophilus g. grammurus*)
E. bilamellata Henry, 1932 from *C.* (= *Callospermophilus chrysodeirus*)
E. callospermophili Henry, 1932 from *C.* (= *Callospermophilus chrysodeirus*)
E. citelli Kartchner and Becker,

1930 from *C. pygmaeus* and *C. tridecemlineatus*

- E. eubeckeri* Hall and Knipling, 1935 from *C. franklinii*
E. franklinii Hall and Knipling, 1935 from *C. franklinii*
E. ussuriensis Yakimoff and Springholtz-Schmidt, 1939 from *C.* (= *Spermophilus*) *eversmanni*
E. volgensis Sassuchin and Rauschenbach, 1932 from *C. pygmaeus*.

It is obviously impossible to name the species from *C. parryi* without further morphological information.

Eimeria dicrostonicis n. sp.
 (figs. 1-3)

This species was found in five out of 14 (35.7%) varying lemmings, *Dicrostonyx groenlandicus richardsoni*. Twenty oöcysts from one lemming measured 23.4-26.8 x 26.8-30.8 microns, with a mean of 25.1 x 29.1 microns. Their length-width ratios ranged from 1.1 to 1.3, with a mean of 1.2. Nine oöcysts from another lemming measured 23.4-25.6 x 27.3-30.8 microns, with a mean of 24.2 x 29.0 microns. Their length-width ratios ranged from 1.1 to 1.2, with a mean of 1.2. The mean dimensions of all 29 oöcysts were 24.8 x 29.1 microns. The oöcysts were ellipsoidal. Their walls were composed of two layers. The outer layer was yellowish brown, a little more than a micron thick, and with a rough pitted surface (fig. 3). The inner layer was colorless and about 0.5 microns thick. In oöcysts which had been accidentally crushed the outer wall was occasionally partly torn off while the inner wall remained intact. There was no micropyle. One, or occasion-

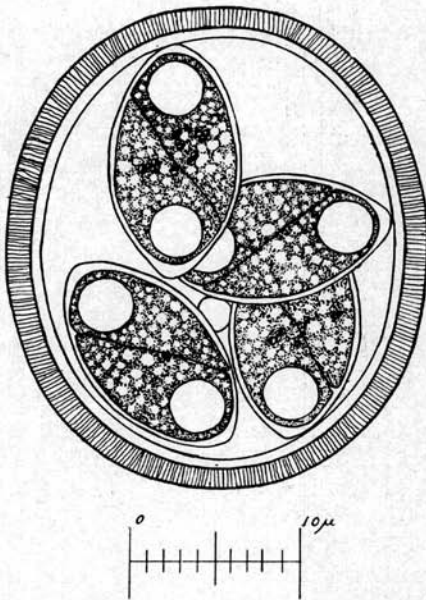


Fig. 1.—Oöcyst of *Eimeria dicrostonicis* n. sp. from the lemming, *Dicrostonyx groenlandicus richardsoni*. About x 2300.

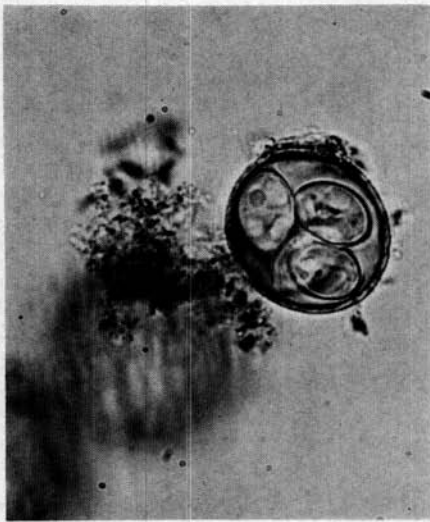


Fig. 2.—*Eimeria dicrostonicis* n. sp. sporulated oocyst. About x 800.

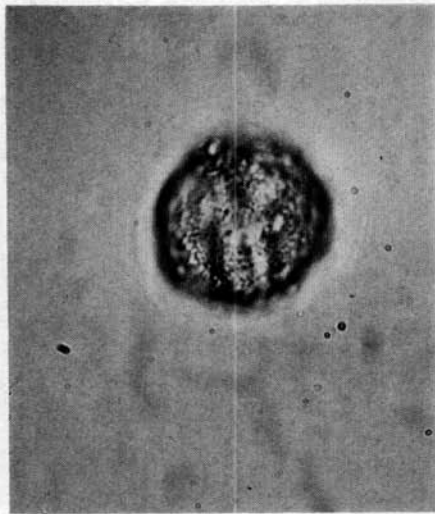


Fig. 3.—Oocyst of *Eimeria dicrostonicis* n. sp. in high focus to show rough, pitted wall. About x 800.

ally two, refractile granules were usually visible lying among the sporocysts in the sporulated oocysts. In some oocysts no refractile granule could be seen, but it is possible that it may have been hidden under a sporocyst. Neither an oocyst residual body nor a sporocyst residual body was present, although occasionally they were represented by a few small granules. Each sporulated oocyst contained four sporocysts. Twelve sporocysts measured 7.4-9.1 x 13.1-14.8 microns, with a mean of 8.4 x 14.0 microns. Their length-width ratios ranged from 1.5 to 1.8, with a mean of 1.7. The sporocysts were ellipsoidal, but slightly pointed at each end. Either no Stieda body or a very small one was present. Each sporocyst contained two sporozoites. These were broad at one end and narrow at the other, and lay with the broad end of one beside the narrow end of the other.

Apparently no coccidia have been

described from lemmings. The species described here does not resemble any species previously described from any member of the rodent family Cricetidae, to which the lemmings belong. Hence it seems justifiable to consider it a new species. I therefore name it *Eimeria dicrostonicis* n. sp.

The oocysts of this *Eimeria* were found in the feces, but the location of the intracellular forms is not known. Furthermore, no evidence is available on the pathogenicity of this species. One may speculate that it perhaps plays a part in the lemming cycle of abundance so well described by Elton (1942), but more study will be necessary to learn whether this is true.

SUMMARY

Eimeria dicrostonicis n. sp. is described from the feces of five out of 14 varying lemmings, *Dicrostonyx*

groenlandicus richardsoni, from the Perry River region in the Canadian Arctic west of Hudson Bay. Its oöcysts measured 23.4-26.8 x 26.8-30.8 microns, with a mean of 24.8 x 29.1 microns. Their mean length-width ratio was 1.2.

Oxyurid type nematode eggs were found in one lemming, and a tape-worm egg in another.

An unnamed species of coccidium whose oöcysts failed to sporulate was found in Parry's ground squirrel, *Citellus parryi*, from the same locality.

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