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SOME PROTOZOA FOUND IN THE FAECES OF CATTLE

ELERY R. BECKER AND W. W. FRYE

A microscopic investigation of the faeces of cattle was undertaken in search of possible cyst forms of the numerous species of ciliates which inhabit the rumen and reticulum of these animals. Of the various workers who have searched for the cysts of these protozoa only one, Liebetanz (1910), reports success. His technique, however, was so open to adverse criticism, and his figures so unconvincing, that it is doubtful if even he really saw cystic forms. What he probably saw were free forms which had withdrawn their motor organelles so that the surface of their bodies presented a rounded or oval appearance. Becker and Talbott (1927) found ciliates present in the rumen and reticulum regions of the stomachs of every one of twenty-six cattle examined, but did not observe anything which might be taken for their cysts. There was still a possibility that encystation took place further down in the intestine. With this in mind we have examined the fresh faeces of twenty-four cattle, twenty of them calves, and the contents of the coeca of four others. The results of our search for bodies which might possibly be cysts of the rumen and reticulum ciliates were negative. Our efforts were rewarded, however, by finding other protozoa concerning which we give here only a preliminary report, since we hope to extend our observations in the near future.

The forms found and their incidence are as follows: 1. *Trichomonas ruminantium* in the faeces of seven and the coeca of two cattle. 2. *Giardia* sp? cysts in the faeces of two. 3. *Endamoeba bovis* cysts in the faeces of five cattle. 4. What are possibly the cysts of *Buxtonella* in eight. 5. Cysts of *Eimeria* sp? in the faeces of two calves. There were a number of multiple infections, but no one animal had more than three of the above species.

Trichomonas ruminantium

Trichomonas ruminantium is a small flagellate seven to nine microns in length, which has been previously reported from the rumen and reticulum. We are able to state definitely that it may

also inhabit the coecum in large numbers. For a further description the reader is referred to Becker and Talbott (1927).

Giardia bovis Fantham 1921

Giardia cysts from the faeces of calves have previously been reported by Nieschulz (1923). He gives the size as 10 by 5.2 microns. Measurements made on fifteen fresh, unstained cysts from each of the two calves had a mean length of 13.1 microns and a mean width of 9.4 microns, considerably larger than the measurements reported by Nieschulz. The length varies from 12 to 14 microns and width from 9 to 10 microns. The ratio of the mean length to the mean width is 1.39 as compared with 1.37 (Simon, 1921) in the case of the cysts of *Giardia lamblia* of man.

Endamoeba bovis

We have found the cysts of *Endamoeba bovis* hitherto undescribed. The free form was described first by Liebetanz (1910) from the rumen and reticulum and later observed by Becker and Talbott (1927). The diameter of twenty-one cysts measured ranged from 6 to 14 microns, with a mean of 9.9 microns. The cysts from all five animals were spherical and uninucleate. Attempts to obtain multinucleate cysts by incubation were unsuccessful. Superficially these cysts bear a marked resemblance to the uninucleate stage of *Endamoeba histolytica* of man. The glycogen vacuole is often of the diffuse type, though often sharply outlined. The nucleus has a fine chromatin beading around the nuclear membrane, and a small punctiform more or less central karyosome. The chromatoid bodies are rather irregular in shape, often clumped, never so markedly rod-shaped as in *E. histolytica* cysts, but often approaching this shape. There is often a secondary chromatic capsule encircling the karyosome at a short distance from it.

Buxtonella sulcata

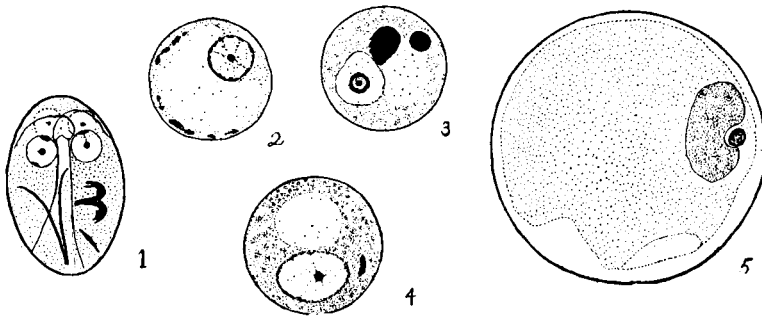
The ciliate *Buxtonella sulcata* was described by Jameson (1926) from the coeca of calves. He does not figure the cysts, but states that the size is 80 to 100 microns in length by 60 to 80 microns in width. We find the diameters of sixteen cysts taken in the order that they were observed on the slides varied from 65 to 84 microns, with a mean of 72.3 microns. The cysts we find are almost spherical. There were likewise a few sluggish, rather degenerated unencysted forms present in the fresh faeces. We feel some doubt that our cysts are actually those of *Buxtonella* and we intend to carry our examination of coecal contents still further.

Eimeria sp?

There were two types of *Eimeria* oocysts found, as shown by the measurements. The type from one calf had a mean length of 29.7 microns and a mean width of 20.2 microns. The oocyst had the pink tint which is so characteristic of *Eimeria stiedae* from the rabbit. The type from the other calf had a mean length of 23.4 microns and a width of 15.9 microns. These oocysts were almost colorless. The ratio of mean length to mean width in both cases, however, was almost exactly the same; *i.e.*, 1.47 plus.

These coccidia were found in calves which the stable attendant says have never had diarrhoea or dysentery. We need to know if these forms may under certain conditions be pathogenic, as is *Eimeria zürni*, which causes "Red Diarrhoea" of cattle. It is possible that the forms we have observed never cause clinical symptoms in cattle.

We intend to extend our observations on these five protozoa further in the hope of materially adding to what we have found out about them. We hope to find the site of infection of the free forms whose cysts we have found and to make observations on them, *Giardia*, *Buxtonella*, and *Eimeria* in particular.



Text Figure. 1. Four-nucleated cyst of *Giardia* sp? from calf. x ca 1750. 2, 3, 4. Cysts of *Endamoeba bovis*. x ca 1750. 5. Cyst of ciliate from calf (*Buxtonella sulcata?*) x ca 500

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