

INTESTINAL PARASITISM IN THREE WILD HOWLER MONKEYS.

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INTRODUCTION

The genus *Alouatta* includes six species that are distributed from southern Mexico to northern Argentina. In particular, the *A. palliata* is found throughout Central America. In Costa Rica it is present in both dry and rainforest. There are a few studies reporting the presence of intestinal nematode specially the *Trypanoxyuris sp* in howler monkeys in Costa Rica all done on fecal samples. To our knowledge this is the first pathological and parasitological report of the intestinal damage caused by nematodes infestation in this monkey species.

MATERIAL AND METHODS

Cases. An adult female (case A) and two adults males (B and C) wild howler monkeys from the Pacific Coast of Costa Rica were found dead and a complete necropsy was performed. In all three cases multiple samples from the cecum and colon were taken for histopathological examination. Additionally, cecal and cecum feces and adult specimens were collected and submitted for parasite identification.

RESULTS

Pathological and parasitological findings:

A. Macroscopic examination:

In cases A and B, a cecum and colon impaction with large numbers of nematodes was observed. In monkey C, adult parasites were not identified. Additionally, in case A scraping cytology's were taken.

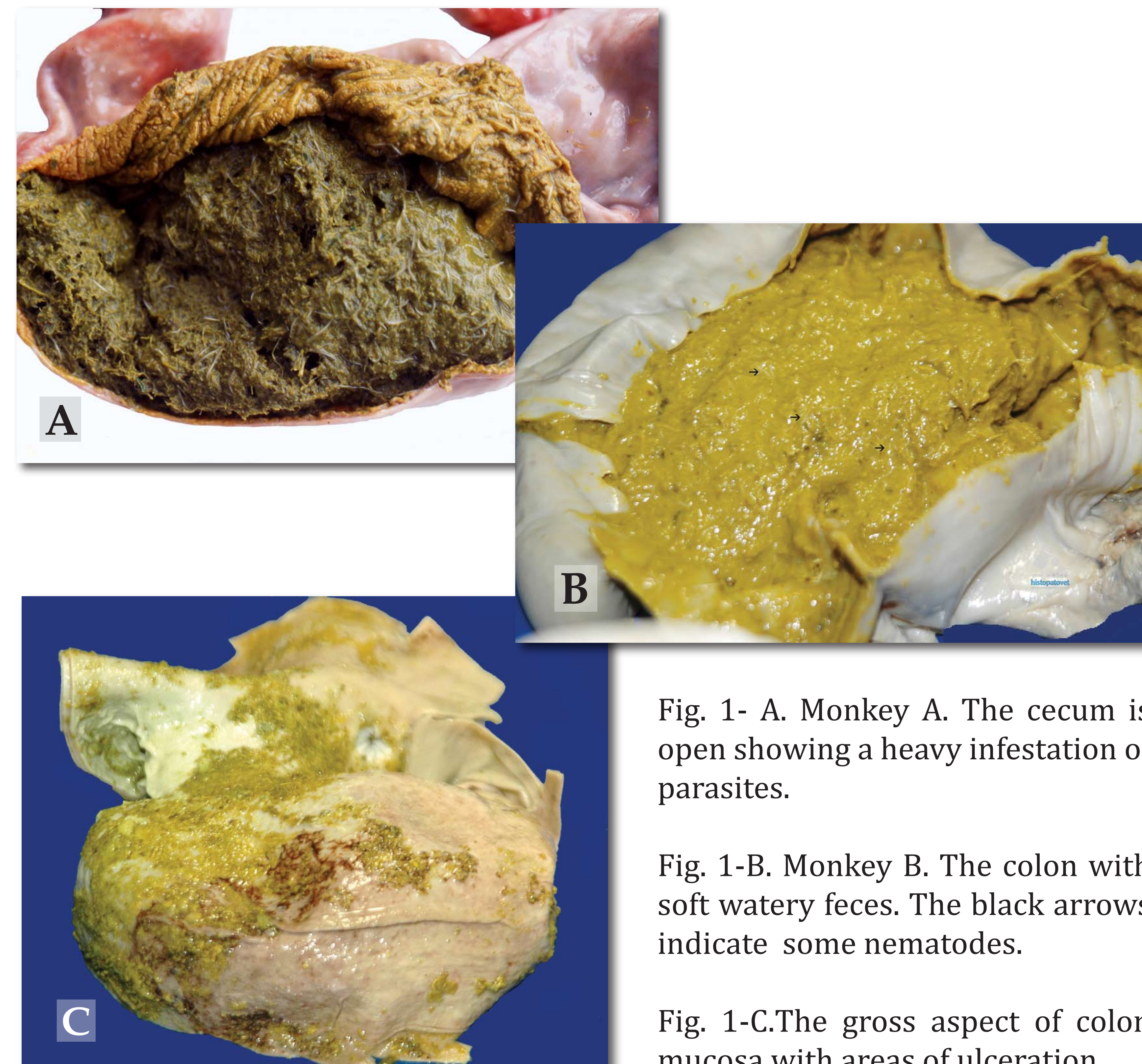


Fig. 1- A. Monkey A. The cecum is open showing a heavy infestation of parasites.

Fig. 1-B. Monkey B. The colon with soft watery feces. The black arrows indicate some nematodes.

Fig. 1-C. The gross aspect of colon mucosa with areas of ulceration.

B- Parasitological findings:

Enterobius vermiculis, was reported in monkey A and *Trypanoxyuris sp* in monkey B. Furthermore, eggs of *Controrchis sp*, *Strongyloides* and *Trypanoxyuris sp* were found in the monkey C.

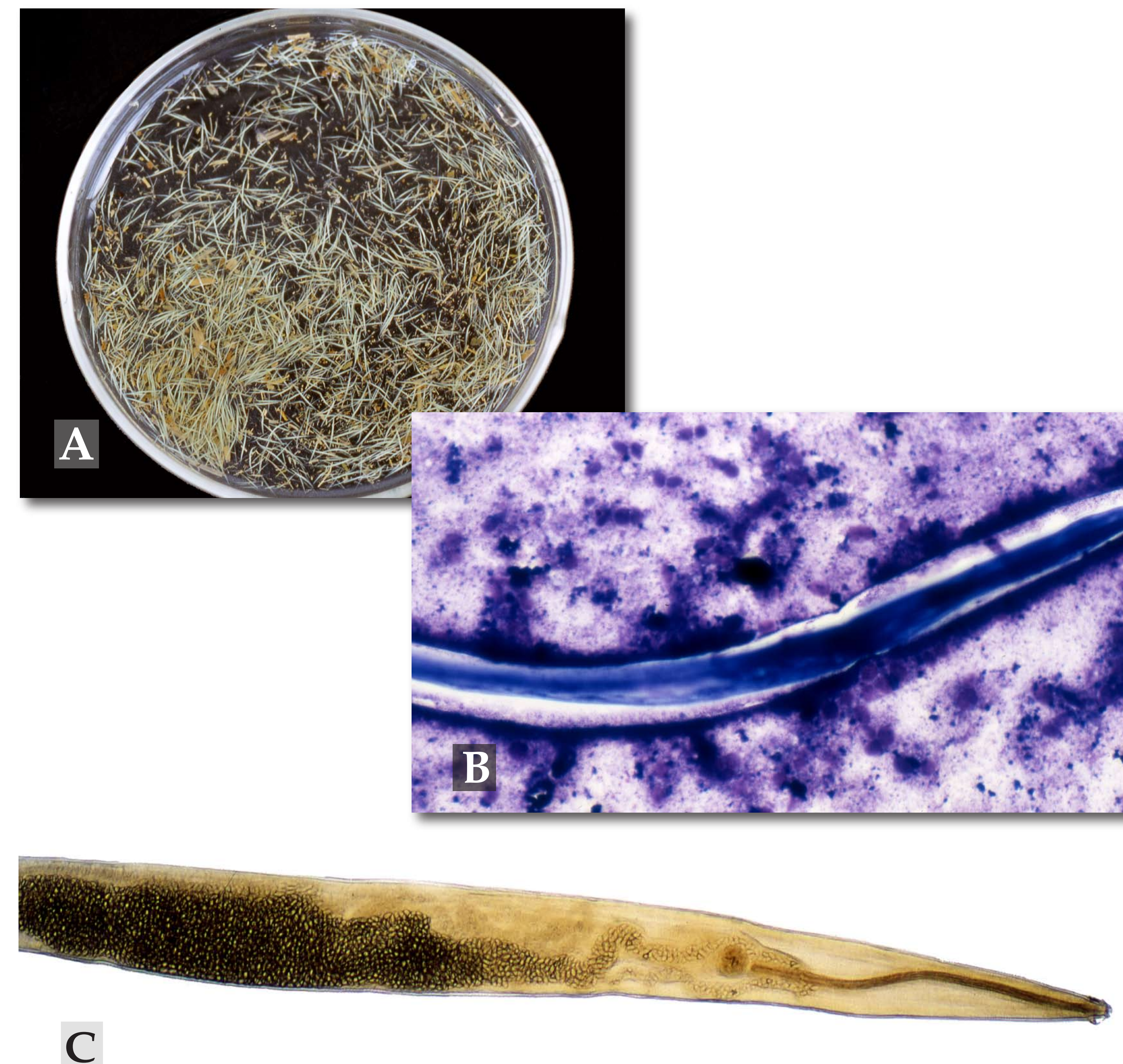


Fig.2-A. Specimens collected from monkey A. The fig. 2-B. It is the scraping from the cecum and stained with Giemsa. The fig. 2-C. It is female of *Enterobius vermiculis*.

C- Microscopic examination:

Samples from liver, heart, lungs, kidneys (not described during this presentation) and small and large intestine were fixed in 10 % buffered formalin. Later embedded in paraffin, sectioned at 5- μ m, and stained with hematoxylin and eosin. In case A, a scraping cytology was taken from the cecum mucosa and stained with Giemsa. See Fig.2-B.

Histopathologically, in monkeys A and B, the cecum and colon had free luminal and mucosal invasion of several nematodes (longitudinal and cross sections) with necrosis of the upper mucosa. In addition, in all three monkeys, there was a moderate inflammatory infiltrate characterized by lymphocytes, histiocytes and few eosinophils. Additionally, monkey C showed hyperplasia of gut-associated lymphoid tissue.

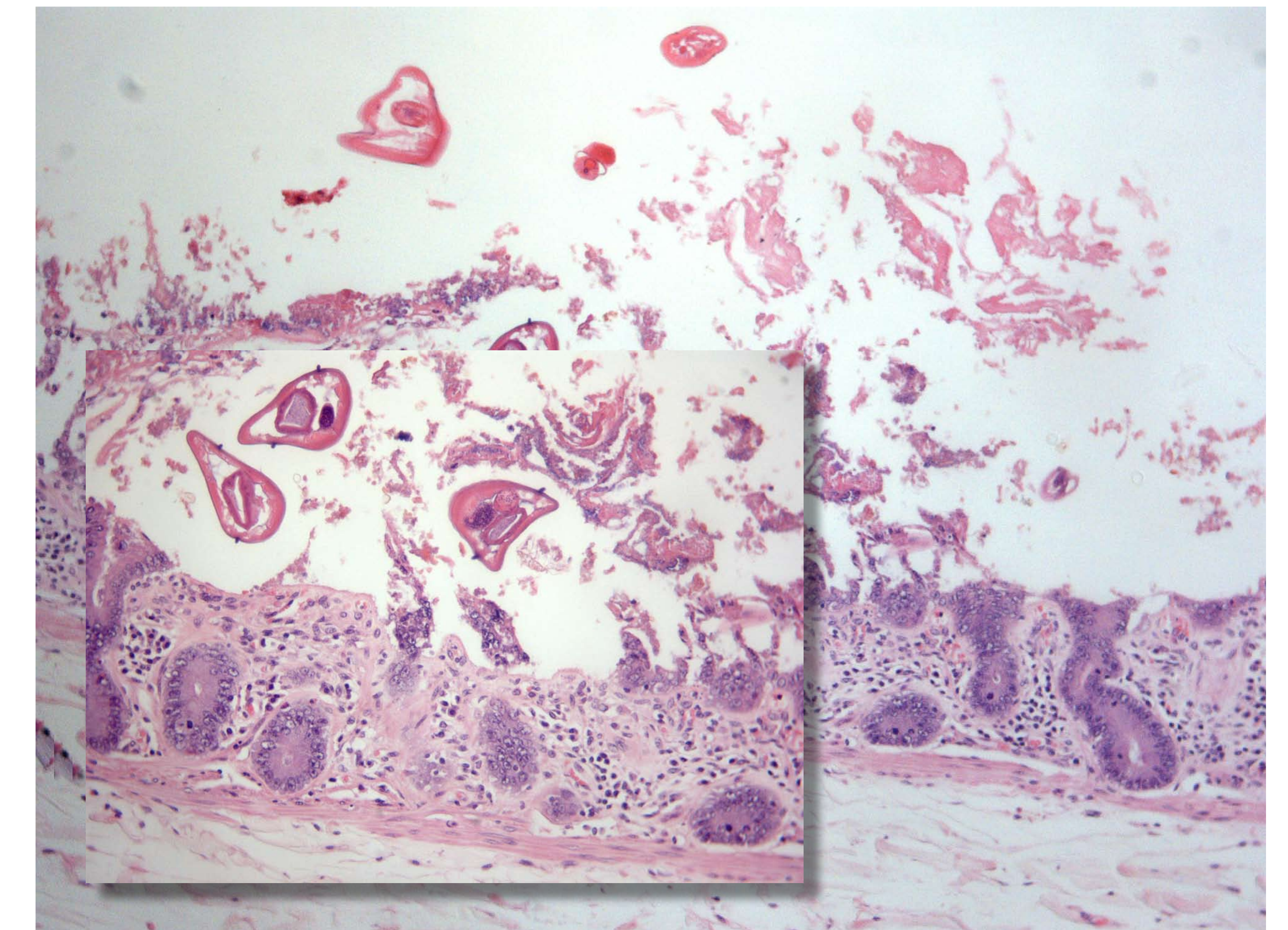


Fig.3. There is necrosis and ulceration of the intestinal mucosa with parasites sections.

DISCUSSION AND CONCLUSIONS

Despite the fact that the parasitic species found in this paper have already been reported in coprological surveys (López-Maldonado, S., 2014. et al. and Stuart, M.D. et al. 1990), no one had described the intestinal histopathological changes associated with this nematode infestation. In addition, these monkeys inhabit forest touristic areas and could pose a zoonotic threat to human visitors.

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