

Occurrence of *Macrorhabdus ornithogaster* in canary breeding in Piedmont. A preliminary study

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Introduction

Macrorhabdus ornithogaster, also known as “megabacterium” or avian gastric yeast (AGY), is a novel anamorphic ascomycetous yeast that belongs in its own new genus, with a worldwide distribution^{1,2,3,4}. Megabacteria has been found in both psittacine and passerine species, both in captivity and in the wild.

It is usually found colonizing the mucosal surface of the isthmus existing between the proventriculus and ventriculus⁵ of a wide diversity of bird species and currently represent a potential threat to bird breeders. Clinical signs include weight loss in spite of a good appetite, regurgitation, diarrhea, depression, maldigestion, ruffled feathers and death^{3,6}.

The main purpose of this study was to assess the presence of this yeast in breeding canaries (*Serinus canaria*) distributed in Piedmont.

Materials and methods

This study was conducted in 9 canary (*Serinus canaria*) breeding centers in three provinces of Piedmont (Torino, Asti and Cuneo) between June 2014 and February 2015. Breeding colonies were composed from 50 to 300 animals: in 8 centers some birds showed symptoms of “going light” syndrome (weight loss: 89%; diarrhea and sudden death: 22% of the cases) while in one breeding the canaries were apparently healthy. Smears were prepared from fecal samples and examined by microscopic test for the presence and identification of *M. ornithogaster*. Level of shedding of AGY was evaluated using a scale from 0 to 6⁷. From dead animals, tissue samples were examined by histopathological analysis.

Results and discussion

All 9 examined breeding centers were positive for *M. ornithogaster* both microscopic and histological analysis. Interestingly, we found an high number of *Atoxoplasma* spp. in feces, with a co-infestation amounted to 66%.

Gross necropsy findings were not specific. Birds were typically thin to emaciated and had little or no body fat. From dead animals, tissues sampled were examined by histology, confirming a picture of *Macrorhabdus* infection, with presence of microorganisms located especially in the proventricular isthmus region. The affected areas, showed a deep and heavy yeasts colonization, with mucosal glands filled by yeasts and mucins, and with swollen and sometimes cystic glandular aspect. Histologically, affected birds typically showed marked disruption of the koilin layer with disorganization and degeneration, and there were large numbers of yeasts which had a matchstick or logjam appearance. Lymphoplasmacytic to heterophilic inflammation may be present, and there may be foci of hemorrhage. In the proventriculus, there was mucous cell hyperplasia with a thick layer of mucus covering the mucosal surface.



Fig. 1 Colour's canaries are the breeders and young are the main and more bred in captivity. When pairs are dissolved, at the end of the breeding season, put together in large aviaries; this aggravates the contamination degree among infect birds with others.



Fig. 2 AGY positive canary showing ruffled feathers, depression and chronic weight loss.

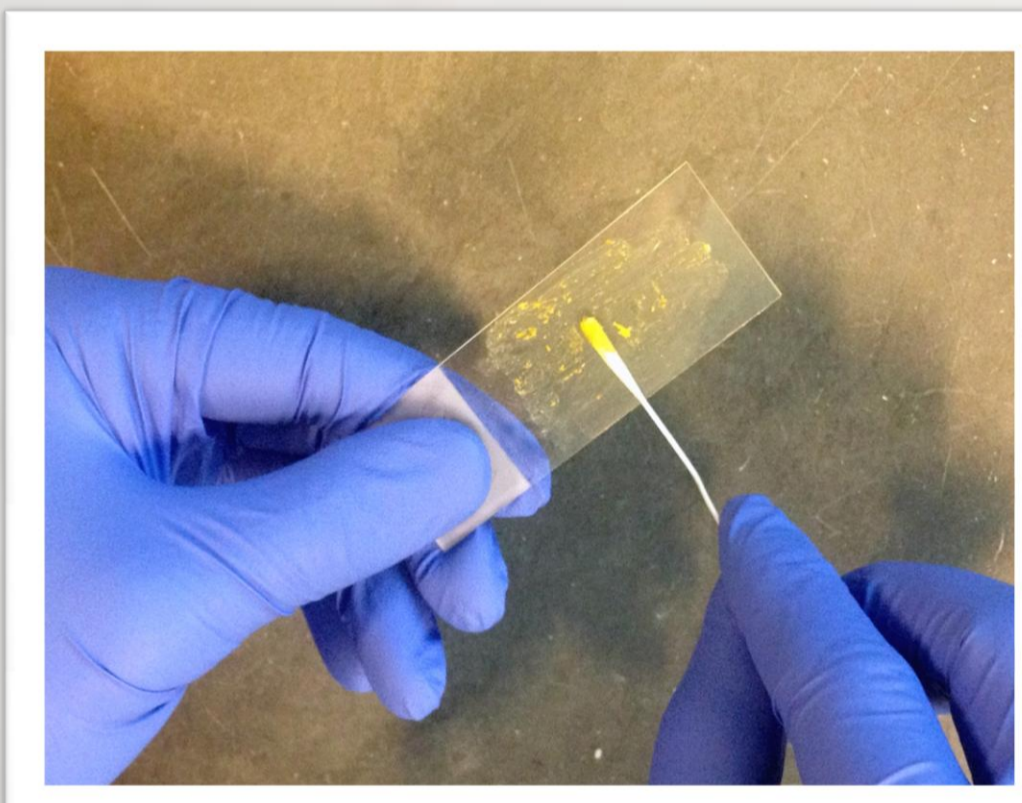


Fig. 3

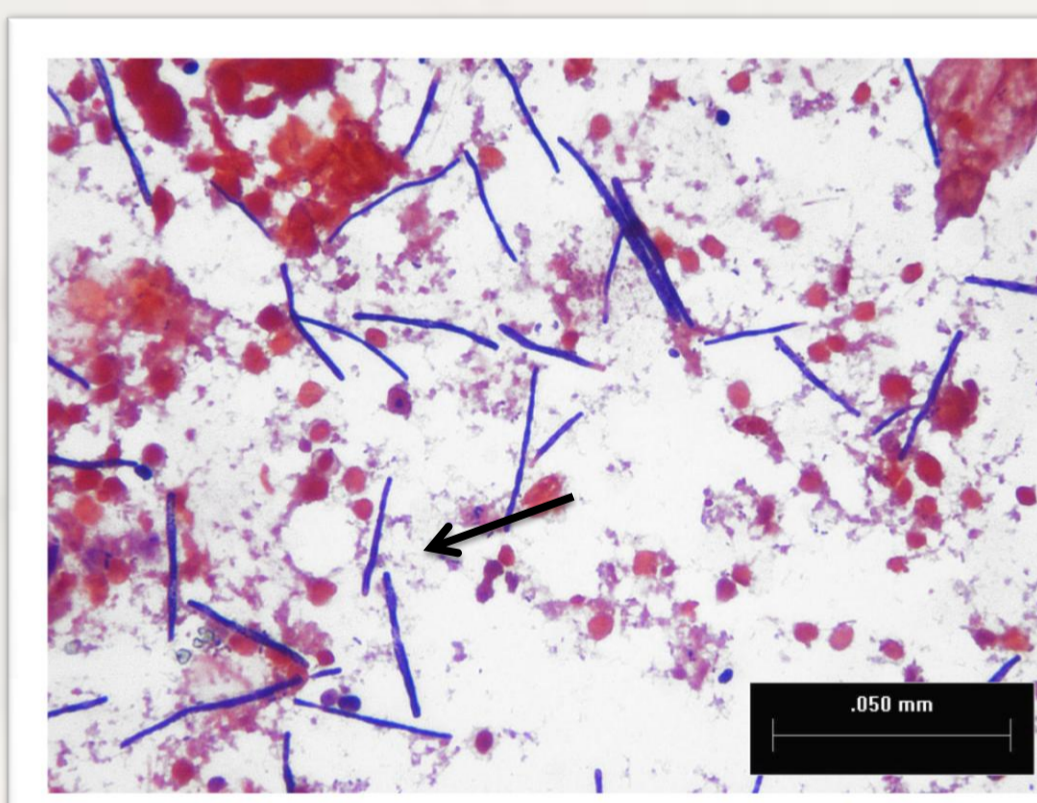


Fig. 4

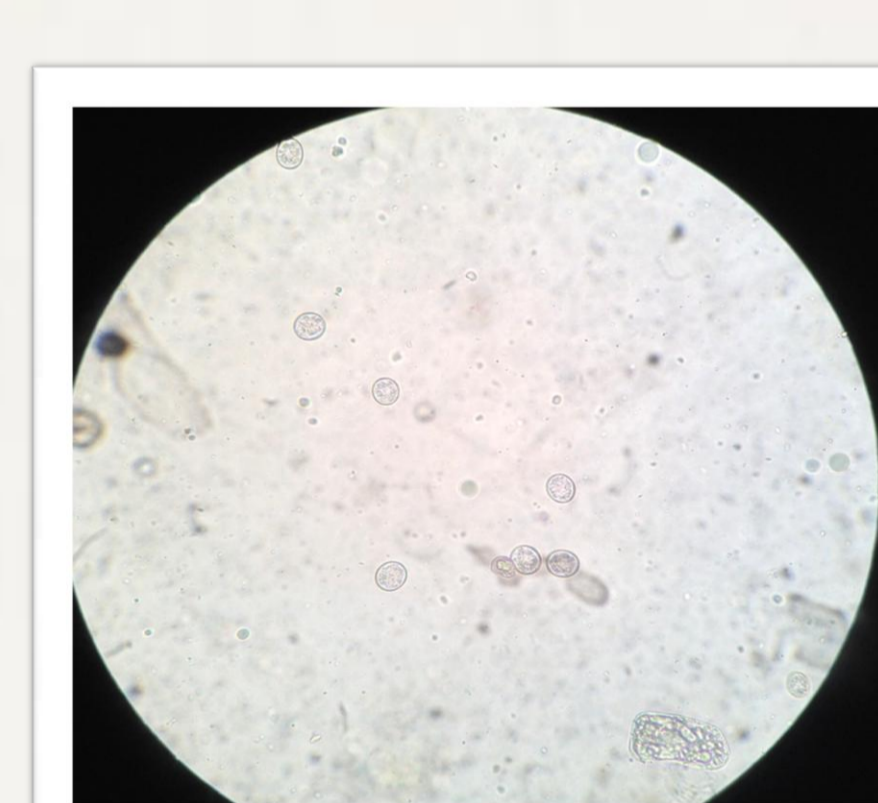


Fig. 5

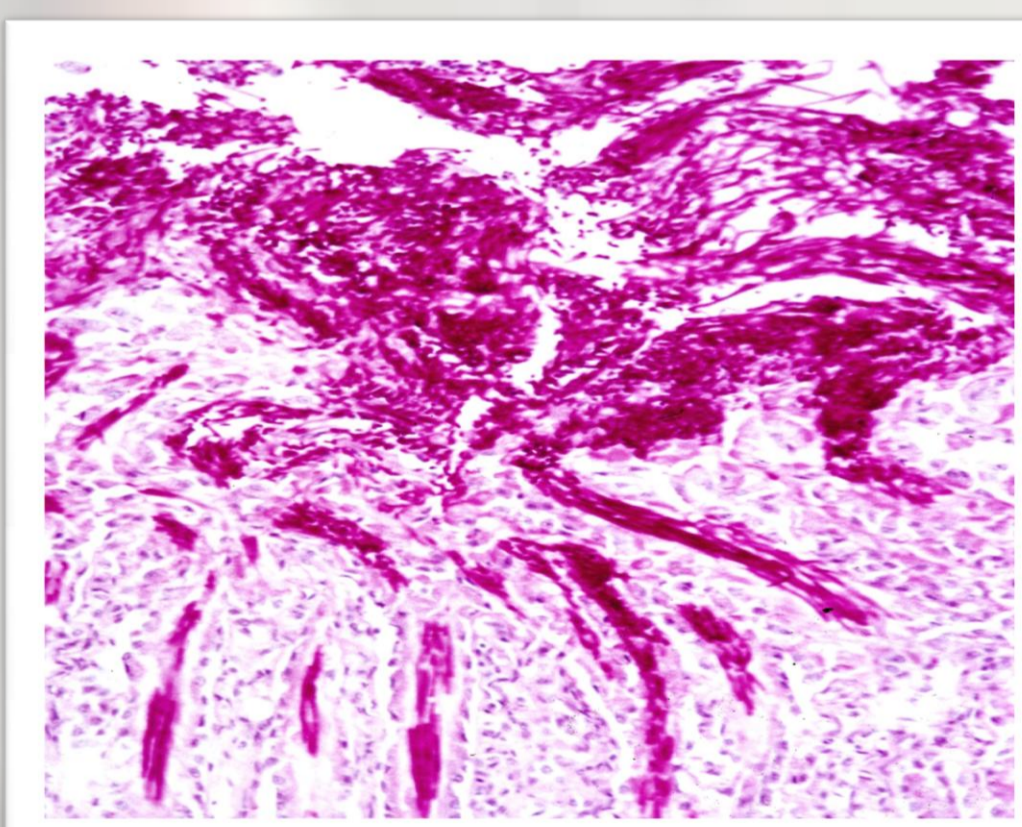


Fig. 6

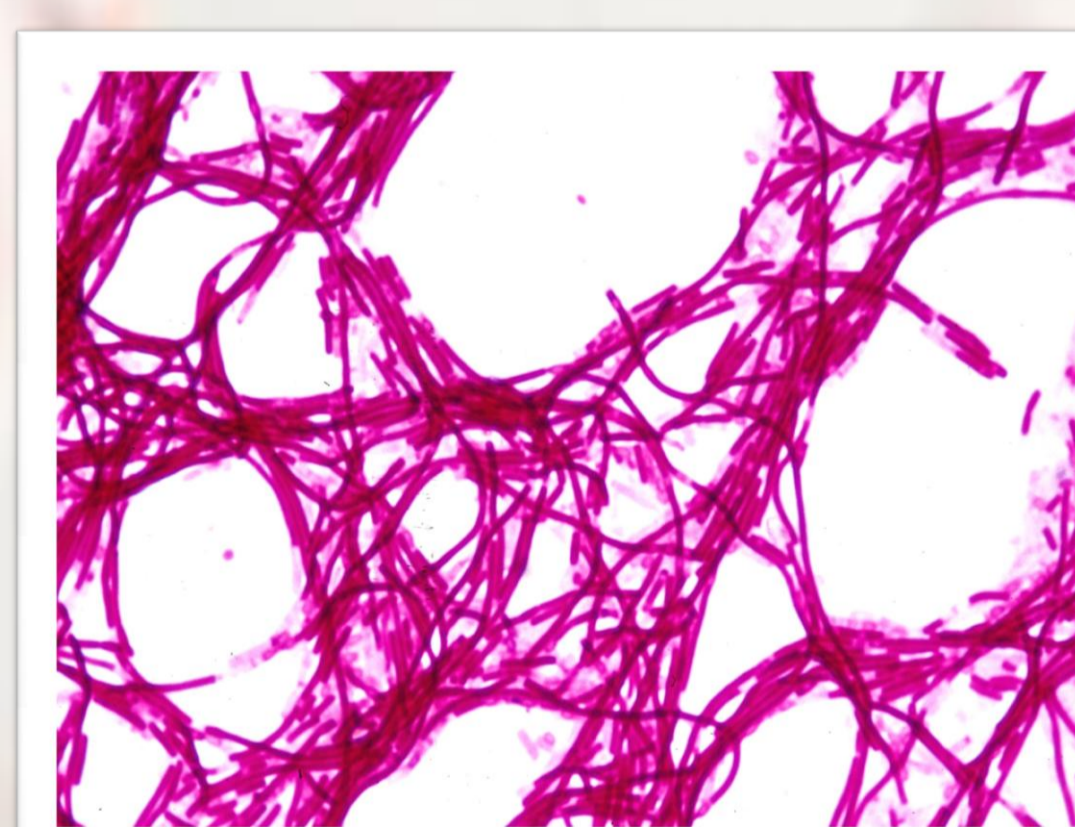


Fig. 7

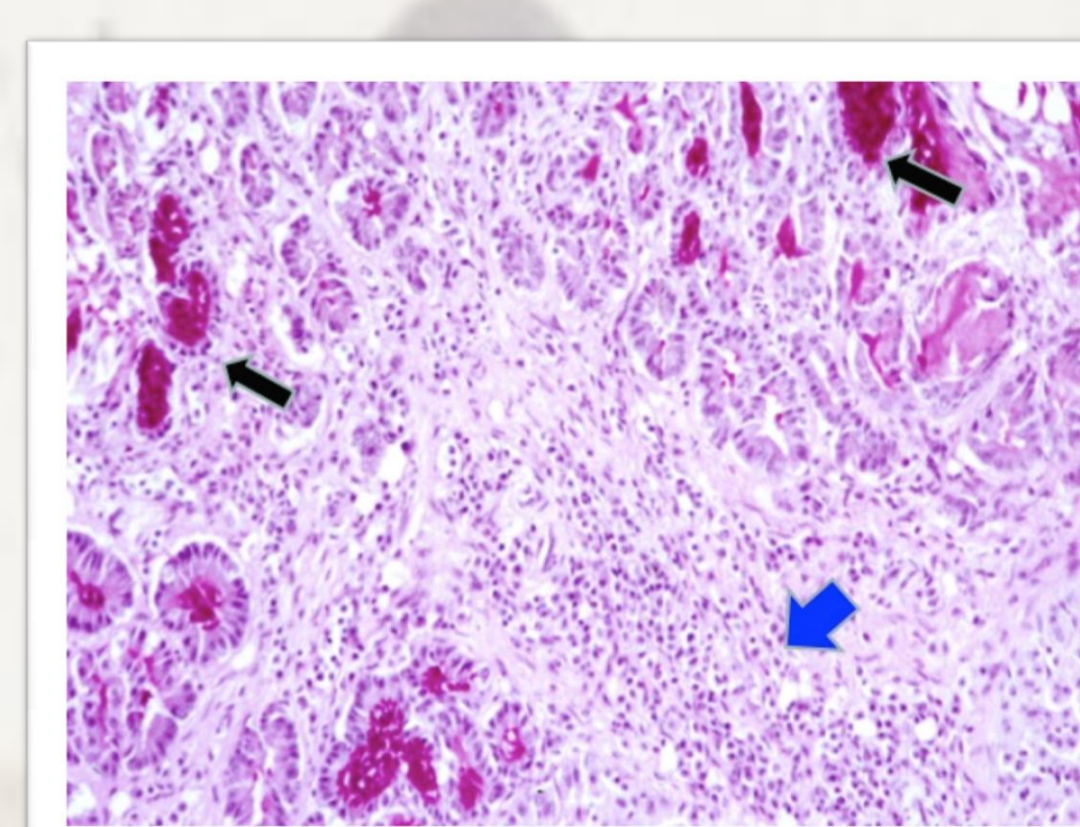


Fig. 8

Our results confirm that *M. ornithogaster* is widespread in our aviaries and, under some circumstances, can behave as pathogen. The health and economic impact of this microorganism is not yet documented, as well as the therapeutic aspects are yet to study.

We plan to continue our work focusing particularly on the pharmacological treatment, using methods considered historically effective as amphotericin B or Nystatin, but expensive and particularly toxic, and alternative drugs or probiotics that increase the microbial flora and defenses of the immune system.

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