

# Intervention Trials on Blackhead Disease Outbreaks in Turkey Meat and Future Breeder Plants : the Help brought by Plant Extracts

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Since the withdrawal of Nifursol in March 2003, the Turkey market in Europe has no means left to treat or prevent Histomoniasis (Blackhead) disease (De Gussem, 2004). This serious parasitic disease also affects other bird species (Pheasant, Partridge, outdoor layer hens) and can decimate entire flocks (Hu and McDougald, 2002) especially during the warm season (Le Pottier, 2004).

As a consequence, advice on farm management practices and de-worming programs have been set, and many feed manufacturers have included products or substances which aim to reduce infectious pressure of the parasite *Histomonas meleagridis* causing the disease. These consist mainly of plant extracts and acidifiers.

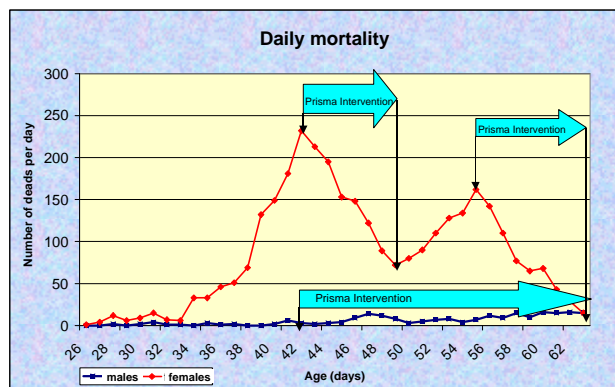
The object of this paper is to present trials that have been carried out on farms where a histomoniasis outbreak had occurred, in order to confirm *in-vivo* actions of PF 04, a selection of plant extracts which all have proven successful in *in-vitro* activity against *Histomonas meleagridis*.

All cases of histomoniasis have been diagnosed by a veterinarian clinic by necropsy findings and confirmation by microscope observation of the protozoa form in caecal liquid.

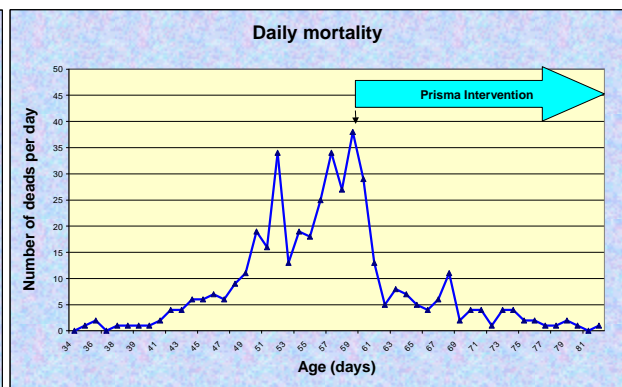
The trials have thus been carried out in meat and in future breeding turkey farms by associating the administration of PF 04 in drinking water with sanitary and farm management practices adapted to each situation. Due to the fact that our intervention was most often asked for at least ten days after the outbreak and to field conditions and requirements, there was no control for the different tests.

In meat turkey farms, the results show important decrease in daily mortality: -59% in 7 days; -88% in 8 days; and -83% in 3 days in different situations after starting of intervention (see graphs n°1 and 2). Moreover, the graph n°1 (male mortality curve) shows how the intervention helped to maintain low daily mortality. In spite of not having a control, a test on interrupting the administration of PF 04 in drinking water lead to a three-fold increase in daily mortality rate (see graph n°1, female mortality curve, days 50-56).

Graph n°1 : Mayenne Dep., West of France, Nov 03  
Histomoniasis outbreak on male and female flocks.



Graph n°2 : Ile et Villaine Dep., W. France, June 04.  
Histomoniasis outbreak concerning only the males



In future breeder plants, the results show the same frame, with however the observation of a one week delay before the mortality rates start their decrease and during which we could not prevent mortality from climbing. These observations mimic the sudden and massive mortality rates observed in Blackhead outbreaks in future breeder turkey plants during the summer of 2003 in different organizations in France.

Hypothesis to explain the differences observed in the development of histomoniasis in meat and in future breeder plants include age of infestation, ambient temperature, bacterial enteric population and other digestive pathologies (McDougald and Hu, 2001), nutrition –in terms of composition and way of feeding-, and virulence of the infesting strain of *Histomonas meleagridis*.

Another factor which could play a key role in the evolution of this disease is animal density. Indeed, a lower animal density as practiced in turkey future breeder plants enables greater mobility. This parasitic disease spreads primarily via the litter and the carrier animals which are not as yet sick are bound to spread the causative agent all around inside of the turkey farm. Thus, Histomoniasis could spread in a homogeneous manner, and a high percentage of the flock could be in the same state of evolution of the disease.

As a contrast, higher animal density would lead to lower mobility of the animals, which could bring to a more local type of spreading of the disease, with fewer animals in the same state of evolution at a certain moment.

If this hypothesis was true, then the first few casualties due to histomoniasis in a low animal density farm such as a future breeder plant or a free-range production farm could infer a bad prognosis for the rest of the flock. Indeed, numerous animals, even not showing any symptom, could already harbor big populations of *Histomonas meleagridis*, and probably be condemned, notwithstanding the fact of other birds of the flock having been or currently in contact with the parasite.

The results obtained are encouraging for the turkey (and other sensitive species) markets in France and in the European countries which all lack means to control Histomoniasis. These results however need to be completed with an *in-vivo* research model with controlled parameters and measurements of caeca and liver lesions as well as caecal *Histomonas* population counts, in order to compare different candidate products. We are currently achieving these *in-vivo* tests in partnership with the National Veterinary School of Lyon (UMR ENVL – INRA) in our Prisma - Evialis R&D center of St Nolf.

## References

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