Contribution for the knowledge of Wild Boar (Sus scrofa L.) helmintic fauna in Tapada Nacional de Mafra, an enclosed hunting area.

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Abstract: Aiming a better knowledge of wild boars helmintic fauna in Portugal, the study of adult helminths was performed in samples from animals hunted during the hunting season of 2000 and 2001 (April - July) at Tapada Nacional de Mafra. Liver (n=23) and lungs (n=19) were available in the two hunting seasons, faeces only in 2000 and gastrointestinal tracts were examined only in 2001. Fasciola hepatica Linnaeus, 1758 and Cysticercus tenuicollis were found in 60,8% and 4,3% of the livers (N=23). Lungworms were collected from 42% of the hosts. Metastrongylus apri Gmelin, 1790, Vostokov, 1905 and M. salmi Gedoelst, 1923 were found in association. M. salmi is identified for the first time in this host, in Portugal. Globocephalus urosubulatus Alessandrini, 1909, Oesophagostomum dentatum Rudolphi, 1803, Molin, 1861, Ascarops strongylina Rudolphi, 1819 and Trichuris suis Schrank, 1788 were collected from the gastrointestinal contents (N=8) of 62,5%, 25%, 12,5% and 12,5%, respectively.

Keywords: Wild boar, gastrointestinal worms, lungworms, Portugal.

1. Introduction

The study of risk factors for the maintenance of wildlife health status, such as parasitic diseases, can be relevant in the natural reserves / parks and game areas.

In wild populations there is usually a balanced host-parasite relationship, not compromising animal health and welfare. However, anthropogenic changes of the environment, the increase of human populations and the introduction of other animal species, may introduce stress factors that can disrupt the natural balance and induce pathological situations. This study is a contribution for the knowledge of wild boar helmintic fauna and for a better understanding of the
host/parasite relationship in this field of animal parasitology in Portugal, since there are not many studies about this subject in our country (Barata, 1989; Caeiro et al., 1993, Bruno de Sousa et al., 2000, 2001).

2. Material and Methods

Tapada Nacional de Mafra is a national hunt and leisure park since 1747. This limited area with 819 ha is located 30 Km North of Lisbon, included in an irregular orographic region (80-358 m).

During the 2000 and 2001 hunting seasons (April-July), was possible to collect heterogeneous samples from 23 adult wild boars (7 females and 16 males) hunted at Tapada Nacional de Mafra. Livers (n=23), lungs (n=19), gastrointestinal tracts (n=8) and faeces (n=6) were stored at 4°C before being processed (Table 1).

Parasitic adult forms were collected from the organs thought parasitological classical methods and submitted to morphological study (Bowman, 1995). The presence of *Fasciola* was also determined by the presence of eggs in the bile per ml (FE).

Faecal egg counts (eggs per gram - EPG) were determined with McMaster slide using samples directly collected from the rectum (Thienpont et al., 1986).

According to Bush et al. (1997) two parameters were used to evaluate the infection level: prevalence (number of hosts infected with 1 or more individuals of a particular parasite species divided by the number of hosts examined for that parasite species) and mean intensity (total number of parasites of a particular species found in a sample divided by the number of hosts infected with that parasite).

Biometrical parameters (body, kidney and spleen weights, percentage of kidney fat and corporal lengths – total length, ear, tail, hock and garrote), age and sex were also determined and correlated with parasitological parameters (EPG, FE, prevalence of lungworms in lungs and the intensity of *F. hepatica* in the liver) of the 2000 hunting season animals. ANOVA analysis was done through Spearman matrix in view to overtake the heterogeneity of the sample, followed by a principal components analysis with the obtained matrix.

Descriptive statistics and statistical analysis were performed with Excel for Microsoft Office 2000 and Statistica for Windows, version 6.0, using a significance level of p<0,01.

3. Results and Discussion

Parasitic forms (helminthic adult forms and/or eggs) were detected in 78,2% of the studied wild boars.

All faecal samples were positive to the presence of gastrointestinal strongyles eggs revealing an average EPG of 2142. A very important egg shedding, up to 3000 EPG, was evidence in 33% of the samples (Fig.5).

Joining EPG results with the presence of nematode adult forms verified in 5 animals, was possible to consider a prevalence of 61,1% for the presence of gastrointestinal nematodes.

The identification, prevalence and mean intensity of the adult specimens collected from the gastrointestinal organs is showed in Table 2.

Table 1. Constitution of the studied sample

<table>
<thead>
<tr>
<th>Date</th>
<th>Animals</th>
<th>Lungs</th>
<th>Liver</th>
<th>Gastrointestinal tract</th>
<th>Faeces</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>8</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>19</td>
<td>23</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

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### Table 2. Prevalence and mean intensity of helminths in the studied population (N)

<table>
<thead>
<tr>
<th>N</th>
<th>Prevalence (%)</th>
<th>Mean intensity</th>
<th>Site location</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Globocephalus urosubulatus</em></td>
<td>8</td>
<td>62,5</td>
<td>205,6</td>
</tr>
<tr>
<td><em>Ascarops strongylina</em></td>
<td>8</td>
<td>12,5</td>
<td>1</td>
</tr>
<tr>
<td><em>Trichurus suis</em></td>
<td>8</td>
<td>12,5</td>
<td>1</td>
</tr>
<tr>
<td><em>Oesophagostomum dentatum</em></td>
<td>8</td>
<td>25,0</td>
<td>19</td>
</tr>
<tr>
<td><em>Metastrongylus spp</em></td>
<td>19</td>
<td>42,1</td>
<td>?</td>
</tr>
<tr>
<td><em>Fasciola hepatica</em></td>
<td>23</td>
<td>60,9</td>
<td>14</td>
</tr>
</tbody>
</table>

- not countable

*Globocephalus urosubulatus* was found in the small intestine, showed the higher prevalence (62,5%) and mean intensity (min. 13, max. 345) of the helminths found in the gastrointestinal tract
(Fig. 1). *Oesophagostomum dentatum* was present in the caecum of 2 animals (25%), with a maximum of 22 and a minimum of 16 specimens/host (Fig. 2). One specimen of *Ascarops strongylina* and other of *Trichuris suis* were found in 2 different animals (12.5%) (Fig. 3).

*Fasciola hepatica* prevalence was 60.8%, and its mean intensity ranged between 1 and 41 specimens. In what concerns FE, the average was 821. However, one individual was highly infected, with an egg count reaching more than 8000 eggs/ml of bile. The FE/F. hepatica relation range between 2.4 and 1010 with an average of 105 FE/F. hepatica, but any significant correlation was found between these two parameters.

To our knowledge, the absence of references to wild boar parasitism by *Fasciola hepatica* in other regions and countries, indicate that the situation here studied, and previous described by other Portuguese authors (Barata, 1989; Bruno de Sousa *et al.*, 2000, 2001) is unusual. At Tapada Nacional de Mafra, wild boar population shares his enclosed territory with a fallow deer population with a high prevalence of fasciolosis (Bruno de Sousa *et al.*, 2001) fact that certainly conducted to a change in the host–parasite balance. However these results doesn’t allow advancing with more conclusions.

*Cysticercus tenuicollis* was also found in the liver of one wild boar.

*Metastrogylus apri* and *M. salmi* were found in association, in 42% of the hosts. Despite adult specimens were found in lungs airways, any lungworms eggs were found in the examined faeces, what could be related with the 4°C faeces storage. *M. salmi* is here describe for the first time in this host in Portugal, although *M. apri* was previously recorded by Barata & Afonso-Roque (1992) (Fig. 4). Despite high value of the found prevalence, it is a half of the referred by de-la-Muela *et al.*, 2001 to this genus at eastern Spain, what remembers the high importance of this infection in this host.

All nematode findings are in agreement with the results obtained in other regions of the Iberian Peninsula (de-la-Muela *et al.*, 2001 and Fernandez-de-la-Mera *et al.*, 2003).
Spearman analysis did not show significant correlations (p<0.01) between parasitological and biometrical parameters. However, principal components analysis of the Spearman correlations matrix data, concludes that axis 1 (explaining 37.74% of the variation) with variables related with weight and animal dimension, shows a positive tendency with some parasitological variables (EPG, FE, lungworm infection). No relation was evidenced between Fasciola hepatica infection and the other variables. Only 16.71% of the total variation is explained by axis 2 and it seems to be more related with the age factor (Fig. 5).

Variance analysis suggests a significant correlation between female sex and Fasciola hepatica infection (p<0.0178), with an F (1,13)=7.35.

4. Conclusions

With exception to Fasciola hepatica, the present results agree with other temperate regions, namely in what concerns the infection by lungworms and gastrointestinal nematodes (Chinone et al. 1984; Humbert & Henry, 1989; Takacs, 1996, 1997, de-la-Muela et al., 2001; Fernandez-de-la-Mera et al., 2003).

Concerning in detail the high levels found of parasitic infections, Globocephalus urosubulatus and Fasciola hepatica showed the highest mean intensity and both are pathogenic to swine, being the second one a zoonosis. Oesophagostomum dentatum was also present, being well known by its pathogenic action in the large intestine.

![Fig 4. Females posterior end of the species Metastrongylus apri (A) and M. salmi (B). Originals.](image)

![Fig 5. Principal components analysis made with Spearman correlations matrix data of the biometrical and parasitological variables (factor 1 vs factor 2).](image)
The average EPG showed high elimination levels by gastrointestinal nematodes, meaning that this kind of parasite infection can be very common in this host.

Relevant lungworm infection was detected, with a new recorded species, *Metastrongylus salmi*, for this host in Portugal.

It is possible to conclude that the most prevalent gastrointestinal parasites found are pathogenic and the recorded faecal egg counts must have a major contribution by these parasites. Accordingly, they must have more economic and sanitary importance than our sample was able to show in both parasitological and biometrical correlations.

5. Acknowledgements

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6. References


