Dictyocaulus arnfieldi (Cobbold, 1884): comparative analysis of the occurrence in horses, mules and donkeys

Dictyocaulus arnfieldi (Cobbold, 1884): análise comparativa da ocorrência em eqüinos, muares e asininos

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SUMMARY

To study Dictyocaulus arnfieldi occurrence, the authors analysed the lungs of 20 donkeys, 22 mules and 44 horses from the following Brazilian States: Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Bahia, Minas Gerais and Goiás. The prevalence of the infection was 65% in donkeys, 22.72% in mules and 4.54% in horses, with the mean intensity of 34.3 worms in the donkeys, 36.5 in the mules and 2.0 in the horses. The authors reported the D. arnfieldi Male/Female ratios which are: 1: 1.82 in donkeys and 1: 4.41 in mules.

UNITERMS: Dictyocaulus arnfieldi; Protostrongylidae; Lungworms; Donkeys; Mules; Horses.

INTRODUCTION

Dictyocaulus arnfieldi has a worldwide distribution (Round¹⁵, 1976) and the donkeys is its natural host (Round¹⁴, 1972), although this parasite can be found in horses, mules, zebras and tapirs as well.

In British Islands Pankhurst¹² (1963) verified that 27% of donkeys analysed faecal samples presented D. arnfieldi larvae, whereas only 0.05% in horse samples were positive. A patent infection of 72.97% was reported by Round¹⁴ (1972), in donkeys that were examined. Losson; Lekeux⁸ (1980) postulate that donkeys once infected, the infection persists during all lifetime.

Clayton² (1979) reported a prevalence above 70% in donkeys from Glasgow. In Denmark, Andersen; Fogh¹ (1981) found the parasite in 87.5% of the donkeys and in 10.4% of the horses that had been raised together.

Gothe; Heil⁷ (1984) reported the presence of D. arnfieldi in 45.3% of donkeys in Germany. Lyons et al.¹⁰ (1985) reported the presence of the parasite in 2% of horses, in 68% of donkeys and in 22% of mules, whereas no parasites were found in ponies. The same authors (Lyons et al.¹¹, 1985) found the parasite in 11% from 488 lungs of Thoroughbred horses and in 50% of four donkeys. Lyons et al.⁹ (1986) reported the presence of D. arnfieldi larvae in 93% of the donkeys and in 50% of the Thoroughbred horses. The parasite was not found in two ponies.

The findings of this parasite in Brazilian horses were reported from the States of Mato Grosso, Minas Gerais, São Paulo, Pernambuco, Rio Grande do Sul and Rio de Janeiro (Costa et al.³, 1986). Referring to donkeys there are the reports of Silva¹⁶ (1961) in Bahia and Gonçalves⁹ (1961) in Rio Grande do Sul; and to mules, Freitas¹⁷ (1957) in Minas Gerais and Fernandes⁴ (1965) in Paraná. Studies about prevalence and worm burden were not carried out by those authors, but Ribeiro et al.¹³ (1979) found this parasite in 9.09% of 55 necropsies made in Pantaneira horses from Poconé, Mato Grosso.

The purpose of this research was to study the occurrence of this parasite in donkeys, mules and horses from some Brazilian States.

MATERIAL AND METHOD

To evaluate the occurrence and the parasitic amount in natural infections by D. arnfieldi, tracheas and lungs of horses, donkeys and mules from the States of Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Bahia, Minas Gerais and Goiás were examined. On the whole, 20 donkeys, 22 mules and 44 horses were studied. The materials from horses and mules from the States of Minas Gerais and Goiás were collected at slaughterhouses; the other animals were specially purchased for this study. They were grown-up animals.

In the necropsy, tracheas and lungs were removed from the carcass and after a macroscopic analysis of the appearance, they were opened and visible worms collected in saline solution (0.8%). Opened tracheas and lungs were washed with saline and the sediment was examined in order to detect the parasites.

The worms were collected and settled in hot formaline
Table 1


<table>
<thead>
<tr>
<th>Origin of the animals</th>
<th>Donkeys</th>
<th>Mules</th>
<th>Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exa</td>
<td>Pos</td>
<td>Exa</td>
</tr>
<tr>
<td>Maranhão</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Piauí</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Ceará</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Rio G. do Norte</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Paraíba</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Pernambuco</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bahia</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Minas Gerais</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>13</td>
<td>22</td>
</tr>
</tbody>
</table>

Exa = Examined; Pos = Positive

Donkeys have been found parasitized in almost all States (Table 1), even considering the few number of examined animals. The number of recovered worms is larger in donkeys, mules, and horses even considering the average worms in the slaughtered animals, as shown in Table 2.

D. arnfieldi was recovered from 65% of the donkeys. This percentage is smaller than the prevalences reported by: Thomas; Jones (1960) in Tennessee - USA (94.44%); Lyons et al. (1986) who found 93% of larvae in faeces and 100% of worms alive in the lungs; and Andersen; Fogh (1981) who reported 87.5% in Denmark. Other data, although superior in quantity, but not much, are the ones of Round (1972) who found 72.97% in England, and the ones of Lyons et al. (1985) who reported 68% in USA. Minor prevalences were found by Pankhurst (1963) in the United Kingdom (55%) and by Gothe; Heil (1984) in Germany (45%).

The prevalence of D. arnfieldi in horses in some countries, as 0.05% in the British Islands (Pankhurst, 1963), 0.0% in the United States (Lyons et al., 1985), 11.0% in Denmark (Andersen; Fogh, 1981), 9.0% in Pantaneira horses in Brazil (Ribeiro et al., 1979), and the amount of information collected in this study (4.54%) make clear that D. arnfieldi is less common in horses than in donkeys.

Data above mentioned confirm that D. arnfieldi is a natural parasite of donkeys.

Considering that mules are hybrid, having their origin as a result of the coupling between donkeys and horses, one must conclude that mules are more susceptible to D. arnfieldi than horses are. Our findings concerning the prevalence (22.72%) reinforce such assertion. An approximate prevalence (22%) was reported by Lyons et al. (1985) in the United States.

In horses, when the mean intensity is examined, the reported results point out a low average (2.0), lower than the one presented by Ribeiro et al. (1979) who found 4.33 and the one by Lyons et al. (1985) with 6.0 lungworms per horse. Concerning donkeys and mules, a mean of 34.3 and 36.5 D. arnfieldi per animal was found respectively, suggesting that a

Table 2


<table>
<thead>
<tr>
<th>Items</th>
<th>Donkeys</th>
<th>Mules</th>
<th>Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recovered worms</td>
<td>158M 88F</td>
<td>27M 19F</td>
<td>0M 4F</td>
</tr>
<tr>
<td>Average worms in the slaughtered animals</td>
<td>22.3</td>
<td>6.63</td>
<td>0.09</td>
</tr>
<tr>
<td>Average worms in the infected animals</td>
<td>34.3</td>
<td>36.5</td>
<td>2.0</td>
</tr>
<tr>
<td>Infectious amplitude</td>
<td>2 - 139</td>
<td>11 - 98</td>
<td>1 - 3</td>
</tr>
<tr>
<td>Occurrence %</td>
<td>65.0</td>
<td>22.72</td>
<td>4.54</td>
</tr>
<tr>
<td>Worm Male/Female ratio</td>
<td>1:1.82</td>
<td>1:4.41</td>
<td>-</td>
</tr>
<tr>
<td>Worm Male/Female amplitude</td>
<td>1:0.71 - 1:3.25</td>
<td>1:1.30 - 1:7.91</td>
<td>-</td>
</tr>
</tbody>
</table>

F = female; M = male
correlation between infection intensity and host susceptibility does not occur.

The average of Male/Female ratios in *D. arnfieldi* points out the presence of larger number of females among the hosts.

ACKNOWLEDGEMENTS

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RESUMO

Para estudo da ocorrência da infecção por *Dictyocaulus arnfieldi*, em alguns Estados brasileiros, foram examinados os pulmões de 20 asininos, 22 muares e 44 eqüinos procedentes dos seguintes Estados: Maranhão, Piauí, Ceará, Rio Grande do Norte, Paraíba, Pernambuco, Bahia, Minas Gerais e Goiás. Foram registradas as ocorrências de 65%, 22,72% e 4,54%, respectivamente, para asininos, muares e eqüinos; as intensidades médias de 34,3, 36,5 e 2,0 vermes para asininos, muares e eqüinos e as relações macho/fêmea de 1: 1,82 e de 1: 1,41 *D. arnfieldi* em asininos e muares.

UNITERMOS: *Dictyocaulus arnfieldi*; Protostrongylidae; Vermes pulmonares; Jumentos; Mulas; Cavalos.

REFERENCES