Prevalence of Gastro-Intestinal Parasites in Horses Used for Cadets Training in Nigeria

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Abstract

The present study was carried out to establish the Gastrointestinal Parasites (GIP) profile of horses used for cadets’ training at the Nigerian Defence Academy Kaduna, Nigeria. A total of forty eight (48) horses made up of 35 males and 13 females were examined regularly between November, 2010 and June, 2011. Fecal samples were collected from sampled horses and processed by flotation and sedimentation techniques. GIP encountered were ciliates (81.3%), Strongylus spp. (68.8%), Oxyuris equi (27.1%), Strongyloides spp. (25%), Dictyocaulus spp. (10.4%) and Parascaris equorum (6.3%). Male horses were significantly more infected than female horses (P<0.05). Similarly, infections were in older horses aged 17 – 20yrs than in younger horses aged between 5 – 16yrs. There was a significant difference in prevalence of GIP between the Stables examined (P<0.05). Environmental hygiene, use of standard drugs and strategic de-worming of horses to reduce environmental contamination are recommended in order to achieve improved horse health for optimum performance.

Key words: Nigeria, defence, academy, horse, parasite, environment, hygiene.

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Introduction

Over the years, technological improvement has replaced the use of the horse profoundly, especially in military operations. Horses which were once the mainstay of military transportation have been replaced by automobiles and aircrafts. However, horses are still kept by many for ceremonies, sports and recreation while military authorities in many countries including Nigeria still maintain minimal capabilities to train and manage these animals in case of wars in unfavorable terrain or for military ceremonies.

Parasitic diseases are the major obstacle in the growth and development of animal health all over the world (Saeed et al., 2010; Mahfooz et al., 2008). Horses, among most domestic animals are reported to be more susceptible to a large number of parasites and may harbor different species at any time (Wannas, et al., 2012). An apparently healthy horse can harbor over one – half million Gastrointestinal Intestinal Parasites (GIP) such as protozoa, trematodes, cestodes and nematodes (Martins et al., 2009; Stoltenow and Purdy, 2003). This is because, the gastrointestinal tract provides favorable environment for the survival and proliferation of many of these parasites (Egan et al., 2010).

Intestinal parasites such as helminth usually produce insidious diseases in animals. Infected horse may show signs of weakness, emaciation, restlessness, unthriftness, diarrhea, anemia and sometimes intestinal obstruction or perforation (Stoltenow and Purdy, 2003).

Due to the economic significance of GIP, several millions of Dollars are spent annually on the control of these parasites worldwide. Despite this huge investment, GIP still remain a major problem affecting the health and well being of horses in different parts of the world (Mbafor et al., 2012). To achieve successful control of GIP in horses, effort should be targeted at reducing environmental contamination which usually serves as a source of re-infection in addition to providing measures that could provide protection to the horse.

The Nigerian Defence Academy (NDA) is the only military institution in Nigeria set up with the mandate to train and produce graduate professional military officers for the Nigerian Armed Forces. The institution still train and maintain horses for cadets training. For maximum performance of these horses to meet the training needs of cadets, there is the need to constantly monitor the health of these animals and to prevent parasite contamination of the environment.

The aim of the study was to determine the prevalence of GIP in horses used for cadets training in NDA with the view of recommending appropriate, economic and efficient control measures that could be employed to achieve a low level of worm egg counts thus controlling environmental contamination and consequently improving horses’ health.

Materials and Methods

Study Site
Nigerian Defence Academy (NDA) is located in Kaduna, Kaduna State (Latitude 10° 41’ 43” and Longitude 6° 38’ 58”). Horses for cadets’ training are kept and maintained in the equitation Department within the Academy. Newly acquired horses are also retained to meet the needs and training for ceremonial ride and cadets’ horse riding training.

Sampled Animals
Forty eight (48) horses distributed in 2 stables A and B were sampled between November, 2010 and June, 2011. Stable A had 25 horses made up of 19 male and 6 female horses while stable B had 23 horses comprising of 16 males and 7 females.

Horses in any one stable were sampled by first preparing a sample frame as described by Putt et al. (1988). This involves identifying a horse by a combination of 2 letters and a number to represent the initials of the horse stable (A or B), sex (M or F) and a serial number. Sampled horses in stable A were labeled ‘A1M’, ‘A2M’, ‘A3F’ ….. While in stable B, horses were labeled ‘B1M’, ‘B2F’, ‘B3M’…..

Sample Collection
Five (5) grams of fecal samples were collected between 6 – 8 am directly from the rectum of sampled horses using transparent polythene bags
Santana) which also serves as hand gloves during sample collection. The procedure involves raising the tail of a restrained horse with the right hand and gently inserting a Santana gloved left hand fingers into the anal opening with a gentle rotator motion to collect some chunk of feces and then rolling the Santana bag over the feces. The bag was tied and labeled appropriately (Stoltenow and Purdy, 2003).

Sample collected were placed on ice packs in a cold box and transported to the Department of Biological Sciences Laboratory, NDA for parasitological analysis.

**Parasitological Techniques**

Fecal samples collected from sampled horses were processed by fecal flotation and sedimentation techniques (Belding, 1965). Processed samples were examined microscopically under the light microscope. Eggs, cysts and trophozoites of protozoans seen were identified based on morphological characteristics as described by Soulsby (1982). Intensity of infection were classified as light (1 – 500egg), moderate (5001 – 1000eggs) and high (>1001eggs) (Upjohn et al., 2010).

**Statistical Analysis**

Significance of the difference between age groups, sex and seasons were tested using X² – test while Analysis of Variance was used to test variations between parasites.

**Ethical Consideration**

Permission was sought and granted before the commencement of the study.

**Results and Discussion**

The overall prevalence of GIP recorded in horses examined was 70.8%. Most of the infected horses harbored multiple infections.

However, ciliates had the highest prevalence with 81.3% of the horses showing evidence of infection. Next was Strongylius spp. with 68.8%, followed by Oxyuris equi (27.1), Strongyloides spp. (25.0%) and Dictyocaulus equorum (10.4%). Parascaris equorum had the least prevalence of 6.3% (Table 1).

With the exception of Ciliates, Dictyocaulus spp. and Parascaris equorum, all parasites recorded in the present study had significantly higher prevalence in horses of Stable B than Stable A (P<0.05) (Table 2).

The prevalence of the various GIP recorded in relation to sex and age of horse is presented in Table 3. Male horses were significantly more infected (80.9%) than female horses (38.5%)(P<0.05). Similarly, prevalence between males and females of the same age group show a significant difference. Male horses of a particular age group had significantly higher prevalence than females of the same age group (P<0.05). However, older horses aged 17 – 20yrs had a significantly lower prevalence (57.1%) than horses aged 5 – 8yrs, 9 -12yrs and 13 – 16yrs with prevalence ranging between 69.2% and 76.2%.

Table 4 showed the seasonal prevalence of GIP in horses used for cadets training in NDA. Infections with GIP showed a significantly higher prevalence (39.6%) during the wet season than the dry season (31.3%)(P<0.05).

However, GIP infections in horses examined showed varied intensity with 60.9%, 34.3% and 4.8% of the infections been light (+), moderate (++) and heavy infections (+++) respectively.

The few documented report on GIP of horses in Nigeria showed varied prevalence. Useh et al. (2005) reported helminthosis as the most commonly encountered disease in horses in Zaria in the Northern Sudan Savannah accounting for 82.3% of diseases diagnosed. Ehizibolo et al. (2012) recorded cases of Strongylus spp., Strongyloides spp., Oxyuris equi, Parascaris equorum, Paragonimus spp., Dicrocoelium spp. and Eimeria spp. in horses belonging to institutional, traditional and private owners in some states (Bauchi, Kaduna and Plateau) of Northern Nigeria.

In a study of GIP in horses owned and maintained by the mounted troop, Nigerian Police Force, Borno State Command, Nwosu and Stephen (2005) recorded only two helminth egg types, Gastrodiscus aegyptiacus (16.7%) and Strongyle spp. (5.6%).

The overall prevalence of GIP recorded in the horses kept and maintained by the Nigerian Defence Academy is considered very high considering the
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effort and financial commitment of the Academy authority to achieve improved horse health that could meet the training needs of cadets. It is also an indication of the level of environmental contamination of the environment by infective larvae and cysts of GIP which tend to be the main deterrent to an effective parasite control.

It is worthy of note that most of the economically important GIP (Strongylus spp., Strongyloides spp., Oxyuris equi Dictyocaulus spp. and Parascaris equorum) recorded in the present study have a direct life cycle where adult parasites living within the horse lay eggs which are excreted into the pasture, larva develops within the egg, which then hatches, grow and molt twice until it reaches the infective third stage (L₃) larva. These may contaminate housing facilities, exercise areas, pasture/feeds resulting in auto-infection or re-infection of horses which could probably be responsible for the observed prevalence despite regular veterinary care provided to the horses. The presence of Strongylus spp. in horses examined though occurring as light infection is worrisome. Large and small Strongyles are known to be voracious blood suckers which could result in anemia in infected horse. In addition, these parasites serve to produce favorable sites for bacterial colonization of denuded areas created by shift in points of attachments to the host.

Table 1: Prevalence of gastrointestinal parasites in horses used for cadets’ training in Nigerian Defence Academy, Kaduna – Nigeria.

<table>
<thead>
<tr>
<th>Parasite</th>
<th>No. of horses positive</th>
<th>No. of horses negative</th>
<th>% Positive</th>
<th>Relative prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protozoa</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ciliates</td>
<td>39</td>
<td>09</td>
<td>81.3</td>
<td>37.4</td>
</tr>
<tr>
<td><strong>Nematodes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongylus spp.</td>
<td>33</td>
<td>15</td>
<td>68.8</td>
<td>31.4</td>
</tr>
<tr>
<td>Oxyuris equi</td>
<td>13</td>
<td>35</td>
<td>27.1</td>
<td>12.4</td>
</tr>
<tr>
<td>Dictyocaulus spp.</td>
<td>05</td>
<td>43</td>
<td>10.4</td>
<td>04.8</td>
</tr>
<tr>
<td>Strongyloides spp.</td>
<td>12</td>
<td>36</td>
<td>25.0</td>
<td>11.4</td>
</tr>
<tr>
<td>Parascaris equorum</td>
<td>03</td>
<td>45</td>
<td>06.3</td>
<td>02.9</td>
</tr>
</tbody>
</table>

Table 2: Prevalence of Gastrointestinal Parasites by Stable of Horses examined in Nigerian Defence Academy, Kaduna – Nigeria.

<table>
<thead>
<tr>
<th>Stable</th>
<th>Ciliates</th>
<th>Strongylus spp.</th>
<th>Oxyuris equi</th>
<th>Dictyocaulus spp.</th>
<th>Strongyloides spp.</th>
<th>Parascaris equorum</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. Inf. (%)</td>
<td>No. Inf. (%)</td>
<td>No. Inf. (%)</td>
<td>No. Inf. (%)</td>
<td>No. Inf. (%)</td>
<td>No. Inf. (%)</td>
</tr>
<tr>
<td>A</td>
<td>25</td>
<td>18(72.0)</td>
<td>06(24.0)</td>
<td>02(80.0)</td>
<td>22(80.0)</td>
<td>04(16.0)</td>
</tr>
<tr>
<td>B</td>
<td>23</td>
<td>15(65.2)</td>
<td>07(30.4)</td>
<td>03(13.0)</td>
<td>17(73.9)</td>
<td>05(21.7)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>48</td>
<td>33(68.8)</td>
<td>13(27.1)</td>
<td>05(10.4)</td>
<td>39(81.3)</td>
<td>09(18.8)</td>
</tr>
</tbody>
</table>

Table 3: Overall prevalence of gastrointestinal parasites in horses used for cadets’ training in relation to sex and age of Horses examined.

<table>
<thead>
<tr>
<th>Age (yrs)</th>
<th>Male</th>
<th>Female</th>
<th>Total male and female infected (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. exam.</td>
<td>No. inf. (%)</td>
<td>No. exam.</td>
</tr>
<tr>
<td>5 – 8</td>
<td>15</td>
<td>13(86.7)</td>
<td>06</td>
</tr>
<tr>
<td>9 – 12</td>
<td>10</td>
<td>08(80.0)</td>
<td>03</td>
</tr>
<tr>
<td>13 – 16</td>
<td>05</td>
<td>04(80.0)</td>
<td>02</td>
</tr>
<tr>
<td>17 – 20</td>
<td>05</td>
<td>04(80.0)</td>
<td>02</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>35</td>
<td>29(82.9)</td>
<td>13</td>
</tr>
</tbody>
</table>
Table 4: Seasonal prevalence of gastrointestinal parasites in horses used for cadets’ training in Nigerian Defence Academy, Kaduna, Nigeria.

<table>
<thead>
<tr>
<th>Season</th>
<th>No. of horses examined</th>
<th>No. of horses infected</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRY</td>
<td>48</td>
<td>15</td>
<td>31.3</td>
</tr>
<tr>
<td>WET</td>
<td>48</td>
<td>19</td>
<td>39.6</td>
</tr>
</tbody>
</table>

The high prevalence of ciliates in horses examined on the other hand is not surprising. Ciliated protozoans are reported to be common inhabitants of the intestinal tracts of horses (Kirkpatrick and Saik, 1988). Although these protozoans are assumed to be contracted by swallowing living organisms with contaminated food and water, they are believed to perform some useful services for their host except in few cases where they may become opportunistic pathogens in association with diseases induced by other infectious agents (Selwyn et al., 2008).

Wet season in Nigeria is characterized by high humidity and relatively moderate temperature which is conducive for vegetation growth, parasite development and increased chances of transmission of infective larvae to grazing animals. The relatively high prevalence observed during the wet season compared to the dry season therefore should be expected. Horses in the Academy though confined to stables are occasionally allowed to graze in open fields or on hand cut grasses to supplement the usual crop residues commonly fed to the animals. The pasture environment or hand cut grasses when contaminated could result in the animals becoming re-infected even after the regular treatment regime. Saeed et al. (2010) however, reported no significant influence of season and sex of horse on the prevalence of GIP, although significantly higher egg excretion by Strongyles was observed during spring and summer.

**Conclusion**

Despite regular de-worming of horses and stable management, the horses kept by the Nigerian Defence Academy for the purpose of cadets’ training still harbor wide variety of GIP which could affect horse health and performance. The presence of these parasites could be associated to poor stable hygiene, environmental contamination by eggs/ cysts of parasites which serve as source of re-infection and the use of ineffective or sub-standard veterinary drugs which have infiltrated most Nigerian markets.

**Recommendation**

Improved stable hygiene, strategic de-worming to reduce environmental contamination and use of veterinary drugs from reputable and registered veterinary drug companies is recommended to achieve control of GIP in horses owned by the Academy. Regular monitoring of fecal egg output to identify infected horses for treatment would help achieve zero egg output level thereby reducing environmental contamination.

**References**


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