Survey of Gastrointestinal Parasites and Ectoparasites of Horses (Equine Equine) in Port Harcourt and Abarka Polo Field, South Southern Nigeria

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Abstract: Gastrointestinal parasites of horses in South Southern Nigeria have not been documented previously. This study was therefore undertaken to determine the prevalence of gastrointestinal parasites and ectoparasites in horses (Equus caballus) in Polo Fields of Abraka and Port Harcourt in South Southern Nigeria during June 2017 to October 2017. One hundred faecal horse samples, (22) in Abraka and (78) in Port Harcourt Polo Fields were examined (using standard parasitological techniques for helminthes and ectoparasites). Soil samples from the two fields were also collected and examined. Out of the 100 horse faecal samples examined, (93%) were infected. The infection was more (100%) in Abraka polo and lowest71 (91.0%) in Port Harcourt polo field. The prevalence of gastrointestinal helminthes across the study locations are; Draschiana gastoma (14.0%), Tridontophorusteni collis (7%), Trichostrongylus axei (49%), Strongylus sp (80%), Dictyoacaulus arnfieldi (35%), Paranaeopha manusilla (1.0%), Eimeria leukarti (4.0%), Strongyloide sp (48.0 %), Cyathostome sp (42.0%), Parascaris equorum (5.0%) and Oxyuris equi (1.0%). Differences were not significant (p>0.05). Prevalence of ectoparasite across the study location were Boophilus sp (23%) and Rileyphalus sanguineus (36%). Mono-infection accounted for 22%while poly-infection accounted for 24% of the total infections. The prevalence of five helminthes; Dictyoacaulus sp, Strongyloide sp, Trichuririshirucha, Toxocara sp and Enterobius vermicularis recovered from the soil samples were of 20%, 30%, 20%, 10% and 10% respectively. This prevalence is a call for public health intervention across the study location.

Keywords: Gastrointestinal, Helminths, Ectoparasites, Polo fields, Equus caballus

1. Introduction

The horse (order: perrisodactyla) is an odd-toed hoofed mammals. The family; Equidae includes all living horses, donkeys, zebras and on agers as well as their extinct ancestors. Horses and humans interact in many ways through sports competition, police work, agriculture, entertainment and warfare. Many important products derived from horses, include meat, milk, hide, bones, blood, hooves and pharmaceuticals (Ahern et. al., 2006); Horses among domestic animals have been reported to be more susceptible to a large number of parasites and may harbour different species at a given time (Wannans et. al., 2012). Parasitic helminthes are one of the most common factors that constrain the health and working performance of donkeys and horses worldwide. They cause various degrees of damage depending on the species and number at present, nutritional and the immune status of equids (Asefa et. al., 2011). They decrease the performance, production and productivity in acute case (Ramaswamy, 1994).

They can also act as vectors between domestic animals and humans, causing a number of diseases, some of which are Zoonotic (Stephen and John, 2003). Horses are afflicted by several diseases that hamper their productivity (Rabo et. al., 1995). Ticks, lice, mites and mosquitoes are common external parasites of horses while blood and gastrointestinal (GI) parasites are considered as common internal parasites. Horses are susceptible to more than 60 gastrointestinal parasites and may harbour several species of worms (Ananzi and Alyousif, 2011). These parasites have the potential to cause serious diseases such as diarrhoea, emaciation, colic, anaemia, haemorrhage and even death. In addition, performance, weight loss and poor growth conditions are associated with diseases of horse (Ananzi and Alyousif, 2011). This condition is more severe in young and undernourished horses and mares ( Lyons et. al., 2012). Studies have reported several gastrointestinal parasites of horse (Love et. al., 1999). These includes; Strongyles, ascarid; Parascarius equorum (in foals), pinworm; Oxyuris equi and lungworm Dictyoacaulus arnfieldi as, cestodes Anoplocephala perfoliata and Trichromonas equis. These parasites are the most common parasitic fauna which inhabit the large intestine of the horses and causes diarrhoea in foals elsewhere (Mair et. al., 2002, and Lun et. al., 2005). However, gastrointestinal parasites of horses in South Southern Nigeria have not been documented. Horses and donkeys have often been described as sturdy animals and succumb to a variety of diseases. Increased awareness of the risk of zoonotic infections associated with horses is needed pre-requisite for controlling horse-man infections (Anne and Gary 2006). This information is scarce in South Southern Nigeria. This study was therefore design to determine the prevalence of gastrointestinal parasites of horses (Equine equine) in Port Harcourt and Abarka Polo field.

2. Materials and Methods

Study Area
A cross sectional study was conducted between June toSeptember2017on Equine horses kept by organized polo
clubs located in Polo Club, Port Harcourt, Rivers State and
Abraka Turf and Country Club of South-southern in Delta
State Nigeria. Horses used in this study were stabled and
maintained by organized Polo Clubs in Abarka, Delta State
and Port Harcourt Rivers State. These horses are used for
polo sport tournaments and for recreational purposes. They
are stabled and supplied with straw, crop residues from
millet and concentrates. Most times, they are allowed to
graze in open fields and were under good grooming. The age
of the Equines were determined by dentition and owner’s
information. During the study, the animals were grouped
into three categories as young (<4yrs), adult (4-10yrs) and
old (>10yrs) and the age of studied animals were determined
based on dentition and owner’s information. The study
animals had not received anthelmintic treatment two
months ago from the period of study but had always been
groomed for ectoparasites.

Faecal collection and examination
Faecal samples were collected directly from the rectum of
individual animal using transparent polythene hand gloves
under proper restraints according to standard procedures in
(Stolttenow and Purdy, 2003). The tails of the restrained
horses were raised gently and the gloved fingers were
inserted into the anal opening from which a small quantity of
faeces was collected, tied and labelled appropriately.
Collected samples were transported to the laboratory for
analysis within 12-24 hours. Faecal samples were observed
macroscopically for the presence of adult helminths and for
the larvae of botfly. Faecal examination was carried out by
direct smear and flotation techniques employing saturated
sodium chloride solution as the floating medium as
described in (Cheesbrough, 2005). Eggs were identified
based on their morphology using the standard identification
key of Souls by (1982).

Ectoparasite collection and examination
Ticks were collected either by handpicking or restraining the
horses on a white sheet cover on which they are groomed
with a hand brush for the recovery of the ticks. Ticks were
collected at predilection sites- head, body, groin and rectum
region, which were packed in plastic vials containing 70%
ethanol, labelled appropriately and was transferred to the
laboratory for identification. Identification and grouping of
the tick to genus and species was based on the morphology
and structure of the tick as described in Walker et al., (2003)
guide to identification of species as revised in 2014.

Soil sample collection and examination:
Purposive sampling of soil samples was made on the polo in
the two locations. Criteria for inclusion for the soil samples
are: 1. areas where soil transmitted nematode (STH) are
most likely to survive, 2. Where human exposure occurs and
animal defecation sites 3. Moist areas 4. Places where
children were observed to have played. About 50g of soil
samples were collected from 20 separate cores of 2-5cm
depth using a hand trowel. The soil samples were air dried
to remove moisture. Air dried soil samples were sieved with a
fine sieve of 250μm, in order to allow helminth eggs to pass
through. Floatation method was used for recovery of
parasites from the soil samples. The procedures for
floatation method follow standard techniques (Cheesbrough,
2005). Identification of helminths was done using the Web
Atlas of Human Parasitology.

Statistical Analysis
Data collected were analysed using SPSS software version
16. Differences among means were determined using Chi-
square at confidence level 0.05

3. Results
A total of 100 faecal samples were collected; 78 samples
from Port Harcourt Polo field and 22 from Abraka. A total
of eleven gastrointestinal parasites were recorded from the
animals. This comprises of nine nematodes species
(Drascihamiae gastoma, Trondontophorus tenicollis,
Trichostrongylus axei, Strongylus sp. Dictyocaulus arnfieldi,
Strongyloide sp. Cyathostome sp, Parascaris equorum,
Oxyurus equi), onecestode (Paranoecephala manila) and
one protozoa (Eimeria eukurt). The differences in the
occurrence of these parasites were significantly (χ2 =,
P< 0.05). Parasites occurrence in order of frequency are;
Strongyle sp (80.0%), Trichostrongylus axei (49%),
Strongyloide sp (48.0 %), Paranecephala manila and
Oxyurus equi (1.0%) (Table 1). Out of the 100 horses
sampled, (93%) were infected with one or more of the
intestinal parasite species. Horses in Abraka polo field had
the highest prevalence of infection 100% while Port
Harcourt polo field had the prevalence of 91.0%. Differences
in the Infection rates across the study locations were not statistically significant (χ2 =, p > 0.05) (Table 2).
Male horses had higher prevalence (93.5%) than female
horses (92.6%). Differences in sex specific prevalence of
infection was not statistically significant (χ2 =, p >0.05) Fig
1. The Parasite specie prevalence was also sex specific.
Drascihamiae gastoma, Trichostrongylus axei and Parascaris
equorum in female horses accounted for the prevalence of
16.7%, 51.9% and 7.4% respectively. Paranoecephala
manila, Eimeria leukarti and Oxyurus equi was associated with
the male horses (Table 3). There was disparity in the
infection rates by age. Infections increased as age increases.
The prevalence of infections of old horses (>10yrs), Adults
(4-10yrs) and Young (<4yrs) horses are 100%/92.3% and
89.7% occurred in respectively (Table 4). Mixed infection
accounted for (88.2%) prevalence of the total population and
varies across study location (Table 5). Ectoparasites were
observed more in male (52.2%) than in female (40.7%),
more in younger horses (58.6%) than in older horses 52.6%
and adults 36.5% (Table 6-7). Five Parasites specie were
recovered from the soil samples from the two study
locations. They are Ascaris lubricoides (62.5%),
Dictyocaulus sp (27.5%), Strongylode sp (2.0%), Trichuris
trichiura (47.5%) and Toxocara sp (20%) respectively (Table 8).
Table 1: Total number of gastrointestinal parasites recovered from the study

<table>
<thead>
<tr>
<th>Species</th>
<th>No. examined</th>
<th>No. of infected (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draschia em gastoma</td>
<td>14</td>
<td>(14.0)</td>
</tr>
<tr>
<td>Trichonothorbus tenicollis</td>
<td>7</td>
<td>(7.0)</td>
</tr>
<tr>
<td>Trichostrongyulus axei</td>
<td>49</td>
<td>(49.0)</td>
</tr>
<tr>
<td>Strongylus sp</td>
<td>80</td>
<td>(80.0)</td>
</tr>
<tr>
<td>Dictyocaulus arnfieldi</td>
<td>35</td>
<td>(35.0)</td>
</tr>
<tr>
<td>Paranocephala manila</td>
<td>1</td>
<td>(1.0)</td>
</tr>
<tr>
<td>Eimeria leukarti</td>
<td>4</td>
<td>(4.0)</td>
</tr>
<tr>
<td>Strongyloide sp</td>
<td>48</td>
<td>(48.0)</td>
</tr>
<tr>
<td>Cyathostomina</td>
<td>42</td>
<td>(42.0)</td>
</tr>
<tr>
<td>Parascaris equorum</td>
<td>5</td>
<td>(5.0)</td>
</tr>
<tr>
<td>Oxyuris equi</td>
<td>1</td>
<td>(1.0)</td>
</tr>
</tbody>
</table>

No. of examined horses, n=100

Table 2: Distribution of gastrointestinal parasites of equine from study locations

<table>
<thead>
<tr>
<th>Study Location</th>
<th>No examined</th>
<th>No infected (%)</th>
<th>D. mega</th>
<th>T. teni</th>
<th>T. axei</th>
<th>Strong sp</th>
<th>D. armfi</th>
<th>P. manni</th>
<th>E. leuk</th>
<th>Strongy sp</th>
<th>Cyathostome</th>
<th>P. Equo</th>
<th>O. Equi</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH</td>
<td>78</td>
<td>71 (91.0)</td>
<td>6 (7.7)</td>
<td>6 (7.7)</td>
<td>39 (50.0)</td>
<td>58 (74.4)</td>
<td>31 (39.7)</td>
<td>1 (1.3)</td>
<td>3 (3.8)</td>
<td>38 (48.7)</td>
<td>39 (50.0)</td>
<td>4 (5.1)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Aabra</td>
<td>22</td>
<td>22 (100.0)</td>
<td>8 (36.4)</td>
<td>1 (4.5)</td>
<td>10 (45.5)</td>
<td>22 (100.0)</td>
<td>4 (18.2)</td>
<td>0 (0.0)</td>
<td>1 (4.5)</td>
<td>10 (45.5)</td>
<td>3 (13.6)</td>
<td>1 (4.5)</td>
<td>1 (4.5)</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>93 (93.0)</td>
<td>14 (14.0)</td>
<td>7 (7.0)</td>
<td>49 (49.0)</td>
<td>80 (80.0)</td>
<td>35 (35.0)</td>
<td>1 (1.0)</td>
<td>4 (4.0)</td>
<td>48 (48.0)</td>
<td>42 (42.0)</td>
<td>5 (5.0)</td>
<td>1 (1.0)</td>
</tr>
</tbody>
</table>


Figure 1: Sex related prevalence of gastrointestinal parasites based on study locations

Table 3: Distribution of gastrointestinal parasites based on sex of equine horses

<table>
<thead>
<tr>
<th>Species of parasites (%)</th>
<th>Sex</th>
<th>No examined</th>
<th>No infected (%)</th>
<th>D. mega</th>
<th>T. teni</th>
<th>T. axei</th>
<th>Strong sp</th>
<th>D. armfi</th>
<th>P. manni</th>
<th>E. leuk</th>
<th>Strongy sp</th>
<th>Cyathostome</th>
<th>P. Equo</th>
<th>O. Equi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>46</td>
<td>43 (93.5)</td>
<td>5 (10.9)</td>
<td>4 (8.7)</td>
<td>21 (45.7)</td>
<td>37 (80.4)</td>
<td>21 (45.7)</td>
<td>1 (2.8)</td>
<td>4 (8.7)</td>
<td>24 (52.2)</td>
<td>20 (43.5)</td>
<td>1 (2.2)</td>
<td>1 (2.2)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>54</td>
<td>50 (92.6)</td>
<td>9 (16.7)</td>
<td>3 (5.6)</td>
<td>28 (51.9)</td>
<td>43 (79.6)</td>
<td>14 (25.9)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>24 (44.4)</td>
<td>22 (40.7)</td>
<td>4 (7.4)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>93 (93.0)</td>
<td>14 (14.0)</td>
<td>7 (7.0)</td>
<td>49 (49.0)</td>
<td>80 (80.0)</td>
<td>35 (35.0)</td>
<td>1 (1.0)</td>
<td>4 (4.0)</td>
<td>48 (48.0)</td>
<td>42 (42.0)</td>
<td>5 (5.0)</td>
<td>1 (1.0)</td>
<td></td>
</tr>
</tbody>
</table>


Table 4: Prevalence of gastrointestinal parasites per age of equine horses

<table>
<thead>
<tr>
<th>Species of parasites (%)</th>
<th>Age of horses</th>
<th>No examined</th>
<th>No infected (%)</th>
<th>D. mega</th>
<th>T. teni</th>
<th>T. axei</th>
<th>Strong sp</th>
<th>D. armfi</th>
<th>P. manni</th>
<th>E. leuk</th>
<th>Strongy sp</th>
<th>Cyathostome</th>
<th>P. Equo</th>
<th>O. Equi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young (&lt;4)</td>
<td>29</td>
<td>26 (89.7)</td>
<td>3 (10.3)</td>
<td>1 (3.4)</td>
<td>12 (41.4)</td>
<td>20 (69.0)</td>
<td>10 (34.5)</td>
<td>0 (0.0)</td>
<td>1 (3.4)</td>
<td>13 (44.8)</td>
<td>14 (48.3)</td>
<td>3 (10.3)</td>
<td>1 (3.4)</td>
<td></td>
</tr>
<tr>
<td>Adult (4-10)</td>
<td>52</td>
<td>48 (92.3)</td>
<td>6 (11.5)</td>
<td>4 (7.7)</td>
<td>25 (48.1)</td>
<td>43 (82.7)</td>
<td>21 (40.4)</td>
<td>1 (1.9)</td>
<td>5 (9.8)</td>
<td>24 (46.2)</td>
<td>24 (46.2)</td>
<td>1 (1.9)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Old (&gt;10)</td>
<td>19</td>
<td>19 (100.0)</td>
<td>5 (26.3)</td>
<td>2 (10.5)</td>
<td>12 (63.2)</td>
<td>17 (89.5)</td>
<td>4 (21.1)</td>
<td>0 (0.0)</td>
<td>11 (57.9)</td>
<td>4 (21.1)</td>
<td>1 (5.3)</td>
<td>0 (0.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>93 (93.0)</td>
<td>14 (14.0)</td>
<td>7 (7.0)</td>
<td>49 (49.0)</td>
<td>80 (80.0)</td>
<td>35 (35.0)</td>
<td>1 (1.0)</td>
<td>4 (4.0)</td>
<td>48 (48.0)</td>
<td>42 (42.0)</td>
<td>5 (5.0)</td>
<td>1 (1.0)</td>
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</tr>
</tbody>
</table>


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relation to climatic conditions, the use of attributed parasite in the study located in the site of collection. The study also recovers female sex. Sex examination revealed the poor parasite species included Trichuris trichiura, Strongyloides stercoralis, and Toxocara canis. Table 7: Prevalence of Ectoparasites in relation to age. The high prevalence of different helminthic parasites was higher than the report of Mbafor et al., (2012). The higher helminthic parasites in this present study could be attributed to exposure to grazing on infected fields. Equine tapeworm had a low prevalence as compared to the finding of Belay et al., (2016) who observed 3.1% prevalence. Strongyloides sp was observed to have a prevalence of 48% which is higher than the work of Matto et al., (2015). Foals are most times infected through the process of parturition and are associated with humid climates and poor sanitation standards (Roberts and Janovv, 2005). The high rate of Strongyloides sp may be due to inconsistency in horse treatment practices and poor hygiene. Eimeria leuckarti is annelid protozoa and is commonly seen in foals. Cystostomatid had a prevalence of 42% which was higher compared to 12.49% recovered by Mbafor et al., (2012). The prevalence of Parasascaris equorum was 5%. This result was a little bit lower than the

4. Discussion

The prevalence of gastrointestinal helminth infection recorded among the horses in the study location was high (93%). The study also recovers eleven helminths parasites from the horses. The high prevalence of different helmintic parasite in the study location highlighted the poor and primitive methods of horse management in the study location. It also shows that very little or no veterinary services are rendered to these horses in order to prevent or control the diseases.

The prevalence of parasitic infection of horses in this present study a bit lower than the 100% prevalence recorded by Mbafor et al., (2012), Uslu and Guclu (2007) and higher than the report of Tesfu et al., (2014) and Matto et al., (2013) who found prevalence at 63.7% and 20.63% respectively. The discrepancy in the results may be attributed to the differences in the biology of the parasite in relation to climatic conditions, the use of anthelmintic, grazing methods, exposure of the horses to pasture field and poor management system.

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Male horses had higher infestation than female horses. This report is consistent with Umar et al., (2013) but contrast Francisco et al., (2009) who recorded a higher prevalence in females. Higher infection rates among the older horses are indication that the older population were more exposed to infection during foraging. Mixed infections found among the horses highlight their ability exploit wide range environment during foraging. The similar genus of ticks (Rhipicephalus and Boophilus) observed in this present study agrees with Garba et al., (2011). These ticks are the nativity of Nigeria and are widely distributed. Although the disparity in the level of infestation could be attributed to the level of activity of the horses (Garba et al., 2011), the grooming practices, parasite control measures, management practices may be responsible for the high infestation in this present study. Prevalence of soil transmitted helmint was reported in Eze et al., (2016). There is the possibility that horses are re-infestivity through contaminated soil.

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