THE INCIDENCE OF PARASITOLOGICAL RESEARCH ON THE RUMINANT LIVESTOCK

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Abstract
This study's goal is to identify external, blood, and Gastrointestinal (G.I) parasites in the farm animals at the Nasarawa State University Research farm, in Lafia, Nigeria. Blood sample was collected through a cephalic vein using the needle and syringe. External parasites were hand-picked directly from the animal body with the aid of hand gloves. Faecal Sample were collected from 270 Cattle, 500 sheep and 700 Goats via their rectum, using clean, unused disposable hand gloves. These methods were utilized to detect Helminthic eggs and Coccidia oocysts: Haematocrit Centrifugation (HCT) were used to assess blood samples. Parasite prevalence was 85.19%, 85.71% and 74.00% in cattle, goats, and sheep, respectively. Ecto parasites count was 3.40%, for Amblyomma spp. 1.36% Boophilus spp and 0.68% fleas. Blood parasites- B. motasi and B. ovis prevalence were found to be 4.08% and 14.97% respectively. Eimeria spp (32.79%) and Oesophagostomum spp (14.97%) were found to be the most frequent gastro-intestinal parasites.

Keywords: gastrointestinal parasites, blood parasites, external parasites, small ruminants, large ruminants

Introduction
Ruminant animals are grown for meat, milk, wool, and other items. In the tropics, most sheep and goats are maintained for meat, skin, dung, and sometimes wool. Nigerian cattle are mostly grown for meat production. These ruminants are sought for food, as well as social and religious functions. The developed bucks are sacrificed, and the nanny goat milk is very healthy. Agribusiness helps farmers boost their income. A parasite is a hazardous creature that lives on another living thing. Some are pathogenic at low levels of infection (Gupta et al., 2017). Most parasites are species-specific, meaning they do not infect other cow breeds.

Parasitic gastroenteritis is a major pathogenic and an economic constraint on ruminant productivity (Paul et al., 2020). Parasite gastro enteritis-related losses have been documented in several Nigerian districts (Olubukola et al., 2014). Parsitoid parasites may cause considerable losses in production and efficiency in ruminants of any age and in severe cases, can kill farm animals. External parasites feed on blood or lay eggs on the host's hide or snout. Some parasites draw blood and boost the host's requirement for protein and energy. They starve the host of nutrients for growth and upkeep. Various vector-borne hemoparasites afflict cattle in Nigeria (Inuwa et al., 2021). Theileria annulata, Theileria mutans, and Anaplasma marginale and Anaplasma centrale have been detected in farmanimals. Tick-borne diseases affecting cattle in Africa include heartwater caused by Dria ruminantium, babesiosis caused by Babesia bigemina and Babesia bovis, anaplasmosis caused by Anaplasma marginale, and theileriosis caused by Theileria parva (Adjou Moumouni et al., 2015).

This study's main purpose was to evaluate the severity and species of Ecto, Blood and Gastrointestinal parasite in the University Research farm animals in the Lafia metropolis of Nigeria.
Materials and Methods

Sampling

A sample comprising 270 cattle, 500 sheep and 700 goats were collected at the Nasarawa State University Research Farm at Lafia, Nigeria.

Tick Collection

The ticks were collected directly. They were handpicked from the external part (ear, hoof and the main body) of the animal using hand gloves. The tick species were identified and counted for each animal. Identification was done based on the tick’s shape and sizes. The bodies of ticks (hard tick) are roughly oval in shape and had pointed mouth at the front, the patterns of pigmentation on the top side of the tick also assisted in the identification.

Faecal Samples Collection

Faecal samples were collected via the rectum of the animals using clean, unused disposable hand gloves. All the samples were labelled and kept in a cool box containing ice packs, during their transport to the laboratory where the faecal samples were tested for possible helminthic infections. The animals were kept under the traditional husbandry that was semi-intensive type at the University Research Farm.

Blood Samples Collection

3ml of blood sample was collected from the animals’ cephalic vein using a syringe (5ml) and needles (21G). The blood was poured into an ethylene diamin tetraacetic acid (EDTA) vacutainer tubes. The tubes were tilted and turned gently so as to mix up the blood and the anticoagulant (EDTA). Each sample tube mix was adequately labelled and recorded in a book. They were thereafter taken to the parasitology laboratory for analysis, to investigate for the presence of parasites.

Faecal Examination

Direct Floatation Method

The Direct floatation method was used. A small amount of fresh faeces (2.00g) was added to 10ml of the floatation solution and mixed thoroughly. The suspension was poured into a test tube and more floatation was added to fill the tube to the top. A cover slip was then placed on top of the surface of the liquid. The tube and cover slip remain undisturbed for 15 minutes. The cover slip is then removed vertically and placed on a slide and was examined under the microscope for the presence of Eimeria spp, Ascaris spp and other gastrointestinal parasites.

Sedimentation Method

About 2g of fresh faeces is mixed with water in a beaker using tongue depressor. The mixture is strained through a tea strainer into a centrifuge tube. The centrifuge tubes were balance in the centrifuge and the samples is centrifuged at 400g. The liquid from the top of the tube is discarded without disturbing the sediment at the bottom. A very small amount of the top layer of the sediment is transferred to a microscope slide using pipette and bulb. A cover slip is then applied to the drop and examined under the microscope.

Blood Examination

Thin Blood Smear Film

Glass slides were thoroughly clean with 75% methanol. Thin smear was made by using two slides on each specimen of blood sample. A small drop of the blood was placed near one end of the slide which was held between the forefinger and the thumb of the left hand. Then the second slide was held between the forefinger and the right hand thumb freely placed over the drop of the blood and immediately moved with the included slid along the horizontal side to make a thin film of blood. The thin smear was then allowed to air dry.
The slides contents were immersed inside methanol for 2 minutes and allowed to evaporate completely, followed by immersing it into a solution of Giemsa stain and left for 45 minutes, then removed and washed with distilled water. Thereafter, it was allowed to stand for a minute to dry. A drop of immersion oil was added to the film before it was viewed under microscope for the identification of blood parasites (*Babesia Motasi* and *Babesia Ovis*).

**Packed Cell Volume (PCV) Determination**

A capillary tube was inserted into the vacutainer containing blood sample horizontally and slightly tilted down to allow blood flow into it. After the capillary tube is filled up, one end was sealed with a crystal seal material. It was then labelled and placed in a haematocrit centrifuge and set on for 5 minutes. It was thereafter removed and placed on the micro-haematocrit reader. The knob was adjusted to enable the middle line intersect the top of the red cell and the percentage Packed Cell Volume (PCV) on the scale was read. The blood plasma in the capillary tube was also viewed under the microscope for blood parasites.

**Data analysis**

The data obtained was analyzed using percentages and tabulations from the Statistical Package for the Social Science (SPSS) Software.

**Results**

Table 1: Prevalence of parasitic Infections in Farm Animals at the University Research Farm

<table>
<thead>
<tr>
<th>Parasites</th>
<th>N0: of sample</th>
<th>N0: infected with GI Parasites</th>
<th>N0: infected with only blood parasites</th>
<th>N0:infested with external parasites</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle-270</td>
<td>150 (55.56%)</td>
<td>0 (0.00%)</td>
<td>80 (29.63%)</td>
<td>230 (85.19%)</td>
<td></td>
</tr>
<tr>
<td>Goat-700</td>
<td>400 (57.14%)</td>
<td>200 (28.57%)</td>
<td>0 (0.00%)</td>
<td>600 (85.71%)</td>
<td></td>
</tr>
<tr>
<td>Sheep-500</td>
<td>290 (58.00%)</td>
<td>80 (16.00%)</td>
<td>0 (0.00%)</td>
<td>370 (74.00%)</td>
<td></td>
</tr>
<tr>
<td>Total 1470</td>
<td>840 (57.14%)</td>
<td>280 (19.05%)</td>
<td>80 (5.44%)</td>
<td>1200 (81.63%)</td>
<td></td>
</tr>
</tbody>
</table>

The prevalence of parasites analysis in farm animals showed that 150 (55.56%) of cattle were infected with gastrointestinal parasites (GIT), 120 (44.44%) were not infected, while no blood parasites was found in the cattle. 80 (29.63%) of cattle were infested with external parasites and 190 (70.37%) were not infested with external parasites. 400 (57.14%) and 290 (58.00%) of goats and sheep were infected with GIT parasites respectively, 300 (42.89%) and 210 (42.00%) of goats and sheep respectively were not infected. 200 (28.57%) and 80 (16.00%) of goats and sheep were infected with blood parasites respectively, while 500 (71.43%) and 420 (84.00%) of goat and sheep were not infected.

As shown in Table 2, *Amblyomma spp* and *Boophilus spp* were found only on cattle. *Amblyomma spp* had the highest percentage of 3.40% of the external parasites followed by *Boophilus spp* at 1.36% and fleas at 0.68%. Blood parasites *Babesia ovis* and *babesia motasi* were found only on goat at 14.97% and 4.08% respectively. Gastrointestinal parasites - *Eimeria spp* was found in goat at 32.79%. *Oesophagostomum spp*, *Fasciola spp*, hookworm, and *Ascaris spp* were found in cattle at 14.97%, 1.36%, 1.36%, and 1.22% respectively. *Trichostrongylus spp* was found only in sheep, at 5.44%.

Table 2: Prevalence of External, Blood and Gastrointestinal Parasites of farm animals at the Nasarawa State University Keffi research farm.

<table>
<thead>
<tr>
<th>Parasites</th>
<th>N0 (%) of animals infected (N= 1, 470)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>80 (5.44%)</td>
</tr>
<tr>
<td>External parasites</td>
<td>20 (1.36)</td>
</tr>
<tr>
<td>Babesia Motasi</td>
<td>60 (4.08)</td>
</tr>
<tr>
<td>Babesia Ovis</td>
<td>220 (14.97)</td>
</tr>
<tr>
<td>Faecal parasites</td>
<td>840 (57.14%)</td>
</tr>
</tbody>
</table>

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<td>Babesia Motasi</td>
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</tr>
<tr>
<td>Faecal parasites</td>
<td>840 (57.14%)</td>
</tr>
</tbody>
</table>
Table 3 shows that female animals had the highest rate of infection of 10.0% while male animals had 42.6%. This may be because female animals were kept longer for breeding purposes than their male counterparts. Younger animals had high rates of infection at 95.5% while older ones had 40.5%. This may be because younger animals were more susceptible to parasites than the older animals. White Fulani, Sokoto Gudali and Muturu are breeds of cattle and Yankasa and Uda is a breed of sheep and West African dwarf and red Sokoto breed are goat.

Table 3: Prevalence of External, Blood and gastrointestinal parasites of animals examined based on breed, sex and age. And PCV% levels

<table>
<thead>
<tr>
<th>Ruminants examined</th>
<th>No: of animals examined</th>
<th>No: infected/infested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>1,470</td>
<td>1,200 (81.6%)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>470</td>
<td>200 (42.6)</td>
</tr>
<tr>
<td>Female</td>
<td>1000</td>
<td>100 (10.0)</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Younger (1-3.5)</td>
<td>1,100</td>
<td>1,050 (95.5)</td>
</tr>
<tr>
<td>Older (3-12)</td>
<td>370</td>
<td>150 (40.5)</td>
</tr>
<tr>
<td>Breed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Fulani</td>
<td>120</td>
<td>100 (83.3)</td>
</tr>
<tr>
<td>Sokoto Gudali</td>
<td>100</td>
<td>80 (80.0)</td>
</tr>
<tr>
<td>Muturu</td>
<td>50</td>
<td>30 (60.0)</td>
</tr>
<tr>
<td>Yankasa</td>
<td>290</td>
<td>230 (79.3)</td>
</tr>
<tr>
<td>Uda</td>
<td>210</td>
<td>180 (85.7)</td>
</tr>
<tr>
<td>West African Dwarf</td>
<td>380</td>
<td>320 (84.2)</td>
</tr>
<tr>
<td>Red Sokoto</td>
<td>320</td>
<td>260 (81.3)</td>
</tr>
<tr>
<td>Ruminants</td>
<td></td>
<td>PCV %</td>
</tr>
<tr>
<td>Cattle</td>
<td>34.5</td>
<td></td>
</tr>
<tr>
<td>Sheep</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Goat</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

In recent times, external blood and gastrointestinal parasites pose serious threats to animal productivity (Sharma et al. 2015). Their possible long-term impacts on animal bye-products, the high cost of the required medications, as well as the parasites' negative consequences, appear to be forcing small-scale farmers out of business. Parasite infection is common in agricultural animals, resulting in severe output losses.. (Olabadunsin et al., 2020).

**External parasites**

The external parasites found are mostly ticks which were *Boophilus* spp 1.36% and *Amblyomma* spp 3.40% and Fleas 0.68%.

**Blood parasites**

*Babesia Motasi* 4.08% and *Babesia Ovis* 14.97% are the blood parasites detected. Takeet et al. (2009) found the same haemoparasite species in sheep in Abeokuta, Nigeria. Furthermore, our discovery that *Babesia spp.* is the most common haemoparasite in small ruminants is consistent with Bilgic et al., (2017). The comparatively low prevalence of the haemoparasite might be due to the arthropod vectors' survival and transmission dynamics being aided by favourable environmental circumstances. The low incidence of Babesia ovis observed in this investigation is consistent with the findings of Kage et al (2019). Small ruminants are known to be endemically vulnerable to the parasite while animals that had recovered from babesiosis are immune to re-infection (Iqbal et al. 2011). The absence of trypanosomes in all of the animals studied might be attributable to the fact that the research location is located inside Nigeria's Tsetse fly free zones, and small ruminants are not natural hosts for the mechanically transmitted Trypanosoma evansi indigenous to the region.

**Gastrointestinal parasites (GIT)**

That gastrointestinal nematode are common is consistent with earlier study data in Okaiyeto et al., (2008). The then prevailing
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weather conditions were considered to
favour parasitic nematode egg development
and survival to infective stages (Aleuy and
Kutz, 2020). Given that this study was
conducted during the rainy season, this may
explain the high incidence rate. Other
researchers have reported the
gastrointestinal parasites found in this
investigation (Shwe et al., 2020). GI
parasites are becoming more common.
Among the most common were Eimeria spp.
(32.79%), Oesphagostomum spp. (14.97%),
Trichostronglus spp. (5.44%), Fasciola spp.
(1.36%), Hookworm (1.36%) and Ascaris spp
(1.22%). Eimeria spp. had the highest rate
at 32.79%. Eimeria infections cause
dehydration, emaciation, weakness, appetite
loss, and death. Conversely, some goats get
constipated and die suddenly without
diarrhoea. (Silva et al., 2014). Farm animals
are the main source of animal protein and
help provide employment. Parasites wreak
havoc on this well-oiled machine. External,
blood and gastrointestinal parasite outbreaks
may significantly impact animal output
depending on the severity of the illness.
Parasite infections often cause decreased
food intake, increased live body weight,
growth rate, conversion efficiency, and even
fatality.

Conclusion and Recommendation
According to the results of this study, the
majority of farm animals are infected with
gastrointestinal parasites, with just a few
infected with external and blood parasites.
Finally, the results of this investigation show
that the majority of the animals kept in the
study area had external, blood, and intestinal
parasites. The county livestock farm
institutions may not have detected the
parasites' influence on the animals due to the
preclinical or chronic nature of the sickness,
which frequently does not end in death.
Their effects, on the other hand, are
typically visible in the form of diminished
productive potentials, such as lower farm
animal growth rate, late maturity, weight
loss, and increased susceptibility to different
diseases. As a consequence, farm animal
parasite prevention and control techniques
are required. If done appropriately, this will
boost the animals' production capacity as
well as the farm's financial well-being.

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