

## Gastrointestinal Parasites of Domesticated Grasscutters (*Thryonomys swinderianus*) in South-western Nigeria

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**ABSTRACT** A total of one hundred and seventy-eight (178) faecal samples were collected for the study of domesticated grasscutters' gastrointestinal parasites, from four farms located in three states (Oyo, Ogun and Lagos) in south-western Nigeria. The faecal samples were subjected to qualitative (Direct smear, Floatation and concentration of eggs and cysts, Larva culture.) and quantitative (Cornell-McMaster dilution egg counting technique) examinations. Data were analyzed using descriptive and inferential statistics. The identified parasites included 9 species of Nematodes, 1 species of Cestode and a Protozoan parasite. The Nematodes were *Ascaris* sp., *Bunostomum* sp., *Strongyloides* sp., *Trichostrongylus* sp., *Oesophagostomum* sp., *Trichuris* sp., *Haemonchus* sp., *Nematodirus* sp and *Strongyles* sp. The Cestode identified was *Moniezia* sp, while *Eimeria* oocyst was the only protozoan parasite isolated. The highest prevalence of gastrointestinal parasites infection was observed in grasscutters from Institute of Agricultural Research and Training (78.8%) while the least was from Agege farm (58.0%).

### INTRODUCTION

Grasscutter or greater cane rat (*Thryonomys swinderianus*, Temminck) farming is a budding smallholder venture in West Africa (Baptist and Mensah 1986; Kyle 1987; Adu et al. 1999) and the meat is considered a delicacy (National Research Council 1991). With the current trend in grasscutter farming and intensification of management practices, there is bound to be increased incidence of infections. A major parasitic condition of livestock under intensive management with significant economic consequences is helminthosis (Sykes 1994). The devastating effect of helminthosis in grasscutter farming was brought to the fore with an outbreak of unexplained deaths in farms at Awoshie, a peri-urban centre of Accra, Ghana, with one farm recording over hundred deaths within one month (Sykes 1994). Post mortem results revealed heavy infection with worms. Several helminth parasites in wild grasscutters was reported in Cameroon (Mpoame 1994). Also recently, out of 1,020 wild adult grasscutters investigated for helminth parasites in Imo State, Nigeria, about 98 percent (1,000) were infected with worms (Opara and Fagbemi 2008).

Preliminary studies on captive grasscutter in Cameroon by Awah-Ndukum et al. (2001) showed the occurrence of ectoparasites such as Fleas (*Xenopsylla* sp.) and endoparasites like Cestode (*Hymenolopsis* sp) and Nematode (*Heterakis* sp). In another work in Ghana, four species of ticks namely *Rhipicephalus simpsoni*, *Ixodes aulacodi*, *Ixodes* sp and *Haemaphysalis*

*parvata* were the ectoparasites found while six species of helminthes parasites comprising 2 species of Cestodes (*Furmanella transvalensis*, *Ralettina mahone*) and 4 species of Nematode (*Longistriata spira*, *Trachypharynx natalensis*, *Paralibyostrongylus vondwei* and *Trichuris paravispicularis*) were equally found (Yeboah and Simpson 2004). From the study carried out by Opara and Fagbemi (2008) in Imo State (South-eastern Nigeria), helminth parasites encountered in the gastrointestinal tracts of wild grasscutters included 14 species of Nematodes (*Ascaris*, *Bunostomum*, *Cooperia*, *Gaigaria*, *Gongylonema*, *Haemonchus*, *Heterakis*, *Mammomonogamus*, *Metastrongylus*, *Oesophagostomum*, *Strongyloides*, *Toxocara*, *Trichostrongylus* and *Trichuris* species); 5 Trematodes (*Cotyllophoron*, *Dicrocoelium*, *Gastrodiscus*, *Paramphistomum* and *Schistosoma* species), 4 Cestodes (*Avitellina*, *Moniezia*, *Taenia* and *Thysaniezia* species) and Acanthocephalan (*Moniliformis* sp.).

These evidences show that the health of captive grasscutters can thus no longer be taken for granted. As promising as micro-livestock integration sounds, helminthosis in grasscutters will threaten the practicability of production and availability of meat to the generality of the populace. It is with this in mind that this study was designed to find out the gastrointestinal parasites of domesticated grasscutter so as to aid prompt diagnosis with a view to reducing mortality and morbidity and thus improve food security in the country.

## MATERIALS AND METHODS

### Study Site

The study was carried out in four grasscutter farms (Institute of Agricultural research and Training (IAR&T) farm, Forestry Research Institute of Nigeria (FRIN) farm, Agege farm and Ilaro farm) selected from three states in south-western Nigeria. The four farms were purposively selected based on their track records and level of activity. South west of Nigeria is one of the six geopolitical zones of the country; a low rain land forests comprising six states, houses most of the great academic institutions and is the home of the Yoruba people.

### Sample Collection

A total of one hundred and seventy- eight (178) faecal samples from different grasscutters were collected from four farms located in the three states of Oyo, Ogun and Lagos. Fresh faecal samples were taken to the laboratory for analysis where they were subjected to faecal examinations.

### Fecal Examination

Qualitative fecal examinations: direct smear (Bowman 1999), floatation and concentration of eggs and cysts (Bowman 1999) and larva culture (Hubert and Kerboeuf 1992) were carried out. While quantitative fecal examination was done using cornell-McMaster dilution egg counting technique (Bowman 1999).

### Statistics

All data generated were analyzed using descriptive and inferential statistics while Analysis of Variance and Least Significant Difference

follow-up test were used on means for statistical significance determination.

## RESULTS

The prevalence of parasites based on egg counts across the four farms sampled is as shown in Table 1.

This shows that *Eimeria* oocyst had the highest prevalence (51%) in Institute of Agricultural Research and Training farm, while *Trichuris* species was not diagnosed in the farm. Out of the 31 grasscutters examined in Forestry Research Institute of Nigeria farm, *Eimeria* also had highest prevalence (44%) and *Ascaris* 0%. That of Agege farm revealed that *Eimeria* had a prevalence of 46.4 percent and 0 percent for *Ascaris*. Similarly, out of the 57 grasscutters that were sampled in Ilaro farm, *Eimeria* had a prevalence of 38.6 percent, while *Ascaris* and *Strongyloides* had 0 percent prevalence.

The percentage prevalence based on the larvae culture of faecal samples collected from the four farms is represented in Table 2.

Institute of Agricultural Research and Training had the highest prevalence of *Bunostomum* sp. (29.8%), and *Strongyloides* sp. (29.8%); Forestry Research Institute of Nigeria had the highest percentage prevalence of *Nematodirus* sp. (8.7%); while Ilaro farm was the only farm that had *Oesophagostomum* sp. (17%) and the highest prevalence of *Haemonchus* sp. (31.9%)

The overall level of parasite prevalence (%) observed during this study was compared with previous research works carried out by other researchers using Chi-square test and there was no significant difference between the percentage parasite prevalence of this study and that of previous studies because Chi-square tabulated was greater than Chi-square calculated at 0.05 level of freedom.

There is no significant difference ( $p = 0.320$ )

**Table 1: Prevalence of parasites based on egg counts across the four farms**

| Parasites               | Farms        |             |             |             |
|-------------------------|--------------|-------------|-------------|-------------|
|                         | IAR&T (N=55) | FRIN (N=25) | AGEGE(N=28) | ILARO(N=70) |
| <i>Strongyles</i> sp    | 1 (1.8%)     | 2 (8%)      | 7(25%)      | 6 (8.6%)    |
| <i>Strongyloides</i> sp | 4 (7.3%)     | 1 (4%)      | 2 (7.1%)    | 0 (0%)      |
| <i>Moniensa</i> sp      | 21(38.2%)    | 8(32%)      | 3(10.7%)    | 17(24.3%)   |
| <i>Trichuris</i> sp     | 0 (0%)       | 3(12%)      | 3(10.7%)    | 20(28.6%)   |
| <i>Eimeria</i> sp       | 28(51%)      | 11(44%)     | 13(46.4%)   | 27(38.6%)   |
| <i>Ascaris</i> sp.      | 1 (1.8%)     | 0 (0%)      | 0 (0%)      | 0 (0%)      |

Note: Figures in the brackets represents the percentage of occurrence

**Table 2: Parasites prevalence (%) from the larval culture of faecal samples collected from the farms**

| Parasites                   | Farms       |             |              |             |
|-----------------------------|-------------|-------------|--------------|-------------|
|                             | FRIN (N=46) | ILARO(N=47) | IAR&T (N=47) | AGEGE(N=33) |
| <i>Bunostomum</i> sp.       | 4 (8.7%)    | 7(14.9%)    | 14(29.8%)    | 6(18.2%)    |
| <i>Haemonchus</i> sp.       | 14(30.4%)   | 15(31.9%)   | 9(19.2%)     | 10(30.3%)   |
| <i>Strongyloides</i> sp.    | 13(28.3%)   | 7(14.9%)    | 14(29.8%)    | 10(30.3%)   |
| <i>Trichostrongylus</i> sp. | 11(23.9%)   | 7(14.9%)    | 8(17%)       | 7(21.2%)    |
| <i>Nematodirus</i> sp.      | 4 (8.7%)    | 3 (6.4%)    | 2 (4.3%)     | -           |
| <i>Oesophagostomum</i> sp.  | -           | 8(17%)      | -            | -           |

Note: The figures in the brackets represent the percentage of occurrence.

in the prevalence of *Ascaris* sp. parasite across the four farms. The prevalence of *Strongyles* sp. in all the farms is not significantly different ( $p = 0.176$ ). There were significant differences ( $p < 0.05$ ) in the prevalence of *Strongyloides* sp, *Moniensa* sp, *Trichuris* sp. and *Eimeria* oocyst at  $p = 0.041$ ,  $0.003$ ,  $0.003$  and  $0.000$  respectively. There was also a significant difference ( $p = 0.000$ ) in the total parasite counts in all the farms.

Least Significant Difference test for mean parasites prevalence with significant differences is shows that there is no significant difference in the prevalence of *Strongyloides* sp. in Ilaro farm, Agege farm and Forestry Research Institute of Nigeria farms, while Institute of Agricultural Research and Training had a significantly higher prevalence than others, with the highest mean (10.0) of *Strongyloides* sp. infection. *Moniensa* sp. parasite prevalence in Ilaro, Agege and Forestry Research Institute of Nigeria were not significantly different; while both Forestry Research Institute of Nigeria and Institute of Agricultural Research and Training were not also significantly different in their prevalence.

This means that both Forestry Research Institute of Nigeria and Institute of Agricultural Research and Training farms had the highest prevalence of *Moniensa* sp. Ilaro farm had the highest mean infection of *Trichuris* sp. (28.07); followed by Forestry Research Institute of Nigeria (14.52), and there was no significant difference in the infection prevalence in both Agege and Institute of Agricultural Research and Training farms. *Emieria* oocyst had the highest mean prevalence in Institute of Agricultural Research and Training (498.75), followed by Forestry Research Institute of Nigeria farm (312.90), while there was no significant difference in the prevalence of *Emieria* oocyst in Ilaro and Agege farms. From the overall total prevalence count,

Institute of Agricultural Research and Training had the highest parasite infection count (685.0), followed by Forestry Research Institute of Nigeria (456.45), while there was no significant difference in the parasite infection of both Ilaro (139.47) and Agege (152.0) farms.

## DISCUSSION

The overall prevalence of parasite infections in the farms is high (78.8% at Institute of Agricultural research and Training farm, 71.2 percent at Ilaro, 58 percent at Agege, 77.4 percent at Forestry Research Institute of Nigeria), which means almost all the grasscutters on farm had worm infestation. There was no significant difference in the prevalence rate when compared with the works of other researchers who reported a prevalence of 96% for gastrointestinal parasites of grasscutters in Umudike, Abia State (Akomas and Enwere 2001) and an infection rate of 98.0% for gastrointestinal helminth parasites of wild grasscutters in Imo State (Eastern part of Nigeria) (Opara and Fagbemi 2008). An infection rate of 84 percent was reported in Anambra State (Eastern part of Nigeria) (Odu-modu 1999), while a lower prevalence (38.3%) was reported in Jos (middle belt region of the country) by Ajayi et al. (2007). This study does not agree with the finding of Opara and Fagbemi (2008); who opined that the variation in the results of previous works is due to the difference in ecological zones where researches were carried out. From the present study, there is no significant difference in the prevalence level of gastrointestinal parasites of grasscutters across the different ecological zones.

Highest prevalence of GIT parasite infection was observed in grasscutters of IAR&T while the least was in Agege farm. During the study, the identified parasites included 9 species of Nematodes, 1 species of Cestode and a Proto-

zoan parasite. The Nematodes were *Ascaris* sp. *Bunostomum* sp. *Strongyloides* sp. *Trichostrongylus* sp. *Oesophagostomum* sp. *Trichuris* sp. *Haemonchus* sp. *Nematodirus* sp and *Strongyles* sp. The Cestode identified was *Taenia* sp, while *Eimeira* oocyst was the only protozoan parasite isolated. This finding is in accordance with other researchers who had reported some of these parasites in Cameron (Mpoame 1994), Anambra (South-eastern Nigeria) (Odumodu 1999), Ghana (Yeboah and Simpson 2004), Jos (North central Nigeria) (Ajayi et al. 2007) and Imo (South-eastern Nigeria) (Opara and Fagbemi 2008).

### CONCLUSION

Grasscutter is a micro-livestock that provides an alternative source of animal protein and is a delicacy that is accepted by peoples all social classes. It has been established in this study that there is an increasing incidence of parasitic infections. It is, therefore, recommended that farmers should incorporate routine examination and treatment of grasscutters to reduce morbidity and mortality so as to raise the level of meat production in the country. The role of good hygienic management cannot be overemphasized, thus there should be provision of clean housing so as to prevent feco-oral of transmission of these parasites. It is also recommended that the services of Veterinarians should be employed to ensure appropriate treatment with specific antihelminthics in order to reduce worm loads of their prized animals.

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