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SEASONAL VARIATION AND PREVALENCE OF LUNGWORM INFECTION IN THREE DIFFERENT BREEDS OF PIGS SLAUGHTERED AT BODIJA MUNICIPAL GOVERNMENT ABATTOIR, IBADAN, NIGERIA.

M.A.S. NSSIEN[1] AND A.O.K. ADESEHINWA[2]
[1]Department of Veterinary Anatomy, University of Ibadan, Ibadan.
[2]National Agricultural Extension and Research Liaison Services, Southwest Zone, Moor Plantation, Ibadan.

Target audience: Pig farmers (large and small scale), researchers, veterinary practitioners, extension staff, livestock industry subsector.

ABSTRACT

523 lung specimens were collected from three different pigs breeds (local, cross and exotic e.g. landrace, largewhite, etc) pig slaughtered at the Bodija Municipal Government Abattoir, Ibadan. This investigation was carried out within a period of seven months comprising the harmattan (January — March) and rainy (April — July) seasons. 523 [igs were slaughtered, 321 of the 523 pigs (61.38 %) had lungworms infection, while the remaining 202 pigs (38.62 %) were not infected. The infection rates among the three different breeds were 192 (59.81 %), 83 (25.86 %) and 46 (14.33 %) for local, cross and exotic, respectively. Likewise, the corresponding distribution patterns for *Metastrongylus* species i.e. *Metastrongylus elongatus (Metastrongylus april); Metastrongylus pudendotectus; and Metastrongylus salmi* were 95.74, 4.26 and 0% respectively. On the basis of higher infection rate, abundance of earthworms and greater abundance of Metastrongylus species, the local breed of pigs were the most susceptible.

Key words: Seasonal variations, prevalence, lungworm infection, pig breeds, slaughtered pigs, abattoir

DESCRIPTION OF PROBLEM

Swine are the exlusive hosts for Metastrongylus. Abnormal hosts in which it has been found are the ox, sheep, goat, dog and there have been records of human infection (1,2). The adult metastrongyloid lungworms lives in the trachea, bronchi and bronchioles, predominantly in the diaphragmatic lobes. The parasite has an indirect life cycle in which the most commonly encountered earthworm species (e.g. *Eudrilus eugenia, Hyperodrilus africanus and Heliodrilus lagosensis)* can serve as intermediate hosts (3,4,5). Larvae develop in the heart and esophageal wall of earthworms (6,7).
Studies of pigs with uncomplicated Metastrongylus infection have demonstrated pathology ranging from no gross lesions (8,9) to bronchitis,

*Author for correspondence

bronchiolitis and pneumonitis (9,10). All these conditions lead to loss of appetite, poor feed conversion, unthriftiness, slow attainment of market weight, weight loss, etc (1). Pigs, less than 6 months old may cough and be dyspneic while older pigs develop an acquired immnity and infrequently show infecton (12,13). This investigation was carried out with the aim to furnish information on the prevalence of lungworm infection, the most common Metastrongylus specie, establish a relationship between seasonal variations and the rate of infection among the breeds of pigs slaughtered at the Bodija Minicipal Government Abattoir, Ibadan. Also, to recommend practicable ways of ameliorating the infection for greater and optimal productivity.

MATERIALS AND METHODS

Extraction of Metastrongylus species from the lung specimen of pigs.

523 lung speciems were collected and examined three times a week from the three different breed of pigs that were slaughtered at the Bodija Municipal Governemnt Abattoir, Ibadan, Nigeria. The respiratory pathways was opened with the aid of a sharp scissors, starting from the trachea into the bronchi and then into bronchioles to reveal its content (lungworms). The caudal tip of the diaphragmatic lobes were incised from which the worms were squeeze out. After post-mortem examination each day, the lungworms were preserved in already labeled two separate sterile bottles, one containing sterile fresh 0.9% normal saline and the other, 10% formaldehyde solutions.

RESULTS AND DISCUSSION

Examination of Metastrongylus species and eggs from lung specimens and faecal samples.

A detailed laboratory examination of the preserved specimens in 0.9% normal saline solution was embarked upon. The adult worms were observed to be slender, white worms in the bronchi and bronchioles of the lung, and inhabits a favourable locale in the periphery of the diaphragmatic lobe (12). The adult worms apparently orientate themselves head down or facing the terminal bronchioles of the lung (14). A few worms were removed from the bottle, placed on a clean glass slide with about 2 drops of 0.9% normal saline solution and covered with a coverslip. The slide was then observed with the aid of a high powered microscope under x 10 to be able to locate the worms. The magnification was increased to x 40 objective in order to distinguish between female and male worms as well as to observe their external morphological characteristics. Most of the worms collected were females but this is not surprising since there are usually many more females than males residing in the bronchioles of lungs (15). The males measure up to 25mm long and females up to 48mm.

Also, the faecal samples obtained from the slaughtered pigs were examined for eggs of Metastrongylus species by floatation methods using saturated sugar solution (16). The eggs were observed to be larvated, 45 57u long 38 — 41u wide, have thick shells and contain first stage larvae when deposited.

The result was based on the ratio of the total number of infected pigs to the total number of slaughtered pigs per month per season which was expressed as the percentage infected, as indicated in Tables land 2.

A total of 523 pigs of three different breeds were slaughtered and their lungs collected and examined for Metastrongylus species. 321 pigs (61.38 %) of the 523 pigs were observed to be infected with lungworms. The infection rates for the local, cross and exotic breeds of pigs were 192 (59.81%), 83 (63.36%) and 46 (64.79%) respectively as shown in Table 1. Previous reports on the prevalence of lungworm infection in pigs had been put at between 8 and 69 percent with special attention to Great Britain (12,16). Also, different countries have different infection rates (percentage infected) with records as follows; Germany, 97% Venezuela, 90% Hungary, 88% and Netherlands, 86%, all for wild boars (1). While, an infection rate of between 59.81 % and 64.79 % was observed in this study with the three different breeds of pigs (Table 1).

Table 1: Metastrongylus infection rates in lungs collected from slaughtered pigs at the Bodija Municipal Government Abattoir, Ibadan. Nigeria.

Breeds	Number Examined			Number infected			Percent Infected
	H	R	St_1	H	R	St_2	St2/St1 (%)
Local	133	188	321	12	180	192	59.81
Cross	39	92	131	0	83	83	63.36
Exotic	18	53	71	0	46	46	64.79
Total	190	333	523	12	309	321	61.38

H — Harmattan season
R — Rainy season
St_1 — Subtotal of Number Examined
St_2 — Subtotal of Number Infected.

Metastrongylus elongatus had the highest occurrence of 95.83 % (460 worms) this was followed by *M. pudendotectus* with 4.17 % (20 worms) while *M. salmi* was not found at all (zero) in the 321 local pigs slaughtered in ibadan during this period as shown on Table2. the trend was similar for the cross and exotic breeds of the examined pigs.

These findings were supported by the monthly weather data (Table 3) collated from the Meterological Station of the University of Ibadan for the period of the study. The first three months i.e. January — March and the next four months. i.e. april — July, were regard as the harmattan and rainy seasons. The harmattan season experienced little or no rainfall with the absence of earthworms in the soil and consequently, absence of infection in both the cross and exotic breeds of pigs. Although a slight infecton rate of about 9.02 % was observed in the local pigs towards the last few days of March. Subsequently, the rainfall pattern increased gradually from the month of April to July, when more earthworms sprang up which contributed to the higher

infection rate that was observed during this season.

Table 2: Distribution of Metastrongylus species in slaughtered infected pigs.

Breeds	M. elongatus		M. pudendotectus		M.salmi		Total
	No.	%	No.	%	No.	%	
Local	460	95.83	20	4.17	NA	Nil	480
Cross	158	95.18	8	4.82	NA	Nil	166
Exotic	34	97.14	1	2.86	NA	Nil	35
Total	652	95.4	29	4.26	NA	Nil	681

NA — Not available
Nil — Zero

The intensity of infection in these three different breeds of pigs will however depend on the interplay between seasons, age, nutritional status, immunocompetence of host, population density of the earthwoms, infective larvae in the soil and eggs in the feaces (17, 18, 19).

Table 3: Monthly Record of temperature, Precipitation and Relative Humidity in Ibadan from Jan. — July, 1998.

Months	Mean Temperature (^{0}C)	Total Precipitation (mm)	Relative Humidity (%)
JANUARY	28.2	5.8	69.95
FEBRUARY	29.2	11.1	61.50
MARCH	31.7	8.6	59.00
APRIL	28.6	243.7	76.00
MAY	27.6	165.3	78.00
JUNE	26.8	190.2	59.50
JULY	25.4	193.9	88.50

CONCLUSIONS AND APPLICATIONS

With respect to the lungworm parasites, pigs that were reared on extensive system of mangement i.e. scavengers, had an abundance of these parasites in them. This was followed by pigs reared on semi-intensive system of management and little or no infection noticed in intensively maanged pigs (20) . From the findings of this study,

1. It was also observed that during the period of heavy rains, pigs reared under instensive system of management were infected almost as much as the scavenger pigs. This was possible when earthworms crawled into

the pens and were eaten by the pigs.

2. Similarly, during the period of heavy rains, higher infection rates were observed due to the abundance of the larvae of Metastrongylus species and the intermediate hosts, in the soil as well as the hosts (pigs).
3. Since lungworm infections of swine are basically herd problem, control measures such as appropriate management of pasture and housing and anthelmintic medication, must be applied to the whole herd.
4. Although soil best supports infective helminth stages, excess humus material is known to provide minimum harborage for earthworms. Also, contamianted soil should be fallowed for about a month before plowing.
5. Adequate rations help to minimize rooting. Also, ringed pigs are most likely to pick up few earthworms.

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