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Intestinal Protozoan Parasites of Pigs Reared Under Different Management Systems in Morogoro, Tanzania

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Abstract

Esrony, K., Kambarage, D.M., Mtambo, M.M.A., Muhairwa, A.P. and Kusiluka, L.J.M. 1996. Intestinal protozoan parasites of pigs reared under different management systems in Morogoro, Tanzania. J. Appl. Anim. Res., 10: 25-31.

Sixty three piggery units with a total herd size of 424 pigs in the small-scale and semi-intensive management systems from semi arid and tropical highland areas of Morogoro region were screened for intestinal protozoan parasites. Thirtysix percent of the screened animals were positive for eimeriosis and 7.8% for cryptosporidiosis. Prevalences of eimeriosis in the semi-intensive and small-scale management systems were 22% and 48%, respectively. High prevalences of eimeriosis and cryptosporidiosis (60% and 25%, respectively) were observed in the tropical highland climate area (Mgeta) and low rates (26% and 0.3%, respectively) were evident in the semi-arid zone. Ninety five per cent of infected pigs excreted between 100 and 5000 OPG and five per cent were excreting more

than 5000 oocysts per gram of faeces. Species of *Eimeria* identified were *E. porci* (31%), *E. suis* (22%), *E. polita* (15%), *E. perminuta* (11%), *E. deblickei* (9%), *E. neodeblickei* (8%) and *E. scabra* (4%).

Key words : Pigs, protozoa, *Cryptosporidium* and *Eimeria*.

Introduction

Isospora suis is the main species responsible for clinical coccidiosis in the young pigs (Blood and Radostitis, 1989; Lindsay *et al.*, 1992), whereas, *Cryptosporidium* infection is of great public health importance and its prevalence in man is high in the developing countries (Current, 1989). Some studies have indicated zoonotic transmission of cryptosporidial oocysts from livestock and pet animals to man (Current, 1989; Mengesha, 1994). Their occurrence and prevalence are well documented in various countries but no work in this direction appears to have been carried out in Tanzanian domestic pigs. Therefore, this study was designed to determine prevalence of intestinal protozoan parasites in two management systems and eco-climatic zones in Morogoro region.

Materials and Methods

Locations

Domestic pigs from six different locations in the semi-arid zone (altitude 500 to 600 metres above sea level; annual rainfall 600-1000 mm and average temperature of 27 C) and one tropical highland area (Mgeta) (2000 metres above sea level; annual rainfall 1200-1500 mm and average temperature of 16 C) were screened for intestinal protozoan parasites.

Management systems

Crossbred pigs (Landrace, Large White or Hampshire) from semi arid zone were reared either at semi intensive commercial farms (Sokoine, Melela and Kichangani) or on small scale piggery units with 2-7 indoor reared pigs. Whereas, those from tropical highland were local breeds reared in small scale piggeries. Commercial feed was fed in semi intensive system while in small scale piggeries animals were fed on green fodder, vegetable waste with or without maize bran.

Sampling

Animals were categorized as piglets (day 1 to 4 weeks), weaners (> 4 weeks to 8 weeks), growers (> 8 weeks to 8 months) and adults (> 8

months). Faeces were collected per rectum from randomly selected animals in large-sized farms and all animals in the small scale piggery units. The modified McMaster technique (Ministry of Agriculture, Fisheries and Food, MAFF, 1986) was used to determine *Eimeria* and *Isospora* oocyst count per gram of faeces. Faecal samples with more than 1000 OPG were then cultured in potassium dichromate (BDH Ltd., Poole, England) in order to identify genera and species of coccidia involved. Identification of species was based on oocyst morphology, shape, size and sporulation time (Levine, 1973; Soulsby, 1982; MAFF, 1986).

Modified Ziehl-Neelsen technique (Henriksen and Pohlenz, 1981) was used to detect cryptosporidial oocysts in faecal smears. *Cryptosporidium* was confirmed by enzyme immunoassay (EIA) using a kit (PATHASURE[®], supplied by Cambridge Veterinary Science Ltd.) coated with a monoclonal antibody (MAb).

Statistical analysis

Statistical analysis of data was carried out using Minitab for Windows Release 9.2. (Minitab Inc., 1993) statistical package.

Results and Discussion

Thirty six per cent of the screened pigs were positive for eimerial infection (Table 1). This is in accordance with the observations of Stuart (1986) and Ajayi *et al.* (1988). The highest prevalence of the disease was

Table 1
Prevalence of intestinal protozoan parasites of pigs in seven locations in Morogoro region

Location	Animals No.	Percent positive	
		<i>Eimeria</i>	<i>Cryptosporidium</i>
Sokoine	21	23.8	0.0
Melela	50	8.0	0.0
Mgeta	128	60.2	25.0
Mkundi	57	33.3	0.0
Kihonda	66	21.2	0.0
Kichangani	82	32.9	1.2
Lutheran	20	40.0	0.0
Overall	424	36.2	7.8

recorded in Mgeta (tropical highland) followed by moderate infection rates at Lutheran Junior Seminary, Mkundi and Kichangani piggery units. It is possible that the cool climate coupled with high rainfall and relative humidity in the tropical highland zone favour the survival and spread of infective oocysts. The lack of difference in the mean OPG in the two localities may be attributed to low stocking rates of animals in many piggery units. However, this may also be due to development of immunity resulting in low infection burdens.

The prevalence of eimeriosis in pigs in the semi-intensive management system was 21.6 percent, whereas, it was 47.6 percent in animals kept under the small-scale management system (Table 2). This difference may be attributed to poor general cleanliness which was commonly evident in the small scale piggery units.

Table 2
Prevalence of *Eimeria* spp. in the two different management systems and two climatic zones in Morogoro region

	Management systems		Climatic zones	
	Semi-intensive	Small-scale	Tropical highland	Semi-arid
No of pigs screened	153	271	128	296
<i>Eimeria</i> +ve (%)	21.6	47.6	60.2	26.4
Mean OPG	14223±9265	12909±4805	13981±5158	12627±6807

Ninety five per cent of the *Eimeria*-infected animals excreted between 100 and 5000 oocysts per gram of faeces. Oocyst excretion pattern was similar in all four age groups sampled (Fig. 1) as well as in the two management systems (Table 2). Although six per cent of the 424 animals sampled and clinically examined were diarrhoeic, there was no statistical difference ($P > 0.05$) in the infection burdens of diarrhoeic and non-diarrhoeic animals (data not shown).

Seven species of *Eimeria* were identified in this study. The most common species was *E. porci* (31%), followed by *E. suis* (22%) and *E. polita* (15%). *E. perminuta* (11%), *E. deblickei* (9%) and *E. neodeblickei* (8%) were found in some animals while the least prevalent species was *E. scabra* (4%).

Out of 424 samples, 7.8 percent excreted cryptosporidia oocysts in their faeces. It was more prevalent in the tropical highland climate than

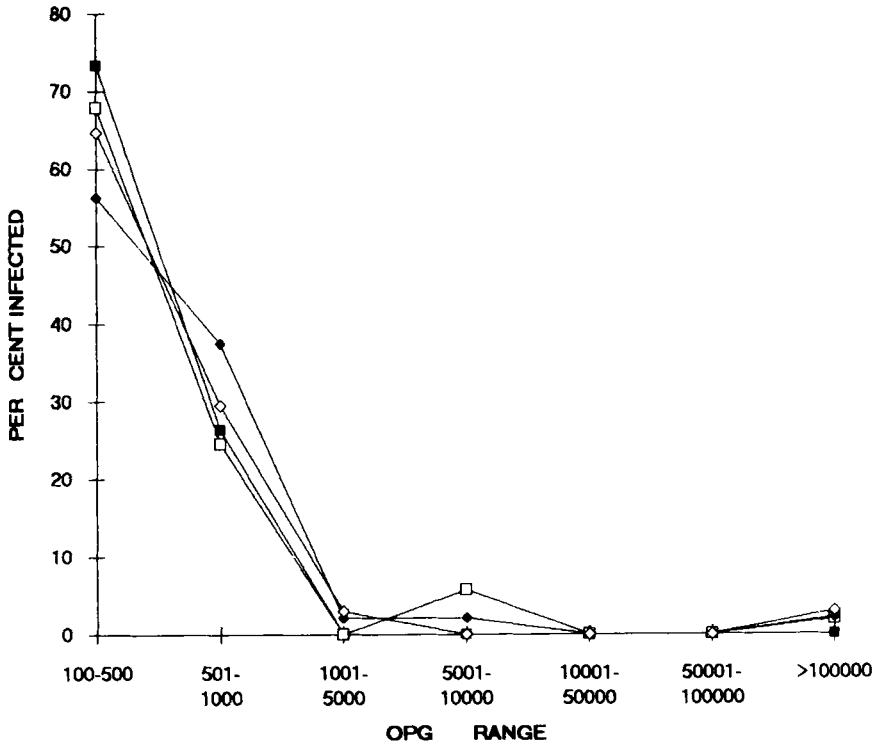


Fig. 1: Percentage of adult pigs (◇), growers (◆), weaners (□) and piglets (■) in Morogoro region excreting various ranges of coccidial oocyst count per gram of faeces (OPG)

in the semi-arid areas (32 vs 1 case). A similar finding has been observed in cattle screened from Kitulo, Mbeya region of Tanzania which also has a tropical highland climatic type (Mtambo, personal communication). It may be possible that cryptosporidia oocysts survive better in cool and humid climatic areas than in hot and dry locations.

Although it is generally known that *Cryptosporidium* is primarily a parasite of neonatal animals (Blood and Radostitis, 1989; Taylor, 1989),

however, in this study it was observed to be more prevalent in growers and adults than in piglets. Similar findings have been reported in pigs elsewhere (Sanford, 1987) also. This may be attributed to light infection and low stocking rates leading to low environmental contamination thus requiring longer periods of exposure for the infection to be significant.

It can, therefore, be concluded from this study that *Eimeria* infection is common in Tanzanian pigs. This calls for further investigation of the economic effect of eimeriosis in pigs which are commonly sub-optimally fed.

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के० इस्रोनी, डी०एम० कम्बारेज, एम०एम०ए० म्ताम्बो, ए०पी० मुहैरवा, एल०जे०एम० कुसीलुका । मोरोगोरो, तन्जानिया में विभिन्न व्यवस्था पद्धतियों में पाले गए शूकरों के आंत्रिय प्रोटोजोआ परजीवी ।

मोरोगोरो क्षेत्र के अर्द्ध-मरुस्थली और समशीतोष्ण भागों में लघु स्तर और अर्द्ध-सघन व्यवस्था में पाले गए तिरसठ शूकर पालन इकाइयों के 424 शूकरों की आंत्रिय प्रोटोजोआ परजीवी के लिए जांच की गई । इनमें से 36% में इमेरियोसिस और 7.8 में क्रिप्टोस्पोरीडियोसिस पायी गयी । अर्द्ध-सघन और लघु स्तरी व्यवस्था में इमेरियोसिस की व्यापकता क्रमशः 22 और 48% थी । सम शीतोष्ण जलवायु के ऊंचे भागों में परजीवी प्रकोप अर्द्ध-मरुस्थली क्षेत्र से बहुत अधिक था । संग्रसित शूकरों के प्रति ग्राम मल में 100 से 5000 या इससे भी अधिक ऊसिस्ट विसर्जित होते थे । इमेरिया की सात प्रजातियाँ, इ पोर्साई (31%), इ स्युस (22%), इ पोलिता (15%), इ पर्मिनुटा (11%), इ स्कैब्रा (4%) पाई गयीं ।