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Prevalence of malaria parasites in turkeys of the Nsukka area in the Anambra State, Nigeria

L.J.E. Orajaka¹

B.M. Anene¹

M.C. Dike¹

ORAJAKA (L.J.E.), ANENE (B.M.), DIKE (M.C.). Prévalence des parasites de la plasmodiose chez la dinde dans la région de Nsukka, État d'Anambra, Nigeria. *Revue Élev. Méd. vét. Pays trop.*, 1991, **44** (3) : 283-286

Des étalements de sang provenant de 202 dindes (94 mâles et 108 femelles) de la région de Nsukka au Nigeria ont été examinés pour y rechercher des agents du paludisme. 44,1 p. 100 des animaux examinés (avec un intervalle de confiance de 95 p. 100) étaient infectés par des *Plasmodium* spp. dont 46,8 p. 100 de mâles et 41,7 p. 100 de femelles. Sur 175 adultes et 27 jeunes âgés de 6 à 16 semaines, 45,7 et 33,3 p. 100 respectivement, ont été reconnus infectés. 20 sur 60 des dindes élevées en système intensif et 65 sur 142 en semi-intensif étaient infectées. La valeur moyenne de l'hématocrite pour les animaux parasités était de $29,95 \pm 3,36$ p. 100. Ce résultat est significativement différent ($P < 0,01$) de la valeur moyenne de $37,3 \pm 3,7$ obtenue à partir des animaux sains. 11 des 89 cas positifs présentaient des formes cliniques. Quatre dindes dans un état critique sont mortes un jour après le début du traitement. Les médicaments suivants se sont montrés efficaces : phosphate de chloroquine à la dose de 5 mg/kg de poids vif, administré quotidiennement par voie intramusculaire pendant 3 jours ou sous forme de comprimés dosés à 250 mg par voie orale pendant 5 jours, et la pyriméthamine par voie parentérale à la dose de 0,3 mg/kg/PV pendant deux jours. **Mots clés :** Dinde - *Plasmodium* spp. - Paludisme - Phosphate de chloroquine - Pyriméthamine - Nigeria.

Introduction

Malaria parasites have been observed in the blood of turkeys from several countries of the world (4). In Nigeria, turkey malaria has been reported in the Onitsha area of Eastern Nigeria (4) and in the Zaria area of Northern Nigeria (1). However, while in the former region, a large number of turkeys was examined and only a single infection recorded in the latter region, an infection rate of 4 (13.8 %) was observed out of 29 local turkeys examined. *Plasmodium* spp. infection has been associated with clinical diseases and mortality in turkeys (1, 5, 6). The clinical and pathological findings in the disease included depression, anorexia, diarrhoea, lassitude, dullness, dyspnoea, anaemia, splenomegaly and hepatomegaly. Apart from some reports (1, 4), only very little information is available on malaria parasites of turkeys in Nigeria.

This study was undertaken to investigate the prevalence of infection of turkeys with *Plasmodium* spp. in the Nsukka area of Nigeria and the distribution of animals according to the management system, age and sex. The

clinical manifestations of cases encountered during the study and the effect of infection on the packed cell volume (PCV) are presented. The efficiency of chloroquine phosphate and pyrimethamine in the treatment of the infection was also studied.

Materials and Methods

Two hundred and two turkey blood samples randomly collected from turkey farms and turkey sellers at various markets within the Nsukka area between August 1988 and May 1989 were examined for malaria parasites. Giemsa stained thin blood films made from ethylene diamine tetra-acetic acid (EDTA) anticoagulated blood obtained from the wing vein of the turkeys were used in the diagnosis of infection. Each stained slide was thoroughly screened for malaria parasites. At least 100 oil immersion fields (OIF) were examined before a smear was considered negative and 10-50 OIF were examined in positive cases depending on the degree of parasitaemia (1). The PCV of the sampled turkeys was determined (3).

Statistical significance of the difference between the mean PCV of infected and uninfected turkeys was evaluated by Student's t-test and that of the difference in infection rates among sexes, age groups and management systems by the Chi^2 (X^2) test (12).

Results

The distribution of the infection turkeys with malaria parasites according to the management system, age, and sex is shown in table I. Out of the 202 turkeys (94 males and 108 females) sampled, 89 (44.1 %) (95 % confidence interval, 0.441 ± 0.069) were infected with malaria parasites. Forty-four (46.8 %) of the males and 45 (41.7 %) of the females were infected. A total of 175 adults and 27 growing turkeys (aged 6-16 weeks) were examined and 80 (45.7 %) and 9 (33.3 %), respectively had malaria parasites in their blood. Of the 60 turkeys under an intensive management system, 24 (40 %) were infected while 65 (45.8 %) of the 142 turkeys managed semi-intensively were infected. Infection rates did not show any significant difference ($P > 0.05$) between sex, age groups and management systems.

Most of the positive cases presented erythrocytic developmental stages of the parasites (photos 1, 2).

Eleven clinical cases were recorded. The predominant clinical symptoms were depression, dullness, fever, anorexia, dyspnoea and cyanosis of the comb and wattle. Greenish diarrhoea, mucopurulent discharge from the nostrils and eyes, corneal opacity terminally, progressive anaemia and emaciation were also observed. Leg weakness with most of the affected turkeys assuming ventral recumbency with bluffed feathers, disequilibrium and swollen eyelids were recorded. Haematological examination showed a fall in the PCV values (range of 27-33 %) and a high degree of parasitaemia with developmental stages of the parasites (photo 1).

¹ Faculty of Veterinary Medicine, University of Nigeria, Nsukka, Nigeria.

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TABLE I Management system, age and sex distribution of turkeys infected with malaria parasites in Nsukka area, Nigeria.

Sr.	Source of sample	Sex				Age			
		Number sampled		Number infected		Number sampled		Number infected	
No.		M	F	Male	Female	Y	A	Young	Adult
1+	Mrs Okeke's Farm	3	1	2(66.7)	—	—	4	—	2(50)
2+	Mrs Onyirioha's Farm	—	1	—	1(100)	—	1	—	1(100)
3+	Mr Ngozika's Farm	3	1	1(33.3)	1(100)	—	4	—	2(50)
4++	Uzoagba Farm	8	5	5(62.5)	1(20)	—	13	—	6(46.2)
5++	Ifesie's Farm	—	1	—	1(100)	—	1	—	1(100)
6+	Agusiobo's Farm	2	2	2(100)	2(100)	—	4	—	4(100)
7++	Agu Brothers Farm	3	17	1(33.3)	7(41.2)	20	—	8(40)	—
8++	Nsukka Town Market	4	1	3(75)	1(100)	—	5	—	4(80)
9+	Q.R.S.S. Farm	5	9	1(20)	5(55.6)	—	14	—	6(42.9)
10++	Mr Agu's Farm	8	5	2(25)	3(60)	—	13	—	5(38.5)
11++	Ezeugwu's Farm	6	7	4(66.7)	1(14.3)	—	13	—	5(38.5)
12++	Ugwuany's Farm	2	5	1(50)	2(40)	—	7	—	3(42.9)
13	Mr E. Ugwu's Farm	3	3	1(33.3)	—	—	6	—	1(16.7)
14++	Mr G. Ugwu's Farm	3	4	—	1(25)	7	—	1(14.3)	—
15+	Uzo Farm	5	2	1(20)	1(50)	—	7	—	2(28.6)
16++	Onuiyi Nsukka	1	4	1(100)	1(25)	—	5	—	2(40)
17++	Mr E. Okonkwo's Farm	4	3	—	2(66.7)	—	7	—	2(28.6)
18++	II TTC Rd Farm	2	6	1(50)	4(66.7)	—	8	—	5(62.5)
19++	Enugu-Ezike Market	6	—	3(50)	—	—	6	—	3(50)
20++	Oye-Orba Market	7	2	6(87.7)	—	—	9	—	6(66.7)
21+	Mrs Erojekwe's Farm	1	6	—	2(33.3)	—	7	—	2(28.6)
22++	Mr Okafor's Farm	2	10	1(50)	3(30)	—	12	—	4(33.3)
23++	Obollo-Afor Market	4	2	1(25)	2(100)	—	6	—	3(50)
24+	Mr Emejuru's Farm	4	9	1(25)	3(33.3)	—	13	—	4(30.8)
25++	Artisan Market	8	2	6(75)	—	—	10	—	6(60)
	Total	194	108	44(46.8)	45(41.7)	27	175	9(33.3)	80(45.7)

+ : intensive management system ; ++ : semi-intensive management system.
 () : percentage of number examined in each category.

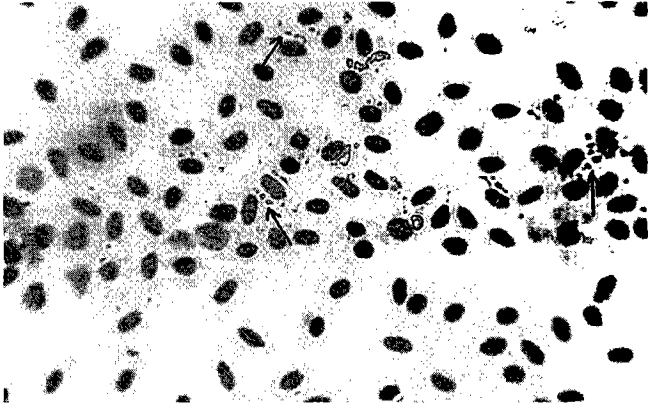


Photo 1 : Turkey blood smear showing developmental stages of *Plasmodium* spp. (Arrowed) with high parasitaemia.

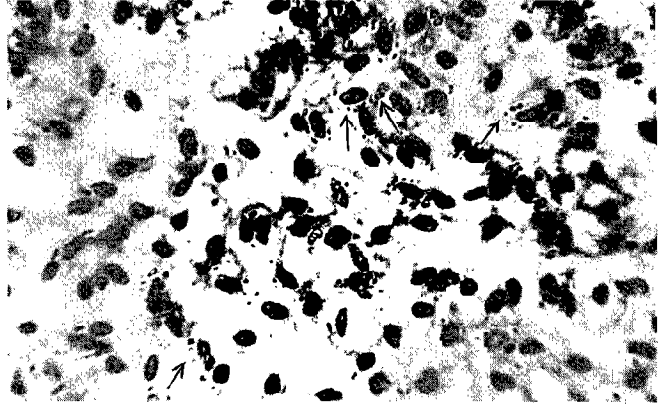


Photo 2 : Turkey blood smear showing infestation with developmental stages of *Plasmodium* spp. from another farm.

The mean PCV values for infected and uninfected turkeys were 29.95 ± 3.36 % and 37.3 ± 2.8 , respectively and for the infected male and female turkeys 30.7 ± 2.8 % and 29.2 ± 3.5 %, respectively. The uninfected males and females represented 39 ± 3.1 % and 35.6 ± 3.3 %, respectively. The difference between the mean PCV value of the infected and uninfected turkeys was highly significant ($P < 0.01$). The mean PCV values for the infected males and females showed no significant difference ($P > 0.05$). However, that of the uninfected males showed a highly significant difference ($P < 0.01$) from the females.

Of the 11 very clinically sick turkeys 4 died (36.4 %). Six of the sick turkeys were placed on a treatment regimen of chloroquine phosphate at rate of 5 mg/kg body weight and 1.0 ml vitamin B-complex intramuscularly (i.m.) daily for 3 days. Three responded favourably to treatment while 3, that were critically ill and already recumbent, died one day after the start of treatment. One other sick turkey was successfully treated with pyrimethamine at a rate of 0.3 mg/kg body weight administered i.m. daily for 2 days. Apart from one more death, the rest of the clinical cases were successfully treated each with a 250 mg chloroquine phosphate tablet orally in water daily for 5 days, along with orange juice dissolved in the solution to compensate for the drug's bitterness and give energy to the animals.

Necropsy findings revealed an atrophic spleen that was hard and fibrous ; the liver was slightly firm with chronic congestion ; heart and gizzard were reduced in size. The intestinal contents were mucoid in nature while the gizzard contained greenish material and the crop contained no feed material.

Discussion

The result of this study shows a high *Plasmodium* spp infection rate (44.1 %) among turkeys in the Nsukka area of Nigeria. The clinical disease (12.4 %) and high mortali-

ty rate (36.4 %) recorded agree with the report of other workers (5, 6, 7) and indicate that turkey malaria is of significant economic importance to the poultry industry. The study did not show any sex, age or management system related predisposition of turkeys to infection with malaria parasites.

The clinical and *post mortem* findings were similar to those described by other workers (1, 6, 8). The absence of feed materials in the crop of 4 dead birds suggests that they were anorexic for many days before death. The effects of drugs on starved and very weak birds may have contributed to the death of some of the turkeys soon after treatment.

The significantly lower PCV value of infected turkeys indicates anaemia which is a key symptom of turkey malaria (6, 10). A significantly higher PCV value was recorded in uninfected males than in uninfected females. Similar reports of higher PCV value in normal male turkeys than in females have been made (2, 9, 11).

However, the similarity in PCV values among the infected male and female turkeys may suggest that *Plasmodium* spp. infection of turkeys reduces the haematocrit more in males than in females.

It may be concluded that this disease is prevalent in the Nsukka area of Nigeria and results in a high morbidity and mortality in turkeys. It was shown that, when applied early, chloroquine phosphate or pyrimethamine was effective in the treatment of this disease.

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Blood smears of 202 turkeys (94 males and 108 females) in the Nsukka area (Nigeria) were examined for malaria parasites. Among the turkeys examined 44.1 % (95 % confidence interval, 0.441 ± 0.069) were infected with *Plasmodium* spp., 46.8 % males and 41.7 % females. A total of 175 adults and 27 growing turkeys (aged 6-16 weeks) were examined and 45.7 and 33.3 %, respectively were infected. Twenty out of 60 reared turkeys under intensive management systems and 65 of 142 turkeys managed semi-intensively were infected. The mean PCV value for the infected turkeys was 29.95 ± 3.36 % and significantly different ($P < 0.01$) from the mean PCV value of 37.3 ± 3.7 obtained from the uninfected turkeys. Eleven out of the 89 positive cases were clinical cases. Four critically sick turkeys died one day after treatment. Chloroquine phosphate at 5 mg/kg body weight administered i.m daily for 3 days or 250 mg tablets given orally for 5 days as well as a parenteral administration of pyrimethamine (0.3 mg/kg body weight) for 2 days were effective in the treatment of the infection. *Key words* : Turkey - *Plasmodium* spp. - Malaria - Chloroquine phosphate - Pyrimethamine - Nigeria.

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