

Cutaneous canine myiasis in the Jos metropolis of Plateau State, Nigeria, associated with *Cordylobia anthropophaga*

**Ndudim Isaac Ogo^{1*}, Emmanuel Onovoh¹, Dadson Rotimi Ayodele¹,
Oluremilekun Olufunmilayo Ajayi², Chukwu Okoh Chukwu¹,
Manasa Sugun¹, and Ikenna Osemeka Okeke¹**

¹Parasitology Division, National Veterinary Research Institute, Vom, Plateau State, Nigeria

²Department of Zoology, University of Jos, Jos Plateau State, Nigeria

OGO, N. I., E. ONOVOH, D. R. AYODELE, O. O. AJAYI, C. O. CHUKWU, M. SUGUN, I. O. OKEKE: Cutaneous canine myiasis in the Jos metropolis of Plateau State, Nigeria, associated with *Cordylobia anthropophaga*. Vet. arhiv 79, 293-299, 2009.

ABSTRACT

One hundred and ninety (190) dogs infested with myiasis, presented to veterinary clinics in the Jos metropolis and surroundings of Plateau State, Nigeria, were screened to identify the fly species responsible for the infestation. The age, breed and sex prevalence of the dogs were also evaluated. All 957 (100%) larvae extracted from the dogs were those of *Cordylobia anthropophaga*. Of the infested dogs, 58.95% were females, with a mean intensity of 4.62 larvae/female; a statistical difference ($P < 0.05$) was observed between the sexes, while younger dogs were infested with more larvae than older dogs. All the breeds of dogs evaluated were infested to varying degrees. The public health significance of these findings was discussed.

Key words: canine myiasis, *Cordylobia anthropophaga*, posterior spiracles.

Introduction

Myiasis is the infestation of human and vertebrate animals with the larval stages of Dipterous flies. Myiasis has been known to occur at various sites of the body, such as the eyes, intestines, mouth, nose, urino-genital tract and brain, where they survive by feeding on dead or living tissues, ingested food or liquid body substances (AGUILERA et al., 1999; WYMAN et al., 2005).

Cases of canine myiasis have been known to occur regularly the world over, and dogs and small rodents serve as important reservoir hosts for the larvae of most dipterous flies

*Corresponding author:

Dr. Ndudim Isaac Ogo (DVM, M.Sc.), Parasitology Division, National Veterinary Research Institute, P.M.B. 1, Vom, Plateau State, Nigeria, Phone: +234 803 4521 514; E-mail: ogoendy@yahoo.com

(McGRAW and TURIANSKY, 2008). Several dipterous flies that have been known to cause canine myiasis include; *Cordylobia anthropophaga*, *Dermatobia hominis*, *Cochliomyia hominivorax*, *Oestrus ovis* and *Phomia sericatus*. These flies are widespread in the tropics and subtropics of Africa and the Americas, but occur with less frequency in other areas of the world.

Canine myiasis, as in other animals, may be specific, in that the larvae invades fresh, uncontaminated skin wounds, or facultative, in which case the larvae are linked to bacteria in contaminated skin wounds or coats matted with faeces (PATTON, 1922; GUIMARAES and PAPAVERO, 1998).

Typical clinical signs observed in canine myiasis include numerous erythematous, furunculoid skin lesions, which ooze serous fluid. The application of pressure to such lesions may lead to the expulsion of the larva(e), with liquefied haemorrhagic or purulent tissue (FARRELL et al., 1987; HOHENSTEIN and BUECHNER, 2004). Definitive diagnosis of canine myiasis is usually by the extraction and laboratory identification of the larvae.

In Plateau State, Nigeria as in other cities of the world, dogs play an important role as a reservoir for the development of myiasis causing flies. However, despite the potential public health significance of canine myiasis, there are few published reports of the actual fly species causing this condition in dogs in Nigeria.

This study was carried out to establish the fly species responsible for canine myiasis and also to determine the age, breed and sex prevalence of the victims of this infestation.

Materials and methods

Larvae samples were collected from 190 myiasis-infested dogs of various breeds (Alsatian, Mastiff, Dobermann, Rottweiler, Caucasian Shepherd, indigenous, and mongrel) brought to three major veterinary clinics located more than 20 km from each another. Larvae extracted from each dog were put in 10 mL bijoux bottles containing 10% formal saline as a preservative, while information such as the breed and sex of the dogs, number of larvae harvested, location and clinical history were obtained. The larvae were sent to the Department of Parasitology, National Veterinary Research Institute, Vom for identification, on a weekly basis for 4 months.

Identification was carried out using the posterior spiracular plate method according to HALL and SMITH (1993) and SOULSBY (1982). In brief, each larva was boiled in 10% potassium hydroxide for 5 minutes and the posterior spiracle cut to a depth of about 1 mm. Excess tissue around the plate was teased out before being dehydrated in varying concentrations of alcohol (70-100%). Zylene cleaning took place before DPX mounting and observation under the dissecting and light microscopes.

The data generated from this study were analysed using statistical software (SPSS) and Student t- test.

Results

All nine hundred and fifty-seven (957) larvae extracted from 190 myiasis infested dogs were identified as third stage larvae of *Cordylobia anthropophaga* with their characteristic six posterior spiracles (Fig. 1). Of the infested dogs, 58.95% were female, while 41.05% were male. Of the larvae examined, 517 (54%) were from female dogs while 440 (46%) were extracted from male dogs (Table 1). Statistically, there was a significant difference in the occurrence of this infestation in terms of sex ($P < 0.05$), with the infestation in female dogs being more significant.

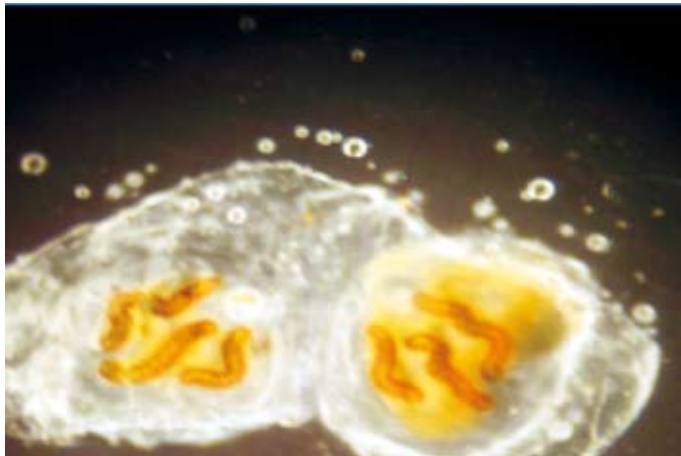


Fig. 1. Typical posterior spiracles of the larva of *Cordylobia anthropophaga* (x400)

An analysis of infestation by age group to determine the prevalence of *Cordylobia anthropophaga* myiasis in dogs showed that young dogs (<5-10 months) were the most affected, with a prevalence of 68.95%, producing 732 of the total larvae extracted from dogs examined, followed by dogs in the 11-15 months age-group, with a prevalence of 21.1% and 140 larvae extracted, while 9 and 10 larvae representing 4.39% and 4.49% prevalence were extracted from the 16-20 months and over 21 months-old dogs respectively. The age prevalence in Table 1 shows a gradual decrease in the numbers of infestations and number of larvae extracted from the dogs as their age increases.

Table 1. *Cordylobia anthropophaga* infestation of 190 dogs according to age and sex groups

Age	0-5 mths			6-10 mths			11-15 mths		
	M	F	Total (%)	M	F	Total (%)	M	F	Total (%)
N° of dogs infested	37	39	76 (40.00)	21	34	55 (28.95)	16	24	40 (21.1)
N° of larvae examined	292	158	450 (47.0)	92	190	282 (29.47)	44	96	140 (14.63)
Mean intensity (±SD)			5.92 ± 9.1			5.13 ± 3.2			3.5 ± 2.0

Table 1. *Cordylobia anthropophaga* infestation of 190 dogs according to age and sex groups (continued)

Age	16-20 mths			>21 mths		
	M	F	Total (%)	M	F	Total (%)
N° of dogs infested	0	9	9 (4.74)	4	6	10 (5.26)
N° of larvae examined	0	42	42 (4.39)	12	31	43 (4.49)
Mean intensity (±SD)			4.67 ± 2.9			4.3 ± 3.0

Table 2. *Cordylobia anthropophaga* larvae parasitism according to breed of dogs

Breed	Number of dogs infested	Number of larvae extracted	Mean number of infestation
Alsatian	73	349	4.78
Mastiff	21	88	4.19
Caucasian Shepherd	7	23	3.29
Dobberman Pincher	3	13	4.33
Local/indigenous	76	437	5.75
Mixed (Mongrel)	6	32	5.33
Rottweiler	4	15	3.75
Total	190	957	

Discussion

Our result shows that all the larvae (957) 100% extracted from infested dogs presented to the clinics were identified as *Cordylobia anthropophaga*. This finding is in contrast with the earlier work of UVA and ONYEKA (1998) who reported *Oestrus ovis* and *Gasterophilus nasalis* in other domestic animals apart from dogs, within the same area of study. Although host-specificity has not been established for myiasis-causing flies, it is surprising to note that even dogs from different places, such as the abattoir and those

used for hunting (sites where several myiasis-causing flies abound) were infested by *C. anthropophaga* only, thus there is a possibility that *C. anthropophaga* may infest dogs preferentially in this locality.

It was also noted that there was no breed predisposition to this myiasis, since all the breeds of dogs presented to the clinics succumbed to the infestation to varying degrees (Table 2). However, 58.95% of the infested dogs were female, suggesting a sex predisposition, especially since this was found to be statistically significant ($P < 0.05$).

This study also demonstrated that young dogs (<5-10 months) were the most infested, with a prevalence of 68.9%, this value being close to that obtained in a retrospective study by OGO et al. (2005), which showed a 77.50% prevalence for young dogs diagnosed with myiasis. A reason for this high prevalence in young dogs could be their thin, soft skin, which has been found to be more suitable for larval development (GUIMARAES and PAPAVERO, 1998).

Larval infestations (myiasis) of domestic and wild animals have been considered issues of economic and public health importance, alongside most arthropod diseases, since ancient times, due to the significant damage they cause to the hides and skin of livestock, and also the fact that some of these larvae parasitize humans (BAILY and MOODY, 1985; OTRANTO and STEVENS, 2002).

Though the extent to which *C. anthropophaga* parasitize humans in the area of study has not been documented, the few larvae extracted from humans and examined in our laboratory were identified as *C. anthropophaga*. Thus, since dogs are close companions of humans and serve as reservoir hosts for the larvae of *Cordylobia anthropophaga* (ROBERTS et al., 1982), it is necessary to inform local residents and especially dog owners of the need to remove rubbish around homes regularly, dispose properly of carcasses, faeces and decomposing materials, all of which serves as breeding sites for this fly, and to also educate them on the imperative of sun-drying and/or ironing clothing and bedding on which flies may deposit their eggs (KPEA and ZYWOCINSKI, 1995; ADISA and MBANASO, 2004).

Acknowledgements

Our thanks are due to Dr. Emenike Irokanulo, Dr. Dogo Goni and Dr. Endy Waziri of the National Veterinary Research Institute, Vom, Nigeria, for their critical appraisal of the manuscript, especially the statistical input.

References

- ADISA, C. A., A. MBANASO (2004): Furuncular myiasis of the breast caused by the larvae of the tumbu fly (*Cordylobia anthropophaga*). BMC Surg. 4, 5.
- AGUILERA, A., A. CID, B. REGUERIO, J. PRIETO, M. NOYA (1999): Intestinal Myiasis caused by *Eristalis tenax*. J. Clin. Microbiol. 37, 3082.

- BAILY, G. G., A. H. MOODY (1985): Cutaneous myiasis caused by larvae of *Cordylobia anthropophaga* acquired in Europe. *Brit. Med. J.* 290, 1473-1474.
- FARRELL, L. D., R. K. WONG, E. K. MANDERS, P. M. OLMSTEAD (1987): Cutaneous myiasis. *Am. Fam. Physician.* 35, 127-133.
- GUIMARAES, J. H., N. PAPAVERO (1998): Myiasis caused by obligatory parasites. In: Myiasis in Man and Animals in the Neotropical region - bibliographic database. (Guimaraes, J. H., N. Papavero), Sao Paulo: Plaide. 1998. p. 257.
- HALL, M. J. R., K. G. V. SMITH (1993): Diptera causing myiasis in man. In: *Medical Insects and Arachnids.* (Lane, R. P., R. W. Crosskey, Eds), London. 429-469.
- HOHENSTEIN, E. J., S. A. BUECHNER (2004): Cutaneous myiasis due to *Dermatobia hominis*. *Dermatol.* 208, 268-270.
- McGRAW, T. A., G. W. TURIANSKY (2008): Cutaneous myiasis. *J. Am. Acad. Dermatol.* 58, 907-926.
- KPEA, N., C. ZYWOCINSKI (1995): "Flies in the flesh": A case report and review of cutaneous myiasis. *Cutis* 55, 47-48.
- OGO, I. N., G. S. MWANSAT, A. JAMBALANG, M. F. OGO, E. ONOVOH, E. A. OGUNSAN, G. I. DOGO, S. BANYIGYI, E. M. ODOYA, O. O. C. CHUKWU, A. B. YAKO, P. U. INYAMA (2005): Retrospective study on the prevalence of canine myiasis in Jos-South Local Government Area of Plateau State, Nigeria. *J. Pest. Dis. Vect. Mgt.* 6, 385-390.
- OTRANTO, D., J. R. STEVENS (2002): Molecular approaches to the study of myiasis-causing larvae. *Int. J. Parasitol.* 32, 1345-1360.
- PATTON, W. S. (1922): Notes on the myiasis producing diptera of man and animals. *Bull. Entomol. Res.* 12, 239-261.
- ROBERTS, L. W., W. L. BOYCE, W. H. LAYERLY (1982): *Cordylobia anthropophaga* (Diptera: Calliphoridae) myiasis in an infant and dog and a technique for larval rearing. *J. Med. Ent.* 19, 350-351.
- SOULSBY, E. J. L. (1982): Helminths arthropods and protozoa of domesticated animal The ELBS and Bailliere Tindall. London. pp. 809.
- UVA, C. U. T., J. O. A. ONYEKA (1998): Preliminary studies on myiasis in domestic animals slaughtered in Jos abattoir, Plateau State, Nigeria. *Afr. J. Nat. Sc.* 2, 111- 112.
- WYMAN, M., R. STARKEY, S. WEISBRODE, D. FILKO, R. GRANDSTAFF, E. FERREBEE (2005): Ophthalmomyiasis (interna posterior) of the posterior segment and central nervous system myiasis: *Cuterebra* spp. in a cat. *Vet. Ophthalmol.* 8, 77-80.

Received: 11 March 2008

Accepted: 4 May 2009

OGO, N. I., E. ONOVOH, D. R. AYODELE, O. O. AJAYI, C. O. CHUKWU, M. SUGUN, I. O. OKEKE: Kožna mijaza u pasa uzrokovana kukcem *Cordylobia antropophaga* u Josu glavnom gradu pokrajine Plateau u Nigeriji. Vet. arhiv 79, 293-299, 2009.

SAŽETAK

Istraživanje je provedeno na 190 pasa u kojih je dijagnosticirana mijaza u sklopu različitih veterinarskih klinika u Josu te ostalim područjima pokrajine Plateau u Nigeriji s ciljem utvrđivanja uzročnika. Vrednovana je i predispozicija s obzirom na dob, pasminu i spol. Svih 957 izdvojenih ličinki (100%) pripadalo je vrsti *Cordylobia anthropophaga*. Od ukupnog broja infestiranih, 58,95% su bile ženke s prosječno 4,62 larve. Dokazana je statistička razlika u invadiranosti među spolovima ($P < 0,05$). U mlađih pasa je pronađeno više larvi. Stupanj invadiranosti bio je različit u različitim pasmina pasa. U radu je raspravljena važnost rezultata za javno zdravstvo i opasnost za ljude.

Ključne riječi: mijaza u pasa, *Cordylobia anthropophaga*, stražnji stigmalni otvori
