# *OOCHORISTICA AGAMAE* BAYLIS, 1919 (EUCESTODA, LINSTOWIIDAE) IN ONE REPTILE AND TWO BAT SPECIES FROM NSUKKA (ANAMBRA STATE, NIGERIA)

F.C. OKAFOR

Okafor, F.C., 1988. *Oochoristica agamae* Baylis, 1919 (Eucestoda, Linstowiidae) in one reptile and two bat species from Nsukka (Anambra State, Nigeria). *Misc. Zool.*, 12: 11-15.

Oochoristica agamae *Baylis, 1919 (Eucestoda, Linstowiidae) in one reptile and two bat species from Nsukka (Anambra State, Nigeria).*– The same cestode parasite was recovered from the small intestines of different insectivorous hosts: a lizard *Agama agama,* two bats *Tadarida chaeraphon nigeriae* (Thomas, 1913) and *Hipposideros caffer tephrus* (Cabrera, 1906) at Nsukka. Various measurements and observations on gross anatomy (eg. number and arrangement of the ovary, dimensions of the cirrus sac, etc.) show that all specimens of the parasites belong to the same species. The different hosts feed on a common intermediate host in the same environment which may account for this phenomenon. The prevalence of the worms and the intensity of infection in the three hosts are also presented. There is a significantly high prevalence in the males, but no explanation for this trend is given.

Key words: *Oochoristica agamae,* Eucestoda, Parasite, Nigeria.

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*F.C. Okafor, Dept. of Zoology, Univ. of Nigeria, P.O. Box 3097, Nsukka, Nigeria.*

## INTRODUCTION

The finding of a parasite species within hosts of different taxonomic status, in an ecosystem, is not a common phenomenon. In the cestodes, such a situation might arise through recruitment of some stages of the life cycle by an unusual intermediate host (JAROLL, 1980). Such developments complicate the transmission dynamics of the parasitic infections.

*Oochoristica* Luhe, 1898 has been isolated from various animals. At least about 45 species have been reported from different types of lizards alone and DELLA-SANTA (1956) recognized 18 species from mammals. The number of these have since increased. SPASSKII (1951) and YAMAGUTI (1959) divided the parasite into numerous genera depending upon the systematic position of the host (whether they were reptiles or mammals) and to some extent upon the nature of their segmentation. The comparison of number of testes and their distribution in species of *Oochoristica* from mammals, indicate that most of them are closely related to one another, but differ from those parasitizing reptiles. Furthermore most species from reptilian hosts have acraspedote proglottides whereas those of mammals have craspedote proglottides.

*Oochoristica antrozoi* Voge, 1954, a parasite of mammals, was reported from reptiles in South America (FLORES-BARROETA et al., 1958). In this report, *Oochoristica agamae* Baylis, 1919 (Syn. *O. africana* Malan, 1939), a parasite of reptiles is recovered from two species of insectivorous bats while studying the helminth parasites of the bats. The similarity in the gross features of this cestode and those commonly foud in lizards prompted this study. A description of the parasites is presented.

## MATERIALS AND METHODS

A total of 110 lizards *Agama agama* and 148 *Tadarida nigeriae* and 53 *Hipposideros tephrus* bats were collected between December 1986 and June 1987, in the town of Nsukka (Anambra State, Nigeria). The lizards were found on walls of buildings, in bushes and abandoned farmlands and were taken by hand. The bats were collected with hand nets as they left their roosts in infested houses, in the evening.

In the laboratory these animals were put in ether and at necrospy intestinal parasites were recovered. The parasites were washed briefly in 0.9% saline solution. Cestodes were relaxed briefly in water and fixed in AFA. Whole cestodes were stained in acid carmine and mounted in canada balsam. Scoleces and proglottides were embedded in paraffin and serial longitudinal and transverse sections were made at a thickness of 10 μm. The sections were stained with haematoxylin and eosin. The eggs were removed from gravid proglottides and stained with 0.10% methylene blue. All measurements are in millimeters; L and W used in the text mean length and width. The results of the prevalence survey were subjected to Chi-square analysis.

## RESULTS

### Generic Diagnosis

*Oochoristica* Luhe, 1898 (after SPASSKI, 1951)

Anoplocephalidea: Linstowiidae (WARDLE et al., 1974). The scolex has four suckers (acetabula) and there are no hooks. The proglottides vary in size. They are acraspedote. The mature and gravid ones are longer than wide. There are two pairs of longitudinal excretory ducts. The ventral pair is with transverse anastomosis which is usually behind the vitelline gland. The genital aperture is single and alternates irregularly. The genital ducts are dorsal to the excretory ducts. The vagina is posterior to the cirrus sac. The ovary is lobed, median and slightly poral. The lobes are joined by an Isthmus. Vitellaria is median and post ovarian. Uterus forms uterine capsules each containing a single egg. The vas deferens is looped. The testes are numerous, posterior and lateral to the vitelline gland. Type species: *Oochoristica tuberculata* (Rudolphi, 1819). It is related structurally to *Oochoristica truncata* (Krabbe, 1879) Zschokke, 1905.

*Oochoristica agamae* Baylis, 1919
*Oochoristica africana* Malan, 1939
*O. africana* var *ookispensis* Malan, 1939
Type Hosts: Reptiles especially *Agama* lizards.
Additional Hosts: *Tadarida nigeriae* Thomas, 1913; *Hipposideros tephrus* Cabrera, 1906; (both insectivorous bats).
Locality: Nsukka, Anambra State, Nigeria.

### Description

These descriptions are based on 10 specimens from each host species. The values presented are the ranges of the recorded parameters. A comparative record of these parameters is given in table 1. Apart from these, there are other features that are uniformly present in these parasites such as that the young proglottides are distended transversely, width exceeding the length several times. At the initial or near the neck region, only internal segmentation is noticed while the more posterior segments have the segmentation on the outside. The length of mature proglottides is greater than its width while the gravid ones are several times longer than the young proglottides. Transverse folds are commonly found on the segments. The genital aperture alternates irregularly and is located at the anterior ¼ of each proglottis. The genital atrium is muscular and oval in dorsoventral view. The cirrus sac extends to the middle of the proglottis and between the excretory vessels. The cirrus lies in the lateral part of the sac. The testes are found in the middle of the proglottides and form a semi-circle behind the ovary. They are

between 0.04-0.07 mm wide and are subspherical in shape. The sperm duct is slightly convoluted and extends transversally parallel to the vagina. The vagina is a thin tube that lies behind the cirrus sac and opens into the posterior ventral side of the atrium. It extends medially along the posterior face of the cirrus sac. The ovary is bilobed while the vitelline gland is compact and lies below the ovary. The uterine capsules fill the whole space in the gravid proglottis. The excretory ducts consist of two pairs of dorsal and ventral longitudinal trunks. They are also convoluted. The dorsal ducts have smaller diameter than the ventral ones. There is a complicated network of anastomosing branches of the ventral pair in the posterior portion of the segment. The diameter also varies with the segments with younger segments being narrower than older and matured ones.

In transverse section, within the scolex, longitudinal muscles form a ring. In the proglottides these muscles appear in bundles comprising three layers. The inner layer consists of several fibres per bundle; the middle layer consists of three fibres per bundle whereas the outer layer is made up of one fibre per bundle. There are also transverse fibres which are scattered between the inner longitudinal muscle bundles and on either sides of the bundles. These features indicate that the worm is *O. agamae* Baylis, 1919.

## Prevalence

*Oochoristica* recovered from the bats and *Agama* lizards was described as *O. agamae*. The infection rates in these animals is presented in table 2. Prevalence of infection in males was significantly higher than in females ($p \geq 0.05$).

## DISCUSSION

Reports on *Oochoristica* infections in animals of different taxonomic groups abound in the literature, but reports on finding the same species of the parasite in both mammals and reptiles are scarce. *Oochoristica agamae* was described from *Agama* lizards of East Africa

Table 1. Measurements of some structures of *Oochoristica* sp. recovered from diferent hosts.
*Medidas de algunas estructuras de* Oochoristica *sp. aislado de diversos hospedadores.*

| Structures | Hosts | | |
|---|---|---|---|
| | *Agama* | *Tadarida* | *Hipposideros* |
| Body length | 40–90 | 40–85 | 40–80 |
| Scolex (LxW) | 0.54–0.60 x 0.46–0.53 | 0.53–0.56 x 0.45–0.50 | 0.53–0.55 x 0.42–0.48 |
| Acetabulum (ø) | 0.148–0.18 | 0.146–.15 | 0.06–0.15 |
| Neck (LxW) | 1.65–1.92 x 0.33–0.38 | 1.55–1.80 x 0.29–0.35 | 1.55–1.75 x 0.29–0.33 |
| First Mature | | | |
| Proglottis | 50 th | 50 th | 50 th |
| Mature proglottides (LxW) | 0.88–1.08 x 0.73–0.87 | 0.73–0.98 x 0.70–0.83 | 0.70–0.96 x 0.69–0.81 |
| Gravid proglottides | 1.45–2.39 x 0.88–0.95 | 1.40–2.11 x 0.86–0.93 | 1.40–2.10 x 0.86–0.91 |
| Genital atrium | 0.04–0.046 x 0.028–0.032 | 0.039–0.045 x 0.025–0.030 | 0.039–0.045 x 0.025–0.030 |
| Cirrus sac | 0.12–0.20 x 0.05–0.08 | 0.100–0.15 x 0.05–0.08 | 0.100–0.15 x 0.05–0.08 |
| Testes (No) | 28–45 | 28–45 | 28–45 |
| Ovary (total width) | 0.38–0.56 | 0.38–0.54 | 0.38–0.54 |
| Vitelline gland (width) | 0.19–0.24 | 0.18–0.22 | 0.18–0.22 |
| Eggs (width) | | | |
| Onchosphere | 0.023–0.029 | 0.022–0.027 | 0.022–0.027 |
| Outer envelope | 0.050–0.06 | 0.05–0.058 | 0.05–0.058 |

Table 2. Distribution of *Oochoristica* infections.
*Distribución de las infecciones de* Oochoristica.

| Hosts | Number Examined | Number Infected | % Infection | Mean worm count $\bar{X}$ (range) |
|---|---|---|---|---|
| *Agama agama* | | | | |
| Males | 50 | 21 | 42 | 2.1 (1-4) |
| Females | 60 | 17 | 28.33 | 1.8 (1-3) |
| *Tadarida nigeriae* | | | | |
| Males | 66 | 12 | 18.18 | 1.7 (1-3) |
| Females | 82 | 6 | 7.32 | 1.5 (1-2) |
| *Hipposideros tephrus* | | | | |
| Males | 15 | 4 | 26.67 | 1.5 (1-2) |
| Females | 38 | 1 | 2.63 | 1 |

by Baylis in 1919 and it differs from other *Oochoristica* species of reptiles from that region (e.g. *Oochoristica theileri* Fuhrmann, 1924; *O. zonuri* Baylis, 1919; *Oochoristica* sp. Maeggitt, 1927) specially in the number of testes, dimensions of the cirrus sac, etc. The parasite is however known to have some morphological similarity with *Oochoristica ameivae* Beddard, 1914, *O. americana* Harwood, 1932, *O. eumecis* Harwood, 1932 and *O. anolis* Harwood, 1932, all parasites of North American reptiles.

This is the first report of recovery of any *Oochoristica* species from *Agama agama* in Nigeria. In insectivorous bats, EDUNGBOLA (1979) isolated some *Oochoristica* sp. The finding of *Oochoristica* in *Tadarida* therefore is not new. What is significant, however, is that the *Oochoristica* collected from these bats resemble in most details the type found in *Agama*. From the data presented in this report (table 1) it is obvious that they are similar in the number and arrangement of the ovary and testes, the shape of the testes, the dimensions of the cirrus sac and its position vis-a-vis the excretory ducts among other features. These features show that the collected cestode fit into the description of *Oochoristica agamae* Baylis, 1919.

Finding *Oochoristica agamae* in insectivorous bats at Nsukka widens the host spectrum of this parasite. It is known from literature that such multigeneric infections result from incidental transmissions from the type hosts to other animals (FLORES-BARROETA, et al., 1958; JARROLL, 1980).

The intermediate hosts of different species of *Oochoristica* are mainly insects and arachnids (STUNKARD, 1961, 1965; WARDLE et al., 1974, amongst others). Lizards and these bats commonly feed on these animals and within the same range. Therefore, the processes involved in finding this reptilian cestode in the bats must have been related to the overlap of the feeding ranges of the two animal groups. Further studies should be conducted to know the dynamics of *Oochoristica* infections in Nsukka as recommended by ESCH (1983). Efforts will be made to identify the intermediate host of *O. agamae* in order to explain the basis of this finding.

The lower prevalence of the parasite in the bats may tend to suggest that these chiropterans serve as reservoir hosts. HOLMES et al. (1977), however, observed that regulation can occur in a single host of a parasite while transmission is maintained in other animal species which also serve as hosts to the same parasite. They further suggested that the host in which regulation operates may not necessarily be the one in which the parasite is most abundant. Thus, the finding of *O. agamae* in

the three hosts, suggests that the taxonomic status of the parasite should be reinvestigated and the host preference reassessed. The higher prevalence of the parasite in males can not presently be explained as there are no known sex related differences in feeding behaviour in either *Agama agama, Tadarida nigeriae* or *Hipposideros tephrus*. Physiological responses to the parasite based on sex may be investigated for a clue.

## RESUMEN

Oochoristica agamae *Baylis, 1919 (Eucestoda, Linstowiidae) en una especie de reptil y dos de murciélago de Nsukka (Anambra State, Nigeria).*

La misma especie de cestodo parásito fue recogida en diversos huéspedes insectívoros: un lagarto *Agama agama* y dos murciélagos *Tadarida chaeraphon nigeriae* y *Hipposideros caffer tephrus* en Nsukka. Medidas y observaciones sobre la anatomía muestran que todos los especímenes parásitos pertenecen a la misma especie. Los hospedadores se alimentan, en el mismo medio, de un común hospedador intermedio, hecho que podría explicar este fenómeno. Se presentan la predominancia y la intensidad de infección en los tres hospedadores. Existe una predominancia de machos.

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