



## Biological Sciences



### PRELIMINARY STUDIES ON THE PARASITE FAUNA OF OKLAHOMA ANURANS\*

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#### INTRODUCTION

In this paper an attempt will be made to summarize the data pertaining to the parasites of the anurans of Oklahoma. Much of this data has been collected by the authors during the past nine months. The remainder has been obtained from a meager literature of native forms.

Cort ('15) obtained his first specimens of the lung fluke *Pneumonoeces breviplexus* from Oklahoma examples of the toad *Bufo americanus*. Guberlet ('20) described a new bladder fluke from bullfrogs collected near Stillwater, and Hannum ('25) described the first protocephalid tapeworm to be found in North American anurans from bullfrogs collected near Stillwater.

#### MATERIAL AND METHODS

To date we have examined 79 hosts including the following six species: *Rana catesbeiana*, 21; *R. sphenoccephala*, 38; *R. pipiens*, 2; *Bufo cognatus*, 1; *B. woodhousei*, 2; *Acris gryllus*, 15. All hosts with the exception of a single bullfrog collected at Price's Falls were collected near Norman. The two examples of *R. pipiens* were taken from a fish pond on the campus of the University of Oklahoma and were probably introduced from Wisconsin.

The senior author is responsible for the identification of cestodes and trematodes. The nematodes were identified by the junior author. We are indebted to Dr. A. C. Walton who has kindly checked our nematode material. His nomenclature is used throughout the present paper.

No attempt has been made to identify the protozoan parasites, or the mites infesting the skin. Only the presence of the more obvious forms is noted in this report.

#### PROTOZOA

None of the bullfrogs were infested with *Opalina*; 14 of the 15 cricket frogs harbored large numbers of these ciliates in the cloaca; 92 per cent of all leopard frogs were infested; and both species of toads were heavily infested.

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## TREMATODES

Trematodes were found in only two host species, *R. sphenoccephala* and *R. catesbetiana*. The former harbored more species of flukes than the latter when metacercariae are considered. Cysts were found in the following tissues of *R. sphenoccephalas* mesentery of the stomach, one host; liver, two hosts; connective tissue about the oesophagus, two hosts; peritonium of the body cavity, one host; fascia of the hind legs, one host; mesentery of the intestine, one host.

It was impossible to identify the greater part of the metacercariae. However, a single *sphenoccephala* harbored 47 specimens of *Clinostomum attenuatum* Cort, 1912.

Only one bullfrog contained cysts. These were found in the peritoneum of the body cavity and have been identified as *C. attenuatum*.

Only two species of adult flukes were common to both hosts. One of these is an unidentified amphistome taken from the cloaca of three frogs. A single *sphenoccephala* harbored one of these flukes, while two parasites were taken from one bullfrog and 116 from another. Our thanks are due to Dr. R. Chester Hughes who examined this form.

On the other hand, both *R. catesbetiana* and *R. sphenoccephala* were extensively infested with an intestinal fluke, *Glythelmins quieta* Stafford. Fifteen of the 38 *sphenoccephalas* harbored this fluke in numbers varying from one to 12. The average number per infested was 4.3. Fourteen of the 21 bullfrogs contained this fluke in numbers varying from one to 76, the average for the infested hosts being 20.8.

A very few of the anurans which have been examined harbored lung flukes. Three immature forms were taken from a single *sphenoccephala* and have not been identified. Of the three infested bullfrogs, one contained a single unidentified, immature form; another harbored a single specimen of *Pneumonoeces brevipleurus* Stafford, and the third contained 13 specimens of *Pneumonoeces longipleurus* Stafford.

Bladder flukes were taken only from *R. catesbetiana*. Seven examples of *Gorgodera circava* Guberlet were taken from one host and six others harbored an average of nine *Gorgodera amplcava* Looss.

*Diplodiscus temporatus* Stafford was taken from five leopard frogs, the hosts harboring from one to four of the parasites.

## CESTODES

Tapeworms were recovered from a limited number of hosts of the following species: *Bufo cognatus*, *Acris gryllus*, *Rana sphenoccephala*, and *R. catesbetiana*. Apparently there is but a single species in our material which has been referred to *Ophiotaenia magna* Hannum. The hosts harbored from one to eight of these worms. A single plerocercoid was recovered from the intestine of a bullfrog and has not been identified. Dr. Hughes of Oklahoma A. and M. College has informed us that his students have taken *Cylindrotaenia americanum* Jewell from the intestines of *Acris gryllus*.

## NEMATODES

Nematode parasites were found in 19 bullfrogs; 20 *sphenoccephalas*; two *pipiens*; four *Acris gryllus*; and one *Bufo woodhousei*. Among our material is an undescribed male of *Oswaldocruzia collaris* Walton, a species of *Folyella* of uncertain systematic position, and a species of *Spinitectus*, apparently new to science. They will be fully considered in a separate publication elsewhere.

There are nine species of nematodes in our collection, including the new forms. Three of these species are larval forms and the exact systematic position is but indicated in this paper.

One species of nematode, *Oswaldocruzia pipiens* Walton, was common

to the three species of *Rana* and one toad, *Bufo woodhousei*. Only a few parasites were recovered from a limited number of each host. A closely related species, *O. collaris* Walton was taken only from *R. catesbeiana* and *R. sphenoccephala*. Only males were obtained. They are the first of this species to be found.

*Rhabdias ranae* Walton was taken from the lungs of both species of leopard frog and *Acris gryllus*. It is one of the more commoner nematodes of anurans in the Norman region. The number of parasites per infected host is generally one to three, but one *pipiens* harbored 16 and 33 were taken from a single *sphenoccephala*. *Rhabdias* sp. (larvae) were taken from *Acris gryllus* and *R. pipiens*.

*Foyella* sp. was taken from six bullfrogs and a single *sphenoccephala*. Dr. Walton has expressed the opinion that the females are probably *Foyella americana* Walton, but that the males are possibly a new species.

*Spinitectus* sp. was obtained from several bullfrogs. This form is closely related to *Spinitectus gracilis* Ward and McGrath, but certain structural differences appear to be specific.

*Spiromoura catesbeiana* (Walton, 1929) was taken from six bullfrogs in numbers ranging from one to 64. Two specimens were recovered from a single *sphenoccephala*.

*Oxysomatium americana* (Walton, 1929) occurred only in bullfrogs. About 50 per cent of the hosts examined harbored from one to 14 parasites. The minimum infection was one and the maximum 151. *Oxysomatium* sp. (larvae) were recovered from three bullfrogs.

Several larvae recovered from *Rana sphenoccephala* have been doubtfully referred to *Physaloptera ranae* Walton.

#### ARTHROPODS

The only ectoparasites obtained were mites which have not been identified. Only one bullfrog was infested with these forms, whereas 25 *sphenoccephalas* harbored mites. The general infestation was large, being estimated at about 500. These mites are generally found on the undersurfaces of the rear limbs and sometimes on the stomach, encysted in the skin. The white undersurfaces of heavily infested hosts are often given a decided reddish tinge.

#### SUMMARY AND CONCLUSIONS

1. Nineteen of the 21 bullfrogs examined contained at least one species of trematode, whereas only 20 of the 38 *sphenoccephalas* harbored flukes. This indicates that bullfrogs are more generally infested with trematodes. They are apparently also more heavily infested.

2. Nematodes infest a larger number of host species than trematodes.

3. The greater number of anurans examined were parasitized by helminths. All bullfrogs harbored at least one species of parasite; thirty-one *sphenoccephalas* were infested with helminths; six cricket frogs contained animal parasites; both specimens of *R. pipiens* contained worms; and all toads examined harbored parasites.

4. At the present time there are 17 species of adult helminths known from Oklahoma anurans. They are:

Trematodes: *Glythelmins quieta*, *Diplodiscus temporatus*, *Gorgodera circava*, *G. amplicava*, *Pneumonoeces brevipleurus*, *P. longipleurus*, and an unidentified amphistome.

Cestodes: *Ophiotaenia magna*, and *Cylindrotaenia americanum*.

Nematodes: *Oswaldocruzia collaris*, *O. pipiens*, *Rhabdias ranae*, *Foyella* sp., *Spinitectus* sp., *Spiromoura catesbeiana*, *Oxysomatium americana*, and *Physaloptera ranae*.

5. The following are new host records for nematodes: In *Rana sphen-  
ocephala*: *Rhabdias ranae*, *Oswaldocruzia collaris* and *Oxysomatium cates-  
belianae*; in *Bufo woodhousei*: *Oswaldocruzia pipiens*; in *Rana catesbeliana*:  
*Oswaldocruzia collaris*, *Foyella* sp., *Spinitectus* sp. and *Oswaldocruzia  
pipiens*.

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