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GILL TREMATODES FROM OKLAHOMA FISHES

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The major portion of taxonomic investigations on North American monogenetic trematodes from fresh-water fishes has been accomplished during the past five years. As late as 1935 only two valid species of *Gyrodactylus* (*G. fairporti* Van Cleave, 1922, and *G. cylindriformis* Mueller and Van Cleave, 1932), one species of *Dactylogyrus* (*D. extensus* Mueller and Van Cleave, 1932), and one species of *Ancyrocephalus*, now *Urocleidus aculeatus* (Mueller, 1932) were described from North American fresh-water hosts. Since the above date fifty-seven additional forms have been reported, making a total of sixty-one species belonging to the genera *Dactylogyrus, Gyrodactylus, Lepidotes, Cleidodiscus, Oncholeidus, Haplocleidus, Leptocleidus, Actinocleidus, Petrocleidus, Aristocleidus, Tetracleidus,* and *Urocleidus*. The latter nine genera were erected by J. F. Mueller of the New York State College of Forestry. The major contributing American authors in this field are Mueller, Mizelle, Price and Van Cleave. Bychowsky, Wagener, Wegener and Zandt of Europe, and Johnston and Tiegs of Australia have contributed materially to the study of Monogenea of their respective continents.

The subclass Monogenea of the class Trematoda includes two orders, namely, the Monophisthocotylea Odhner, 1912, and the Polyopisthocotylea Odhner, 1912. The subfamily Tetraonchinae, with which we are concerned, belongs to the order Monopisthocotylea, superfamily Gyrodactyloidea and to the family Dactylogyridae.

The hosts examined in this investigation were catfishes and sunfishes collected in the vicinity of Stillwater, Oklahoma. The fishes were subjected to low temperatures (Frigidaire) for a minimum of eight hours before examination. Freezing facilitates host examination since it breaks up the branchial mucus, and kills the parasites in a relaxed condition. The gills

were removed from the hosts, placed in stoppered vials about one-half full of water, and vigorously shaken between thumb and forefinger for approximately fifty consecutive times. The fluid containing the parasites was then alternately diluted and decanted in watch glasses until clear enough for reliable examination with a wide-field binocular microscope.

Tetraonchid parasites from fresh-water fishes are small flukes which range from about one-half to one and one-half millimeters in length. They attach themselves to the gills of fishes by means of a posterior haptor which is supplied with four anchors or large hooks and fourteen smaller hooks or hooklets. The genital systems are composed of a copulatory complex consisting of a cirrus and accessory piece, a vas deferens, vagina, ovary, oviduct, and vitellaria.

Thus far sixty-one hosts representing nine species of fishes have been examined and twelve species of Tetraonchinae belonging to five genera were recorded (see table 1). A gross infestation of 28 per cent was ascertained.

TABLE I. *Record of host fishes examined showing the species of Tetraonchinae found in them.*

	No. hosts examined	No. hosts infected	Actinocleidus longus	Actinocleidus fergusoni	Actinocleidus fusiformis	Cleidodiscus pricei	Cleidodiscus diversus	Cleidodiscus vancleavei	Cleidodiscus longus	Onchocleidus mucronatus	Onchocleidus principalis	Haplocleidus dispar	Haplocleidus n. sp.	Pterocleidus acer
HOST														
Helioperca macrochira	14	7		+	+					+		+		+
Apomotis cyonellus	4	1					+		+					
Aplites salmoides	1	1			+									
Pomoxis annularis	7	2						+	+					
Pomoxis sparoides	2	1						+						
Micropterus dolomieu	2	1									+			
Allotis humilis	14	0												
Ictalurus punctatus	1	1				+								
Ameiurus melas	16	3				+							+	
TOTALS	61	17												

The host species presenting the heaviest infestations (quantitative and qualitative was the bluegill sunfish, *Helioperca macrochira* (Rafinesque). The small-mouth bass, *Micropterus dolomieu* Lacepede, possessed the smallest number of species of ectoparasites. All examined specimens of orange-spotted sunfish, *Allotis humilis* (Girard), were negative. Three new host records are worthy of note, namely, *Pterocleidus acer* Mueller, 1936, on the bluegill, *Onchocleidus mucronatus* Mizelle, 1936, on the green sunfish, and a new species of *Haplocleidus* Mueller, 1937, on the common bullhead, *Ameiurus melas* (Rafinesque). A description of the new species of *Haplocleidus* is being prepared for later publication.

As to the economic importance of this group MacCallum[5] found that infested fishes spread parasites rapidly under crowded conditions and at times may be responsible for 90 per cent of the mortality among butterfly and angel fishes in aquaria. Embody[1] reports a considerable loss of trout in New Jersey due to heavy infestations with *Grodactylus*. Guberlet, Hansen, and Kavanagh[2] reported a daily mortality rate of 2 per cent for trout fingerlings infected with *Gyrodactylus* in a Seattle hatchery. Numerous

chemicals have been advocated as anthelmintics for these parasites but at present no particular one is accepted as specific for all ectoparasitic flukes. Laird and Embody[4] recommend a two minute immersion of the host in a solution of Zonite made of one ounce of the chemical to twelve quarts of water. Hess[3] reports that immersion of the hosts in a weak solution of potassium permanganate is successful for extermination of these parasites. Guberlet, Hansen and Kavanagh[2] concluded after much experimentation that exposure of the host for two and one-half minutes to a 5 per cent solution of common salt was the most effective treatment.

This report constitutes the first record of tetraonchid parasites from the gills of Oklahoma fishes. The data herein is taken from material to be used for a master's thesis being prepared under the direction of J. D. Mizelle, of the Department of Zoology, Oklahoma Agricultural and Mechanical College.

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