

# Proposed Life History of a New Faustulid Digenea in the Gulf of Mexico Involving Ctenophores and Jellyfishes as the Second Intermediate Hosts

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**Goals:** To describe the adult, cercaria, and metacercaria of a new faustulid Digenea. To communicate the result of different experimental infections and field observations in order to elucidate the life cycle for this parasite.

**Material and Methods:** Jellyfish, ctenophores (*Mnemiopsis mcradyi*, *Beroe ovata*, *Phialidium languidum*, *Chrysaora quinquecirrha*) were collected in the Davis Bayou, Ocean Springs, Mississippi, USA by hand net, transferred to containers with marsh water, transported to the laboratory, and observed alive under binocular microscope. The clam *Tagelus plebeius* was collected by hand, during the low tides. In the laboratory, the specimens were isolated in small dishes and checked for cercariae sed. Some infected clams were crushed, and the internal tissues were dissected and examined for sporocyst. The Gulf menhaden *Brevoortia patronus* was collected in the same area than the intermediate hosts. In the laboratory, the fish were kept alive in marine aquaria and dissected for parasites. Cercariae, metacercariae and adults were processed using the standard methods for digenean.

***Bacciger brevoortii* n. sp.**

**Adult.** Principal diagnostic characters: body small, oval, covered with minute spines.

Oral sucker sub-terminal. Ventral sucker equatorial. Testes rounded, symmetrical.

Cirrus sac oval to claviform. Ovary trilobed, post testicular. Vitelline follicles in two groups of 5-8 each. Excretory vesicle U-shaped. The longer caeca, combined with the posterior position of the ovary and the more anterior position of the genital pore were the more important diagnostic features in the new species.

**Metacercaria.** Principal diagnostic characters: unencysted worms in host mesoglea.

Body pyriform, spinose. Excretory bladder V-shaped, containing rounded concretions. Flame cell formula  $2[(3+3)+(3+3)]=24$ . Primordia of testes, ovary, and vitellaria present. Prevalence of infections: *M. mcradyi* 5-8%, *Beroe ovata* 20%, Jellyfishes 10%

**Cercaria.** Principal diagnostic characters: Trichocercous cercaria developed in elongated sporocyst. Body oval, spinose, brown-ligth when alive. Twelve pairs of cephalic glands.

Tail with 25-27 pairs of lateral finlets. Excretory vesicle V-shaped filled with rounded granules.

Primordia of testes and ovary present in some specimen. Flame cell formula similar to that of the cercaria ( $2[(3+3)+(3+3)]=24$ ).

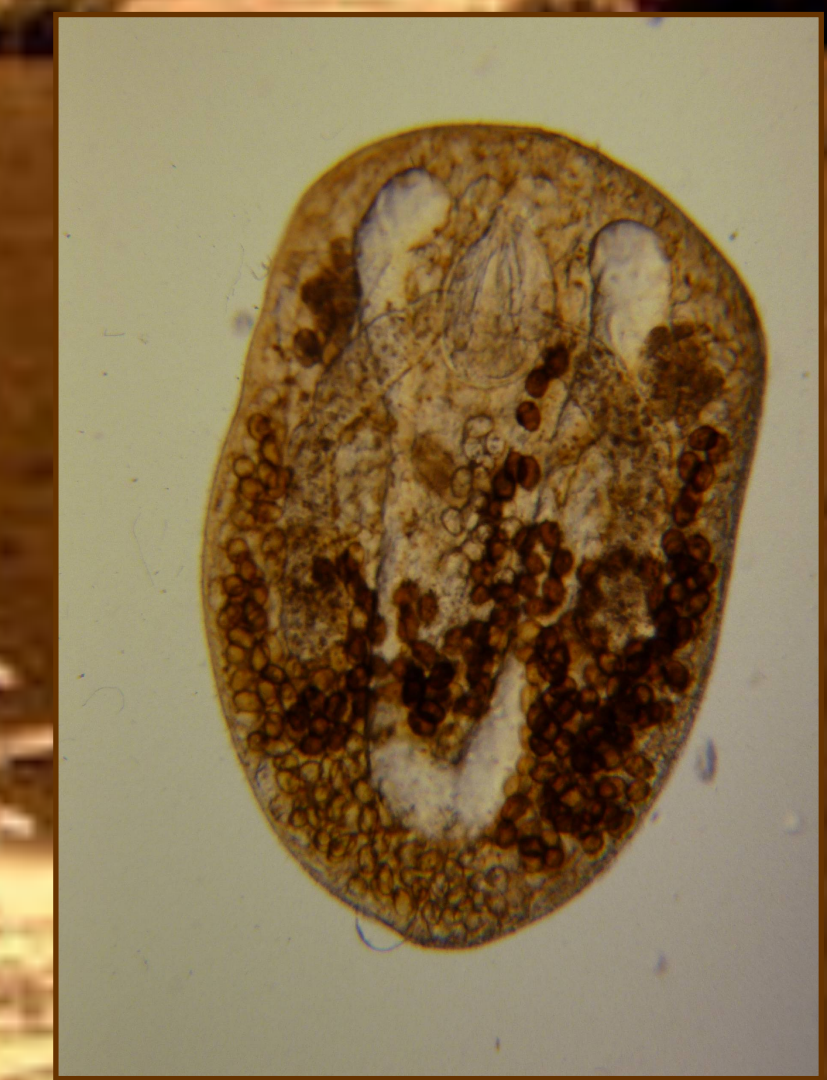
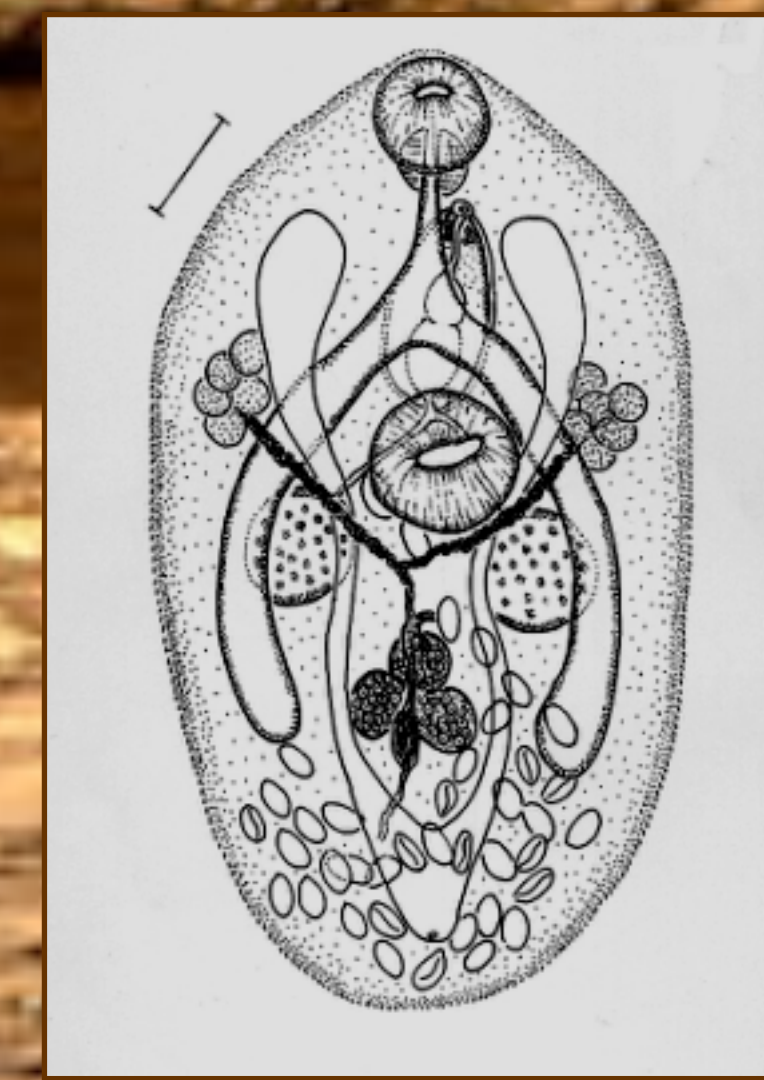
**Experimental infections and morphological comparisons:** The following infections and controls were conducted:

- Uninfected *M. mcradyi* exposed to cercaria from *Tagelus plebeius*
- Reared *B. patronus* fed metacercaria from natural infected *M. mcradyi*
- Uninfected *B. ovata* fed metacercaria from *M. mcradyi* to assess metacercarial transference
- Compared immature and adults specimens from *B. patronus* with metacercaria and experimental immature specimens.
- Compared naturally infected metacercaria with experimentally produced
- Naturally infected *M. mcradyi* were maintained alive in aquaria for a week to observe metacercarial behavior

**Conclusion: Proposed Life Cycle**

The cercariae seed by the clam *T. plebeius* penetrate and remain like an unencysted metacercariae in the ctenophores *M. mcradyi*, *B. ovata* and jellyfishes. The morphology of the metacercariae from natural and experimental infections is similar. The metacercariae could pass from one species of ctenophores to another by eating one each other. The metacercariae develop in immature adults of *Bacciger brevoortii* n. sp. in fish experimentally infected. The morphology of the experimental, and naturally infected juvenile is similar. Possibly this species like others species of *Bacciger* uses also an amphipod as second intermediate host with ctenophores and jellyfishes as paratenic host. This case represent a new life history scheme for faustulids that increases potential for infections. Finally during months with higher prevalence of infections, the frequency of small *M. mcradyi* (between 2 -5 mm) infected was 50-60%. These small specimens could play an important link between the metacercaria and the adult in the wild because they constitute an easy prey for the final host. Juvenile and adult menhaden normally feed on large zooplankton. In this study, small but not large specimens of another species of hydromedusae were found in the stomach of these fish (see picture below).

Adult



Metacercaria



Cercaria

