



## Notes on the morphology of two species of *Gussevia* Kohn & Paperna (Monogenea: Dactylogyridae) parasitic on *Astronotus ocellatus* (Agassiz) (Perciformes: Cichlidae) from Brazil

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**Abstract:** *Gussevia asota* and *G. astronoti* (Monogenea) were collected on *Astronotus ocellatus* (Agassiz, 1831) from southeastern Brazil by the first time. A comparative morphological analysis between present specimens and their types showed variability in the morphology of the haptor.

**Key words:** fish parasite, taxonomy, freshwater fish, Neotropical region.

**Resumo.** Notas sobre a morfologia de duas espécies de *Gussevia* Kohn & Paperna (Monogenea: Dactylogyridae) parasitas de *Astronotus ocellatus* (Agassiz) (Perciformes: Cichlidae) no Brasil. *Gussevia asota* e *G. astronoti* (Monogenea) foram coletados de *Astronotus ocellatus* no sudeste do Brasil pela primeira vez. A análise morfológica comparativa entre os espécimes estudados e os espécimes-tipo mostrou variabilidade na morfologia geral do haptor.

**Palavras chave:** parasito de peixe, taxonomia, peixe dulcícola, região Neotropical.

*Gussevia* Kohn & Paperna, 1964 is a Neotropical monogenean genus which includes parasite species of cichlid fishes (Kritsky *et al.* 1986). Currently, there are 17 valid species in the genus, three of them are parasites on *Astronotus ocellatus* (Agassiz, 1831) from Amazonas River Basin (Thatcher 2006). During a parasitological survey of fishes from the Guandu River, southeastern Brazil, numerous specimens of *Gussevia asota* Kritsky, Thatcher & Boeger, 1989 and *G. astronoti* Kritsky, Thatcher & Boeger, 1989 were collected from the gills of *A. ocellatus*. A comparative morphological analysis between specimens of these species of *Gussevia* and their type specimens revealed variability. Herein, notes concerning the general morphology of the haptor of these monogeneans are provided.

Between December 2004 and November 2005, 35 specimens of *A. ocellatus* (Cichlidae) from the Guandu River (22°48'32"S, 43°37'35"W), State of Rio de Janeiro, Brazil were collected. The fish measured 20.4 (11.5-28.5) cm in standard length. The monogeneans were removed from

the gills of the hosts and placed in vials containing a 1:4.000 solution of formalin. After one hour, the vials were shaken and additional formalin was added to increase the concentration to 5%. The parasites were stained with Gomori's trichrome and mounted in Canada balsam; some specimens were mounted in Gray and Wess' medium (Humason 1979) for study of sclerotized structures. Measurements are in micrometers ( $\mu\text{m}$ ); means are followed by ranges in parentheses. The illustrations were made with the aid of a drawing tube mounted on a Hund Wetzlar H-600 phase contrast microscope. Voucher specimens are deposited in the Helminthological Collection of the Instituto Oswaldo Cruz (CHIOC), Rio de Janeiro, Brazil. Type-specimens of the two species studied and *G. rogersi* Kritsky, Thatcher & Boeger, 1989 deposited in the Invertebrates Collection of the Instituto Nacional de Pesquisas da Amazônia (INPA) were also examined. The ecological terms follows Bush *et al.* (1997) and haptoral terminology is according to Kritsky & Mizelle (1968) and related papers.

***Gussevia asota*** Kritsky, Thatcher & Boeger, 1989 (Figs. 1, 3, 4)

Measurements (based on 20 specimens from 40 examined): Body 523 (510-540) long; greatest width 100 (91-105) at level of gonads. Pharynx 22 (20-23) in diameter; haptor 90 (81-105) long, 109 (90-118) wide, well-developed anterior and posterior lobes, posterior lobe larger than anterior bearing bilateral small glandular patches. Ventral anchor 27 (26-29) long, base width 6 (5-7). Dorsal anchor 28 (26-30) long, base 8 (7-9) wide. Ventral bar 31-32 long; dorsal bar 34 (33-35) long. Hooks pairs 1, 2, 3, 4, 6 and 7, 11-12 long; hook pair 5, 13 (12-14) long. Testis, 77-74 long, 17-18 wide. Male copulatory organ 52 (49-54) long, proximal ring diameter 12 (10-13). Accessory piece 33 (32-35) long. Germarium 86-87 long, 21-22 wide.

Host: *Astronotus ocellatus* (Agassiz, 1831)  
(Perciformes: Cichlidae)

Site of infection: Gills.

Locality: Guandu River, State of Rio de Janeiro, Brazil (22°48'32"S, 43°37'35"W).

Voucher specimens: CHIOC N° 36991a, b; 36993.

Other specimens studied: Holotype (INPA N° 170) and nine paratypes (INPA N° 171a-i).

Prevalence: 71.4% (25 of 35 fishes examined).

Mean intensity: 17.6

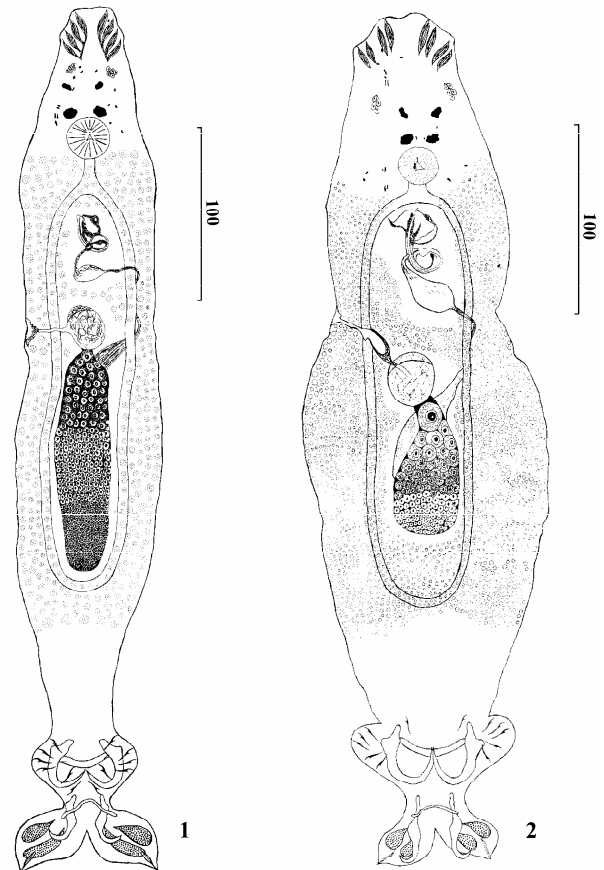
***Gussevia astronoti*** Kritsky, Thatcher & Boeger, 1989 (Figs. 2, 5, 6).

Measurements (based on 20 specimens from 35 examined): Body 465 (443-508) long; greatest width 145 (135-151) at level of gonads. Pharynx 25 (22-27) in diameter; haptor 73 (63-77) long, 111 (102-120) wide, well-developed anterior and posterior lobes, the anterior lobe larger than posterior bearing bilateral small glandular patches. Ventral anchor 39 (38-40) long, base width 7 (6-8). Dorsal anchor 33 (32-34) long, base 10 (9-11) wide. Ventral bar 35 (33-37) long; dorsal bar 45 (43-47) long. Hooks pairs 1, 2, 3, 4, 6 and 7, 10 (8-12) long; hook pair 5, 14 (12-15) long. Testis, 47 (42-52) long, 19 (17-20) wide. Male copulatory organ 71 (69-72) long, proximal ring diameter 13 (12-14). Accessory piece 51 (48-54) long. Germarium 53 (48-58) long, 29 (24-33) wide. Vagina dextral, with internal well sclerotised shield, opening in anterior half of trunk.

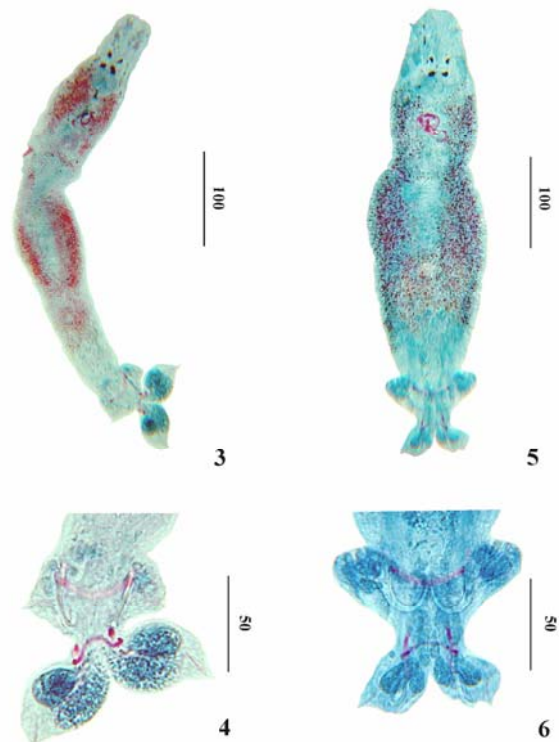
Host: *Astronotus ocellatus* (Agassiz, 1831)  
(Perciformes: Cichlidae).

Site of infection: Gills.

Locality: Guandu River, State of Rio de Janeiro, Brazil (22°48'32"S, 43°37'35"W).



**Figures 1-2.** *Gussevia asota*, 1. ventral view. *Gussevia astronoti*, 2. ventral view. Scales in micrometers.



**Figures 3-6.** *Gussevia asota*. 3. Entire specimen, 4. detail of the haptor (stained with Gomori's trichrome). *Gussevia astronoti*. 5. Entire specimen, 6. detail of the haptor (stained with Gomori's trichrome). All scales in micrometers.

Voucher specimens: CHIOC N° 36990a, b; 36992.  
 Other specimens studied: Holotype (INPA N° 169).  
 Prevalence: 62.8% (22 of 35 fishes examined).  
 Mean intensity: 17.5

Examination of the type-specimens of *G. asota* and *G. astronoti* showed that these species were adequately described by Kritsky *et al.* (1989). Nevertheless, all the specimens collected from Guandu River showed morphological differences in haptor and body shape. First, these specimens presented conspicuous well-developed haptoral lobes with bilateral posterior glandular patches (absent in original descriptions of *G. asota* and *G. astronoti* and in the type-specimens). Second, the body of specimens collected in Guandu River showed larger dimensions than the type-specimens. In addition, differences between the vagina illustrated by Kritsky *et al.* (1989) and the vagina observed in the holotype of *G. astronoti* were observed; in the holotype an internal well-sclerotized shield is present, but this detail was not illustrated in the original description.

The comparative morphology of the haptoral and copulatory complexes are nearly identical with the original description and observed in type-specimens, with minor differences easily explained by orientation of specimens. Also, differences in soft parts, can be a result of differing fixation technique: the type-specimens are apparently very contracted.

Another species of *Gussevia* described by Kritsky *et al.* (1989) parasitic on *A. ocellatus*, *G. rogersi*, also showed haptoral lobes. According to Kritsky *et al.* (1989), this species could be differentiated from *G. asota* and *G. astronoti* because the morphology of the male copulatory organ, vagina and sclerotised haptoral structures. We confirmed these differences with the observation of the holotype of *G. rogersi* (INPA N°318-1).

This is the first record of *G. asota* and *G. astronoti* in southeastern Brazil, outside Amazonas River Basin. Possibly, these parasite species were introduced with the host (*A. ocellatus*) in southeastern Brazil. *Astronotus ocellatus* is a native fish from Amazonas River Basin and is considered an allochthonous species in southeastern Brazil, where it was initially introduced during the 1960's (Azevedo *et al.* 2007). Formal quantitative data (intensity or prevalence) about species of *Gussevia* were not included in Kritsky *et al.* (1989), but in the remarks of the original description of *G. asota*, the authors commented the low infestation level of

this species (<10 worms/fish), interestingly, mean intensity of *G. asota* in the Guandu River (17.6) is much higher than the type-locality (Janauacá Lake, Amazonas, Brazil). Recently, Mendoza-Franco *et al.* (2007) recorded a single specimen of *G. asota* on six specimens of *A. ocellatus* from Central Panama, suggesting that *A. ocellatus* has lost their original monogenean since its colonization to Panama from South America.

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