



Fine-scale genetic structure patterns in two freshwater fish species, *Geophagus brasiliensis* (Osteichthyes, Cichlidae) and *Astyanax altiparanae* (Osteichthyes, Characidae) throughout a Neotropical stream

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ABSTRACT. Streams are very important environments for Neotropical freshwater fish fauna, and possess a high number of species. These small drainages are also highlighted by their intrinsic biological and physicochemical features; however, knowledge on the genetic distribution of fish in these drainages is limited. Therefore, in the present study, RAPD (random amplified polymorphic DNA) and microsatellite markers were used to analyze population differentiation and gene flow

of *Astyanax altiparanae* and *Geophagus brasiliensis* from three sites (high, medium, and low) throughout the Penacho stream (about 32 km long), which is a Neotropical stream. Both markers revealed higher levels of genetic diversity levels for *A. altiparanae* (\bar{P} : 90.05; H_s : 0.350) compared to *G. brasiliensis* (\bar{P} : 30.43; H_s : 0.118), which may be related to the particular biology of each species. AMOVA revealed significant genetic variation among populations of each species. All pairwise Φ_{ST} values were significant, ranging from 0.020 to 0.056 for *A. altiparanae* samples, and from 0.065 to 0.190 for *G. brasiliensis* samples. Bayesian clustering analysis corroborated these results and revealed clusters of both *A. altiparanae* (two based on RAPD data) and *G. brasiliensis* (two based on RAPD data and three on microsatellite data). Gene flow estimates showed that there were similar rates of migration among *A. altiparanae* samples and low rates of migration among some *G. brasiliensis* samples. These results suggest patterns of fine-scale genetic structure for both species in the Penacho stream. This information may enhance knowledge of Neotropical streams and may be useful for future management and conservation activities.

Key words: RAPD; Microsatellite; *Astyanax altiparanae*; *Geophagus brasiliensis*; South America