**METODOS**

We used FuzzyQ (Fuzzy Quantification of Common and Rare species in Ecological Communities) (Balbuena et al., 2021) to define common and rare species, the method is based on the abundance–occupancy relationship of species in a community (Balbuena et al., 2021). Where applies clustering to estimate a probability for each species to be common or rare based on its abundance-occupancy. We take in account silouette width and common.I (*Ci* s) value for species classification. Silhouette mensure how each species matches its own cluster (common and rare), values range between -1 (where species fits the opossite cluster) and +1 (the species fits its own cluster) (Balbuena et al., 2021). Common.I represent a probability of each species to be common, commonness index range 0 to 1 (Balbuena et al., 2021). 10 espécies comuns tiveram valores de silouette negativos, representando que as espécies se encaixava melhor no grupo oposto, porem, essas espécies tiveram o valor de Ci S maiores que 0.50. Portanto, utilizamos todas as espécies que o indice considerou comum. We performed FuzzyQ in the R environment (version 4.0.1, R Core Team 2020) using the *FuzzyQ* package(Balbuena et al., 2021)

Common.I represents the *Ci* s, that is, the probability of each spe

cies being common (Given that *Ci* = 1 – *Ri* , fuzzyq only returns *Ci* s).

FuzzyQ includes a bootstrap procedure to compute the confidence

intervals of *Ci* s. First, fuzzyqBoot generates and applies fuzzyq to *N*

bootstrap replicates by site of the species abundance matrix:

how well each species matches its own cluster (Equation 2,

Supporting Information). S

Silhouette values can range between −1

(the species fits the opposite cluster perfectly) and +1 (the species

fits its own cluster perfectly;

to define the 25% most abundant species as common species and the 75% least abundant species as rare ones. We opted to concatenate and use the second and third quartiles, because the 25% least abundant species only included singletons and doubletons. We constructed a rank abundance curve for all communities using raw abundances. Analyses were performed using all species and repeated separately for common and rare species

**RESULTADOS**

We found evidence of the effects of the predictors and their interactions on the community structure (presence-absence and relative abundance data) of total community, common species and rare species. Considering that the results of complete data set and the data set composed only of common species were similar (Tables 2 and 3), ordination plots are only shown for the former. Ordination plots of the common and rare species can be found in the supporting information (Figures S3 and S4 for the common species data set, S5 for the rare species data set).

However, mesohabitat showed an interaction with grazer occurrence for the three dataset (Table 3; Figure 4; Figure S4 for the common species; Figure S5 for rare species). Despite evidence of an interaction between the grazer factor and mesohabitat, the two-axes PCoA did not indicate effects of grazers in riffles (Figure 4b; Figure S4b for the common species data set) or pools (Figure 4c; Figure S4c for the common species data set).

We found that the effect of grazers on species composition (presence-absence) was not mediated by mesohabitat type or substrate roughness. However, According to our results, the effect of grazers on community structure (relative abundances) depended on the type of mesohabitat. Although significant, the interaction between mesohabitat and grazer was not clear to interpret in the ordinations. The subtle difference in the community structure may be attributed to *Cocconeis placentula* (a species complex), which was dominant in all combinations of the grazer factor. This species has a prostrate growth form (Goldsborough, 1994) and quickly colonizes substrates (Robinson & Rushforth, 1987). Grazed communities tend to exhibit an increase in species with prostrate growth forms and species that are adnately attached to substrates (DeNicola et al., 2021; Feminella & Hawkins, 1995; Passy & Larson, 2019). This is because the firm attachment of these diatoms to the substrate reduces grazing compared to pedunculated, floating or colonial forms, which are more easily reached by most grazers (Holomuzki & Biggs, 2006). Indeed, we can understand this interaction between mesohabitat and grazer through a turnover of the second-most-common species among mesohabitats (*G. parvulum* in riffles and *A. minutissimum* in pools). The occurrence of the short-stalked *Gomphonema parvulum* both on grazed and ungrazed substrates in riffles may reflect its resistance to grazing or its ability to replace more heavily grazed species. Similarly, Lange et al. (2011) observed that the congeneric *Gomphonema minutum* Agardhbecame more abundant at higher grazing pressures than in areas with low grazer density*.* By contrast, *Achnanthidium minutissimum* is a small and adnately attached diatom which is known to be less susceptible to grazing pressure (Bergey & Weaver, 2004; Holomuzki & Biggs, 2006) and hydrological disturbance (Schneck & Melo, 2012). Further, *A. minutissimum* was the species that showed the clearest response to the interaction between mesohabitat and grazer, through its increased abundance in riffles when grazers were present. Therefore, in riffles, grazers may have reduced the abundance of some common species, such as *Eunotia incisa* Gregoryand *Fragilaria capucina* Desmazières, favouring competitively dominant ones instead, such as *A. minutissimum* and *C. placentula.* Thus, this finding supports the possibility that grazer-periphyton interactions depend on the habitat in question. Therefore, at the local scale, although subtle, the environmental heterogeneity between mesohabitats influences the effect that grazers have on the species composition of benthic diatoms.

We suggest two probable explanations for the subtle effect of grazers on species composition in our experiment. First, we focused only on diatoms, as they are usually the most representative microorganisms in benthic communities in streams (Biggs, 1996), although other algal groups (Cyanophyta and Chlorophyta) may also be relevant for grazer consumption (Beck et al., 2019). Finally, the no effect of grazers on species composition might have been related to their low densities (Lange et al., 2011), as our study took place in a natural system.