SCIENTIFIC NOTE

Does Barypenthus concolor Burmeister (Trichoptera: Odontoceridae) Select Particles of Different Sizes for Case Building?

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Barypenthus concolor Burmeister (Trichoptera: Odontoceridae) Selecta Partículas de Diferentes Tamanhos Para a Construção de Casulos?

RESUMO - Larvas de muitas espécies de Trichoptera utilizam partículas orgânicas ou inorgânicas para construir seus casulos nos quais ficam protegidas de predadores. O estudo da grande variedade de estruturas produzidas por tricópteros é muito importante para o entendimento da evolução do comportamento de construção de casulos. O objetivo deste trabalho foi investigar se larvas de Barypenthus concolor (Burmeister) são capazes de selecionar tamanhos específicos de partículas para a construção de casulos. O estudo foi realizado em um riacho de altitude no Parque Nacional da Serra do Cipó, MG. Coletaram-se casulos e amostras do substrato em três locais do riacho, para os quais foram feitas análises granulométricas. A média da massa de cada tamanho de partícula encontrada em cada local foi utilizada para a determinação das proporções dos tamanhos de partícula presentes no substrato. As proporções dos tamanhos de partícula de cada casulo (ponto I: n = 10, ponto II: n = 19, ponto III: n = 13) foram também analisadas. As possíveis diferenças entre as proporções dos tamanhos de partícula presentes e dos tamanhos de partícula utilizados pelas larvas de B. concolor foram avaliadas por meio de Qui-quadrado. Cascalho médio e fino predominaram nos três locais amostrados (>70%). Não houve diferenças significativas entre as proporções esperadas e as observadas para tamanhos de partícula nos casulos. Portanto, B. concolor não seleciona tamanhos específicos de partículas para a construção de casulos.

PALAVRAS-CHAVE: Comportamento, macroinvertebrado bentônico, córrego de altitude

ABSTRACT - Many species of Trichoptera larvae use organic or inorganic particles to build cases that protect them from predators. The study of the wide variety of structures produced by trichopterans is important to understand the evolution of case building behavior. The objective of this work was to investigate if larvae of Barypenthus concolor (Burmeister) are capable of selecting particles of specific sizes to build their cases. The study site was an altitudinal stream in Serra do Cipó National Park, MG, Brazil). Cases and substrate samples were collected at three sites of the stream and submitted to granulometric analyses. The average mass of each particle size found in each site was used to determine the particle size proportion present in the substrate. The proportions of particle size of each case (site I: n = 10, site II: n = 19, site III: n = 13) were also analyzed. Possible differences between the proportions of the particle sizes of the substrate and of those used by B. concolor larvae were assessed by the Chi-square test. Medium and fine gravel predominated at the three sites (>70%). There were no significant differences between the expected and observed particle size proportion in the cases. Therefore, B. concolor does not select specific particle sizes for case building.

KEY WORDS: Behavior, benthic macroinvertebrate, altitudinal stream
Results from the granulometric analyses are presented in Table 1. Medium and fine gravel predominated at the site I (30.8% and 41.3%, respectively), II (46.7% and 36.8%, respectively) and III (58.0% and 28.9% respectively); these two particle sizes together represented more than 70% of all particles in the substrate. At all sites, silt (particles smaller than 0.063 mm) was available in very low quantities. This results from the swift current, characteristic of the altitudinal streams of this region, which prevents silt sedimentation (Allan 1995).

Table 1. Sediment particle size composition (%) the three studied sites in Indaiá stream, Serra do Cipó National Park, MG, Brazil.

| Size category      | Particle diameter (mm) | Site I | Site II | Site III |
|--------------------|------------------------|--------|---------|----------|
| Medium gravel      | > 4.000                | 30.8   | 46.7    | 58.0     |
| Fine gravel        | 2.000                  | 41.3   | 36.8    | 28.9     |
| Very coarse sand   | 1.000                  | 21.8   | 12.8    | 8.0      |
| Coarse sand        | 0.500                  | 4.0    | 2.4     | 2.3      |
| Medium sand        | 0.250                  | 1.7    | 1.0     | 1.9      |
| Fine sand          | 0.125                  | 0.2    | 0.2     | 0.5      |
| Very fine sand     | 0.063                  | 0.1    | 0.1     | 0.2      |
| Silt               | < 0.063                | 0.1    | 0.0     | 0.1      |

There were no significant differences between the expected and observed proportions of each particle size found in B. concolor cases (Fig. 1). Therefore, this species uses all different particle sizes present in the substrate, at random, except for medium gravel. The absence of medium gravel on trichopteran case composition may reflect a larval restriction to use this particle size, determined by the insect body size. However, even in the absence of medium gravel, the Х² test showed no significant differences between observed and expected frequencies of particle sizes used by B. concolor. Stuart & Currie (2002) found examples of Trichoptera species that built similar structures and presented different behavior. They also found taxa that built different structures using similar behavior patterns, independently of their phylogenetic distance. We believe that, if the behavior pattern is specific, it must be repeated in other B. concolor populations indigenous of sites with a substrate composition similar to the studied one.

Some benthic macroinvertebrates are specialized in specific substrate types (Allan 1995). Yet, our results showed that B. concolor depends directly on the particle size composition present in the substrate. The knowledge of this behavior pattern is important for conservation reasons, since changes on the composition of the substrate particle size caused by anthropogenic impacts can have a direct influence on the species survival. Dam building, water diversions, river channels, pollution and landscape alterations are examples of anthropogenic impacts that have caused
substantial changes towards substrate homogenization (Allan 1995, Karr & Chu 1999). Such a substrate alteration can have detrimental consequences to B. concolor because, to build their cases, the larvae utilize particles sizes in the same proportion as they are available in the habitat. Cases with homogeneous particle sizes could be less resistant to predators pressure. Also the insects could spend more time and require more adhesive substance to build their cases (which would represent a significant increase on energy costs), and cases’ architecture could differ from the one necessary for adequate breathing. Behavioral studies of B. concolor, as well as the results here presented, are environmentally important, because Baryphentus is an endemic genus of Brazilian lotic ecosystems (Flint et al. 1999) and the larvae of the order Trichoptera are widely used as biological indicators of water quality (Rosenberg & Resh 1993).

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