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Body-size frequency distribution in Cypridoidean non-marine ostracods (Crustacea, Ostracoda)

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Body-size distribution is known to be right-skewed in many animal groups (Hutchinson & MacArthur 1959; Van Valen 1973; May 1978, 1986; Dial & Marsluff 1988; Fenchel 1993; Brown 1995; Blackburn & Gaston 1994b, 1996; Owens et al. 1999). Although several conjectures have been elaborated to explain such pattern, including body-size optimization, dependence on resource distribution and the influence of environmental grain (Brown 1995; Gaston & Blackburn 2000), there is still no wide consensus on the issue. Additionally, Blackburn & Gaston (1994a) suggested that observed body-size distribution might be biased in groups with many species awaiting description because the discovery process does not randomly draw species from the global pool but favours large-body species instead. Within that conceptual framework, we here address the description of body-size distribution and the discovery record of the major ostracod group in inland waters, the superfamily Cypridoidea (Ostracoda, Podocopida). Ostracod body-size was assessed with carapace length data retrieved from the literature. After removing the marine/brackish water subfamily Paracypridinae, raw data set includes body-size measurements for 1127 species (approximately 64 % of overall diversity in the superfamily). Boddy-size frequency distribution was computed from the $\log_{10}$-transformed body-size data, the slope for species in body-size classes above the modal size class estimated with linear regression (ordinary least squares), and skewness measured as the third standardized moment of the distribution (Sokal & Rohlf 1981). Given that the number of size classes affects slope values (Loder et al. 1997), frequency distributions with different size classes above the modal one were analysed.

Cypridoidean body-size frequency distribution is highly right-skewed (Fig. 1). The number of species above the modal size class decline (in a log-log regression) with a slope of -1.37/-1.42, well within the range of actual values recorded in several other groups (Loder et al. 1997; Gaston & Blackburn 2000). Slopes of the estimated body-size distributions (with 50 and 20 body-size classes above the modal class) were both significantly smaller than -2 (t-test) (the theoretical value suggested by May 1978) but not significantly different between them (ANCOVA: $F = 0.0988$, $p = 0.7542$).

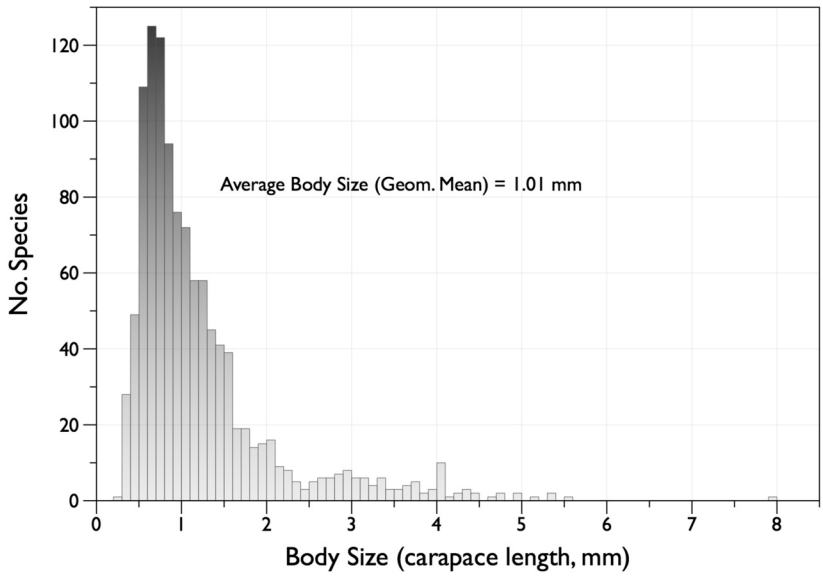

Fig. 1: Frequency distribution of body-size measurements of 1127 non-marine Cypridoidean ostracod species (subfamily Paracypridinae excluded).

Concerning the discovery record, the description rate has remained fairly constant since 1890. There are no signs of levelling off in the description process, thus making any attempt to fit a model for the extrapolation of the total number of species in the group useless (Bebber et al. 2007). Cypridoidean average body-size has decreased slightly but significantly through time (from 1.241 mm in 1870 to 1.009 mm nowadays; $p < 0.0001$), fitting predictions by Blackburn & Gaston (1994a). However, skewness showed no significant change through the whole record; thus suggesting a small impact in overall body size distribution with upcoming new species descriptions.

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