

Size Matters: Morphometric Analysis and Sexual Dimorphism in *Marrella splendens*

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Students from the Yoho-Burgess Shale High School Research project spent two days and two nights camping at the Walcott Quarry location. We appreciated experiencing field conditions, hiking, hearing lectures and learning the geologic context in which the lace crab, *Marrella splendens*, is preserved in the Burgess Shale. Harry Whittington's 1971 seminal population study on *Marrella splendens*, the most abundant arthropod at the Walcott Quarry, was the impetus for a morphometric reevaluation. The Geological Survey of Canada generously loaned over 100 specimens from Whittington's collection for our research study. The students measured two width and three length characters for each of these specimens to produce size-frequency and bivariate plots. Our size-frequency plots match Whittington's results, including the bimodal distribution that divides the population at about 10 mm at three discrete levels. His suggestion that this distribution pattern may reflect sexual dimorphism is supported by our analysis of an additional four characters. Bivariate plots (medial length vs. maximum width and inner spine length vs. outer spine length) demonstrate nearly isometric growth relationships. Most individuals are smaller than 10 mm, a pattern consistent with sexual dimorphism within a population in which only one gender grows to large size. Furthermore, the posterior dark stain commonly associated with *Marrella* specimens is rounded in several specimens. It has been informally suggested that these rounded shapes are reminiscent of egg sacs in some modern female arthropods. We have found that at least 80% of the specimens with rounded stains fall within the size class above 10 mm.