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Intraspecific decline in shell size of the bivalve Harpax spinosus across the Pliensbachian/Toarcian transition

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Abrupt changes in seawater temperature during the late Pliensbachian and early Toarcian significantly influenced not only species and functional diversity of marine benthic ecosystems, but also affected body size at intraspecific and community levels. Although community-level trends in body size driven by selectivity in species extinctions are well-documented, intraspecific trends in size and life-history strategies remain poorly explored. *Harpax spinosus* is an Early Jurassic plicatulid, bimineralic bivalve that was abundant during the Pliensbachian but went extinct at the onset of the Toarcian oceanic anoxic event. Here, we evaluate temporal changes in size-frequency distributions of this species at high stratigraphic resolution at Peniche and Fonte Coberta sections in the Lusitanian Basin. Analyses of *H. spinosus* at these sections document that this bivalve typically achieved 10-15 mm in length during the deposition of the *margaritatus* and *spinatum* zones, with left-skewed or bimodal size distributions. However, its median size significantly declines to < 10 mm within the *spinatum* Zone (in the upper part of the *apyrenum* Subzone), coinciding with the appearance of small koninckinid brachiopods. This size reduction is followed by a return to larger sizes in the upper part of the *spinatum* Zone. A second decline in size occurs in the lowermost Toarcian where *Harpax* co-occurs with small-sized *Koninckella-Nannirhynchia* assemblage (*Koninckella* fauna), immediately above the *mirabile* Subzone. Although this abrupt decline in size can be accentuated by condensation, the size distribution at bedding plane is strongly left-skewed (with infrequent small-sized individuals), in contrast to the size distribution in the overlying marl. *Harpax* assemblages in the lowermost Toarcian *semicelatum* Subzone are characterized by right-skewed or symmetric size-frequency distributions, with median size < 10 mm. Sclerochronological analyses of growth rings and stable isotopes indicate that the decline in size was not associated with any decline in lifespan and was rather associated with a decline in the von Bertalanffy growth coefficient.