Phenotypic Plasticity in the Burrows of the Deep-Sea Isopod *Bathynomus doederleini* (Crustacea: Isopoda: Cirolanidae)

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We investigated whether the deep-sea isopod *Bathynomus doederleini* has the capacity to change burrow length in response to changes in environmental conditions. We observed burrowing behavior in individuals that were placed on substrates with either simple (ST) or complex (CT) surface topographies. For ST group, the aquaria were filled with 0.3% agar to a depth of 25 cm. For CT group, we placed five plastic, transparent T-shaped tubes on the surface of the agar substrate.

Individuals in the ST group (N = 10) constructed seven burrows. The mean ratio of the burrow length to body length was 1.8. The individuals in the CT group (N = 10) constructed eight burrows with a mean ratio of burrow length to body length of 2.5. Thus the burrows were significantly longer in the CT group ($F_{6,7} = 5.66$, $p = 0.039$; t (Welch) = 2.22, df = 7.84, $p = 0.029$).

These results demonstrated phenotypic plasticity in the burrows of *B. doederleini* in response to sea floor topography complexity. The capacity to change the burrow morphology in response to different environmental conditions suggests they have a highly organized central nervous system that is able to assess their environment.