

## Evolution of Oasisia, an unusual polytypic vestimentiferan

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Oasisia tubeworms (Annelida: Siboglinidae) are highly unusual compared to other eastern Pacific siboglinids. For example, Riftia and Tevnia are monotypic genera, each with a single species distributed across thousand of kilometers of the East Pacific Rise (EPR). In contrast, molecular analyses revealed that Oasisia is polytypic, comprising five distinct evolutionary lineages: three discrete lineages (nominally *O. alvinae*) occurring sympatrically along portions of the northern and southern EPR; a fourth lineage inhabiting an isolated region south of the Easter Microplate along the easternmost segment of the Pacific-Antarctic Ridge (PAR); and a fifth, *Oasisia fujikura*, occurring along the Kermadec Arc in the southwest Pacific. These Oasisia lineages are also unusual phenotypically. Riftia and Tevnia tend to be relatively homogeneous in sizes and body proportions across their vast ranges, and high levels of gene flow connect the discrete vent populations. The genetically distinct Oasisia lineages, however, vary wildly in sizes and shapes, ranging from broad mats composed of thousands of tiny worms, each a few centimeters long, to massive clusters of meter-long, worms that envelop tall hydrothermal chimneys. These differences even exceed the noteworthy phenotypic plasticity exhibited by the 'short fat' and 'long skinny' morphotypes of *Ridgeia piscesae* along the northeast Pacific ridge axes. A suite of nuclear and mitochondrial DNA markers was examined to elucidate the population genetic and evolutionary relationships among these diverse Oasisia lineages and place them in the broader phylogeny of vestimentiferan siboglinids.