

## **Phylogeny of Ophryotrocha (Polychaeta, Dorvilleidae) from hydrothermal vents with descriptions of six new species**

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Ophryotrocha is a widely distributed genus of Dorvilleidae from diverse marine environments. A number of Ophryotrocha species are opportunistic or stress-tolerant in deep-sea reduced environments such as hydrothermal vents, methane 'cold' seeps and whale falls. Until now, only five Ophryotrocha species were known from hydrothermal vents, including Ophryotrocha akessoni Blake, 1985, O. platykephale Blake, 1985, O. globopalpata Blake & Hilbig, 1990, O. wubaolingi Miura, 1997 and O. fabriae Paxton & Morineaux, 2009. Here, we studied Ophryotrocha specimens collected from hydrothermal vents across a large geographic scale. Phylogenetic analyses were conducted based on concatenated DNA sequences from mitochondrial (COI and 16S rRNA) and nuclear (H3 rRNA) genes. Totally, nine species were identified, including the previously known O. akessoni, O. platykephale, O. globopalpata and six new species. Five of six new species, from the Gulf of California, Southeast Pacific Ridge and Southwest Indian Ridge, were morphologically close to O. akessoni, with a rounded prostomium, ventral-laterally inserted palps and similar shape of noto- and neurochaetae. The other new species was similar to O. platykephale based on long thin antennae, dorsal-laterally inserted palps and long blades on neurochaetae. A maximum likelihood analysis showed three major clades. Clade 1 was comprised of O. akessoni and 5 new species, supporting the morphology results. Clade 2, comprised of O. platykephale and a new species from Lau Basin, and Clade 3, formed by O. globopalpata alone, were clustered together with O. flabella known from whale falls. Our results indicate a marked previously unknown diversity and biogeographic patterns in Ophryotrocha from hydrothermal vents.