



New crabs from hydrothermal vents of the Kermadec Ridge submarine volcanoes, New Zealand: *Gandalfus* gen. nov. (Bythograeidae) and *Xenograpsus* (Varunidae) (Decapoda: Brachyura)

COLIN MCLAY

School of Biological Sciences, Canterbury University, PB 4800, Christchurch, New Zealand. E-mail: Colin.mclay@canterbury.ac.nz

Abstract

Gandalfus puia gen. et sp. nov. (Bythograeidae) is reported from submarine volcanoes near the Kermadec Islands. The genus *Austinograea* is revised with the result that *A. yunohana* Takeda, Hashimoto & Ohta, 2000 is transferred to the new genus. Both of these species occur in relatively shallow waters (240–1650 m) compared to other bythograeids. A sister group hypothesis of the modern genera, *Allograea* + (*Segonzacia* + (*Cyanagraea* + (*Bythograea* + (*Gandalfus* + *Austinograea*)))) is presented to provide an interpretation of variation in eye regression and male gonopods; *Austinograea* and *Gandalfus* are the most derived genera. The pattern of eye regression with depth is discussed. A varunid, *Xenograpsus ngatama* sp. nov., also collected from these volcanoes, is the first record of this genus from the southern hemisphere. Keys to all known species of the family Bythograeidae (13 species 6 genera) and to the genus *Xenograpsus* (3 species) are presented.

Key words: *Austinograea*, Kermadec Islands, South Pacific, identification key, eye regression, evolution

Introduction

In a recent review of vent decapods, Martin & Haney (2005) listed 125 species belonging to 33 families. In addition, Desbruyères & Segonzac (1997) have provided a useful handbook to hydrothermal vent faunas. Studies of hydrothermal vents and seamounts in recent years have resulted in the discovery of many new species of unusual crabs, particularly of the families Bythograeidae Williams, 1980 and Varunidae H. Milne Edwards, 1853. These animals are important predators in hydrothermal vent communities because they are often very numerous (Martin *et al.* 1998; Jeng *et al.* 2004; Martin & Haney 2005). Sampling of the Kermadec underwater volcanoes by NIWA biologists has brought to light two new crabs belonging to these families. New anomurans of the genera *Munida* and *Agononida* (see Vereshchaka 2005) and *Munidopsis* (see Schnabel & Bruce 2006) have also recently been reported. Webber (2004) reported a new species of prawns of the genus *Alvinocaris* and *Chorocaris* from this area. Other animals discovered from these active volcanoes, at a depth of 216–460 m, include a large mussel, *Gigantidas gladius* Cosel & Marshall, 2003 (Cosel & Marshall 2003). The Kermadec volcanoes are associated with Pacific–Australian plate convergence at the Kermadec Trench. “Rumble III” is an active volcanic site that shoals to 220 m and last erupted in 1986 as observed by a Japanese fishing trawler at the time (Ian Wright, pers. comm.). Recent geological reports on this site can be found in de Ronde *et al.* (2001), Wright (2001) and Wright *et al.* (2002).

The Bythograeidae includes 12 species in 5 genera (assuming that *Bythograea intermedia* Saint Laurent, 1988 is a synonym of *B. thermydron* Williams, 1980; see Guinot & Hurtado 2003: 431). Most of these are known from the Eastern Pacific Rise with only 4 species of *Austinograea* Hessler & Martin, 1989 known from