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REPORT

The recovery of coral genetic diversity in the Sunda Strait following the 1883 eruption of Krakatau

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Abstract Surveys of microsatellite variation show that genetic diversity has largely recovered in two reef-building corals, *Pocillopora damicornis* and *Seriatopora hystrix* (Scleractinia: Pocilloporidae), on reefs which were decimated by the eruption of the volcano Krakatau in 1883. Assignment methods and gene flow estimates indicate that the recolonization of Krakatau occurred mainly from the closest upstream reef system, Pulau Seribu, but that larval input from other regions has also occurred. This pattern is clearer in *S. hystrix*, which is traditionally the more dispersal-limited species. Despite these observed patterns of larval dispersal, self-recruitment appears to now be the most important factor in supplying larvae to coral populations in Krakatau. This suggests that the colonization of devastated reefs can occur quickly through larval dispersal; however, their survival requires local sources of larvae for self-recruitment. This research supports the observation that the recovery of genetic diversity in coral reef animals can occur on the order of decades and centuries rather than millennia. Conservation measures aimed at sustaining coral reef populations in Krakatau and elsewhere should include both the protection of upstream source populations for larval replenishment should disaster occur as well as the protection of large adult colonies to serve as local larval sources.

Keywords Dispersal · Recovery · *Pocillopora* · *Seriatopora* · Microsatellite · Volcano

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Introduction

On August 26, 1883, the eruption and near-total destruction of the volcano Krakatau in the Sunda Strait, Indonesia, completely exterminated all marine life in the surrounding area. Pyroclastic flows deposited molten rock and ash at a temperature of 475–550°C to an average thickness of 20 m (Mandeville et al. 1994) on the surrounding sea floor (Sigurdsson et al. 1991). It is the scientific consensus that all life within a 15 km radius was completely extinguished by this eruption (Simkin and Fiske 1983; Thornton 1996). A new volcanic island Anak Krakatau ("the Child of Krakatau") has been rising in the caldera since August