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# A new technique to increase polyp production in stony coral aquaculture using waste fragments without polyps

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## ABSTRACT

The wild harvest of corals for the aquarium trade has had negative impacts on coral reef ecosystems. Although this problem can be directly addressed by increased availability of cultured corals, improvements to current aquaculture techniques are needed to rise coral production. Here, we carried out a manipulative experiment using the large polyp reef-building scleractinia coral *Duncanopsammia axifuga* to test whether the presence or absence of polyps, the orientation of the fragment's trunk (upside-down or right way up), or heterotrophic diet (unfed, normal *Artemia* and lipid-enriched *Artemia*) influences polyp production, growth, survival, and overall health of the coral. There was an 85% survivorship of fragments across all experimental treatments regardless of trunk orientation. *D. axifuga* produced the highest number of new polyps from fragments initially fixed without polyps, with diet having no effect of polyp production. Conversely, normal and lipid-enriched *Artemia* diets significantly enhanced growth and polyp production in fragments that were initially fixed with one polyp. Overall, we conclude that *D. axifuga* is suitable for coral aquaculture purposes due to high survival rates and also because polyp production was successful from what was previously considered waste fragments (i.e. without polyps). Further work is required to determine whether these aquaculture techniques enhance polyp production in other coral species with similar morph types used in commercial aquaculture.

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