

## Aquaculture of the Galapagos sea cucumber, *Isostichopus fuscus*

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### Abstract

This paper presents the results of the first attempt to breed the sea cucumber *Isostichopus fuscus* in land-based installations on the coast of Ecuador. This species has been intensively fished along the mainland and around the Galapagos Islands, where efforts at management have always met strong opposition from local communities. Ecuadorian populations of *I. fuscus* have thus been severely depleted over the past decade. The topics presented here include spawning, fertilization, larval rearing, disease control and juvenile growth. Data pooled from monthly trials conducted over three years indicate that, under optimal conditions, juveniles can be grown to a size of ca. 8 cm in length in 3.5 months. The survival rate is typically between 30 and 50 %. Furthermore, preliminary experiments have shown that the growth of young sea cucumbers in abandoned shrimp ponds is a promising option. Overall, this study demonstrates that *I. fuscus* can be reared in captivity, thus providing an alternative to fisheries, or a way to maintain sustainable harvests and eventually contribute to the restoration of the natural populations.

**Keywords:** Holothurian, spawning, larvae, development, juvenile, growth, disease

## 厄瓜多尔等刺参的养殖

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### 摘要

本文介绍了在厄瓜多尔沿海首次利用陆基实施培育等刺参 (*Isostichopus fuscus*) 的实验结果。产于厄瓜多尔沿海和加拉帕戈斯岛的该种海参多年来被大量捕捞，为保护资源免遭破坏的种种努力受到当地社团的反对，因此，厄瓜多尔等刺参的种群在最近的10多年来遭受严重破坏。本文介绍了等刺参的产卵、受精、幼虫培养、病害控制和幼参的养殖。在三年多内，每月进行的试验数据表明，在适宜条件下，幼体在3个半月的时间内体长可以达到8厘米。具有代表性的成活率在30-50%之间。进一步的实验证明，在废弃的对虾池内养殖等刺参是有前途的。总之，试验表明，等刺参可以在池塘等实施条件下进行养殖，为单纯的捕捞渔业找到了另一条途径，或者说，找到了可持续收获的路子，最终为天然资源增殖做出贡献。

**关键词:** 海参、产卵、幼虫、发育、稚参、生长、病害

### Introduction

*Isostichopus fuscus* (Figure 1) is a deposit-feeding sea cucumber that is mainly found on reefs and sandy bottoms along the western coast of the Americas, from northern Peru to Baja California, Mexico (Castro, 1993; Toral, 1996; Sonnenholzner, 1997; Gutierrez-Garcia, 1999). Like many other commercial species, *I. fuscus* has been widely fished over the past decades to meet the growing demand for beche-de-mer on the major Asian markets. As the waters along mainland Ecuador became depleted, the fisheries shifted to the Galápagos Islands, raising international apprehension over the fate of this very unique archipelago, which has been recognized as a national park and marine reserve.