

Photo-identification of *Stichopus mollis*

by Lesley Raj
University of Otago, New Zealand

This note outlines the preliminary result of a photo-identification study, which began in December 1996 and is continuing. Holothurians lack obvious hard parts, and therefore cannot be aged directly. The most obvious way to study growth rate would be by some method of tagging or marking individuals for identification (Gentle, 1982; Conand, 1990). These processes are difficult however due to the animals' ability to rapidly regenerate damaged tissue and expel foreign objects embedded in the body wall (Gentle, 1990; Conand, 1990). The main objective of the study is to deter-

mine if characteristic markings, for example warts and spots, on individual *Stichopus mollis* can be used as a means of identification.

Site

A site was chosen in Elizabeth Basin, Doubtful Sound, Fiordland (Fig. 1). It was selected for many reasons, the first being the presence of *Stichopus mollis* in sufficient numbers to allow for re-identification of individuals during recurring visits to the site.

The nature of this study requires divers to be down for a period of up to 60 minutes. Maximum depth at Elizabeth Basin is 15 m, which allows a long and safe bottom time when diving to photograph the animals.

The area is enclosed by natural boundaries: a rock wall, a vertical face and a shallow beach. These act as a natural barrier to animals trying to move into or out of the area, again increasing the chances of re-photographing individuals for identification and growth studies.

There is no fishery yet in New Zealand for *Stichopus mollis*, so there should be no loss of holothurians through fishing. Due to the remoteness of Doubtful Sound, no losses due to disturbance by other divers were expected.

Methods

A dive buddy and I swim transects from the shallowest point of the study site, along the rock wall. We move towards the vertical cliff, photographing any *Stichopus mollis* within 5 m of the transect line. Once we reach the end of the transect, at which the depth is approximately 15 m, we move across 5 m and swim back towards the beach, again pho-

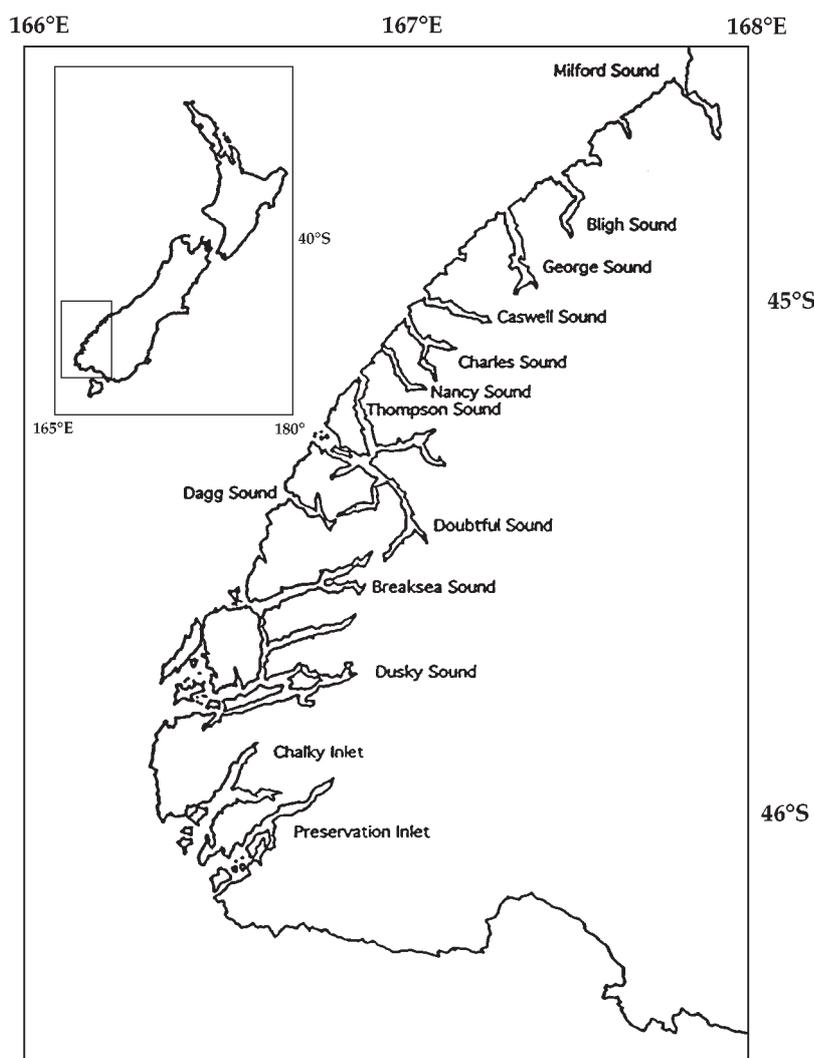


Figure 1

South-western New Zealand showing Doubtful Sound and the other major fiords (from Stewart, 1995, p. 52)

tographing any *S. mollis* we pass. This process is repeated until the camera film is finished, or the transects completed.

Total length is the only measurement that can be taken underwater, and is therefore the only feasible estimate for field use (Sewell, 1990). At each individual *Stichopus mollis*, my dive buddy holds or places a ruler beside the animal for the photograph. The photographs are generally taken from above to give a dorsal view of the animal. Generally, visibility at this site is good, ~20 m. Special care is taken to ensure the animals are not touched by the divers or the ruler, to make sure the animals are photographed in a 'resting' state.

The photographs for each month are placed into one of four groups according to the individuals' visual characteristics: 1) spots, 2) stripes, 3) monocolour and 4) obvious, unique patterns. Then the photos between months can be compared and any matching patterns or characteristics indicate the re-identification of individuals. These animals' length measurements can then be taken from the ruler in the photo and their growth calculated.

Results and discussion

Up until the end of September 1997, seven individuals have been positively identified due to their characteristic markings (Fig. 2).

Stichopus mollis appear to have characteristic warts and spots that remain constant for a period of at least 18 weeks. The sequence of these natural markings allow re-identification of individuals from a wild population.

This method of tracking holothurians is non-invasive, and does not restrict the individuals feeding or movement. Photo-identification is therefore favourable when studying growth and movement, as there are no external variables to consider, for example thinning of tegument (Lokani, 1992).

Photo-identification is only useful for identifying holothurians which have naturally occurring markings. Stewart (1993) was able to readily identify *Holothuria scabra* from photographs due to their characteristic large body wrinkles (these animals were kept in enclosures).

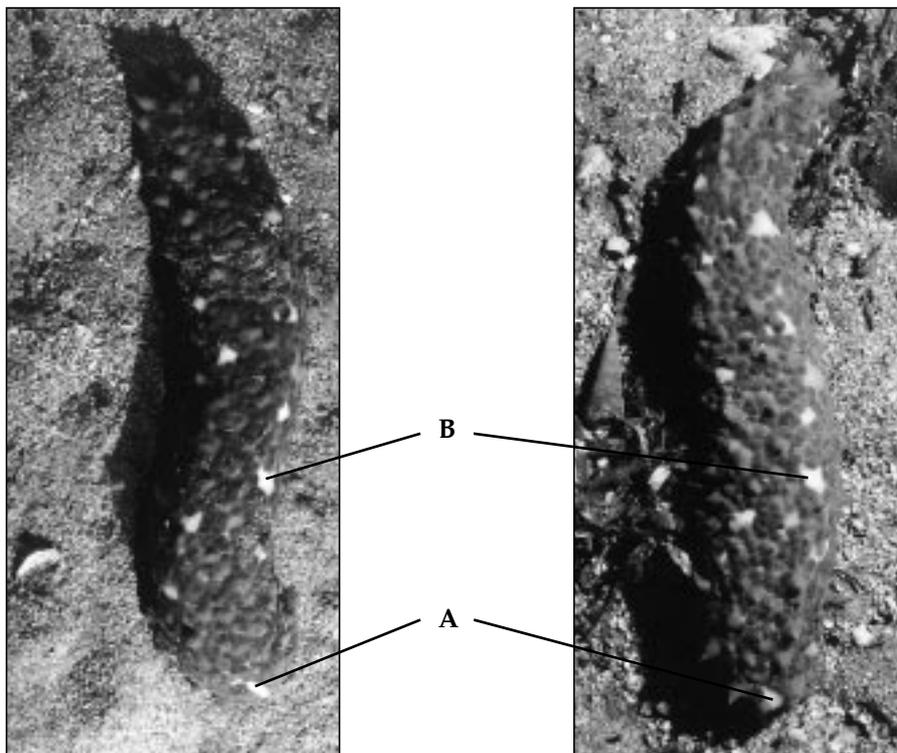


Figure 2

The same individual *Stichopus mollis* with photos taken 13 weeks apart
(A and B are characteristic spots)

The process of matching photographs is time consuming and tedious. If a computer programme existed, similar to a police fingerprint database, photos would be an efficient means of identifying holothurians. However, this study does prove photo-identification can be used as a means of re-identifying holothurians for growth measurements.

Acknowledgements

The study is funded by the University of Otago, New Zealand. Travel assistance is provided by 'Fiordland Travel' and film supplied at a discounted price by 'Agfa'.

References

- CONAND, C. (1990). The fishery resources of Pacific island countries. Part 2: Holothurians. FAO Fisheries Technical Paper, No. 272.2 : 143 p.
- GENTLE, M.T. (1982). Unpublished report on population biology of beche-de-mer in Fiji. South Pacific Commission, Noumea, New Caledonia.

GENTLE, M.T. (1990). Ecology and resource potential of commercial beche-de-mer. South Pacific Commission, Noumea, New Caledonia.

LOKANI, P. (1992). First results of an internal tag retention experiment on sea cucumber. SPC Beche-de-mer Information Bulletin No.4: 9–12.

SEWELL, M.A. (1990). Aspects of the ecology of *Stichopus mollis* (Echinodermata: Holothuroidea) in north-eastern New Zealand. New Zealand Journal of Marine and Freshwater Research, 24: 97–103.

STEWART, B.G. (1993). Evidence for a marked decline of beche-de-mer populations in the Suva and Beqa areas of Fiji, and a preliminary description of a method of identifying beche-de-mer individuals based on characteristic body wrinkles. The University of the South Pacific Marine Studies Technical Report 1. 20 p.

Preliminary notes on the exploitation of holothurians in the new Wakatobi Marine National Park, Sulawesi, Indonesia

by Abigail Moore¹

Introduction

The remote Wakatobi or Tukang Besi islands are situated in the south-east of Sulawesi (Indonesia) in the area of greatest tropical marine biodiversity (Tomascik et al., 1997). They are inhabited by two separate ethnic and cultural groups: the Bajo, or sea-gypsies, who live almost exclusively by the exploitation of marine resources at a very low subsistence level; and the land-based islanders, who are mainly farmers and traders. There are also large numbers of vessels from other parts of Indonesia, and even other countries exploiting the area.

Fishery background

Holothurians are mainly exploited by the Bajo, but also collected by anyone, anywhere if seen in the

course of other activities, including by the crews of many vessels just passing through. The area has a long history of beche-de-mer exploitation, but there is no separate 'holothurian fishery' as such.

Holothurians form an important part of a multi-species invertebrate fishery (WWF, 1994), which is often also combined with fin-fish exploitation, as reported in other Indo-Pacific areas (Trinidad-Roa, 1987; Conand, 1997). The product is largely marketed through Chinese traders in Bau-Bau, the nearest town of any size, or to visiting Bugis or Chinese traders en-route to Surabaya.

As one of the few cash-earning commodities in what is still predominantly a barter economy, 'trepane' are more important to the local community than their actual value might suggest.

1. BSc, MSc student at Hull University, UK. E-mail: abigailmoore@hotmail.com