FISHERIES RESEARCH BULLETIN OF TONGA

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CONTENTS

Ministry of Fisheries, the Kingdom of Tonga
Japan International Cooperation Agency

Foreword

It is my great pleasure to announce the publication of Fisheries Research Bulletin of Tonga. Fisheries products play very important roles in the diet and culture of the Tongan people and in foreign trade of the country. Therefore, the optimum and sustainable utilization of the fisheries resources are essential issues in the country's development. I cannot therefore over-emphasize the importance of scientific fisheries research to ensure the wise utilization of fisheries resources. This bulletin is not only a milestone in scientific research conducted in Tonga but also an instrument to facilitate exchange of scientific information with foreign countries. I hope that the contents of this bulletin will ever be enriched through the effort of Tongan fisheries scientists. Suggestions, opinions or criticisms on the articles contained in this bulletin are most welcome for the progress in fisheries research of the country.

Finally, I would like to express my appreciation to Japan International Cooperation Agency and fisheries experts despatched by the Agency to Tonga whose effort has made the publication of this bulletin possible.

15 July 1994

Sione Tualau MANGISI
Secretary
Ministry of Fisheries

Purpose of This Bulletin

Establishment of fisheries resource management is a prerequisite to the sustainable development of fisheries. In the Aquaculture Research and Development Project which was commenced in October 1991 as a joint project between Tongan Ministry of Fisheries and Japan International Cooperation Agency, we have been making a great deal of effort to establish such technology. This bulletin contains reports on the results of the research conducted as part of the project. I am convinced that each report marks a step toward the final goal, even though we still have to go a long way before successful fisheries resource management is a reality in Tonga. We also intend to exchange views and knowledge on the management of fisheries resources with the fisheries scientists of not only South Pacific region but also of the world through wide distribution of this bulletin.

15 July 1994

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Transport of Live Green Snails, *Turbo marmoratus*, from Vanuatu to Tonga

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Abstract

Fifty live green snails, *Turbo marmoratus*, were successfully transported from Vanuatu to Tonga. The average body weight of the green snails was 2 kg. The green snails were packed in plastic containers with paper towels wetted by seawater which contained streptomycin sulfate at 50 ppm in concentration. Transportation time was seventeen hours and twenty minutes. Temperature inside the plastic containers was 21.4-24.0C° during the transportation. Survival rate of the green snail was 100% after the transportation.

Introduction

The green snail, *Turbo marmoratus*, is a commercially important gastropod due to its highly prized mother-of-pearl shell and meat which is highly appreciated as food. However, this species does not occur in Tonga (Yamaguchi, 1988). Transplantation of this species was successfully conducted in Tahiti. Forty-two green snails were transplanted in Tahiti from Vanuatu in 1967 (Fig. 1). Now the population of the green snail in Tahiti has increased to the exploitable level (Yen, 1991). The transplantation of the green snail should also be considered in Tonga for the creation of a new resource for fishermen in future. Once a green snail resource is established by the transplantations, the population of green snail will be controlled under strong fishing pressure. Therefore, the transplantation of green

snail will not disturb the ecosystem of indigenious marine organisms. This report describes the results obtained in an experimental transport of live green snails from Vanuatu to Tonga carried out in June 1993.

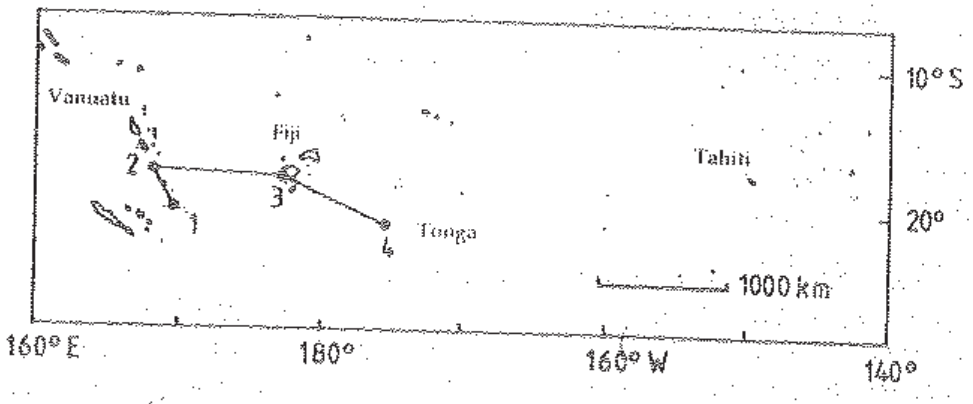

Fig. 1. The route of the green snail transport from Vanuatu to Tonga. 1. Anietyum Island, 2. Port Vila, 3. Nadi, 4. Fua'amotu

Method of the Transport

Collection of green snails

Vanuatu is the nearest country where the green snail has been commercially exploited (Fig. 1). Vanuatu Department of Fisheries agreed on the export of live green snails to Tonga in May 1993 upon the request of Tongan Ministry of fisheries. The collection site of the green snails was Anietyum Island that is the southern most Island of Vanuatu. Six local divers collected fifty green snails of 2 kg in average total weight within two weeks from 2 June 1993. They sent thirty-two green snails on 5 June and eleven on 17 June 1993 from Anietyum to Vanuatu Department of Fisheries in Port Vila. Vanuatu Department of Fisheries kept all green snails in its broodstock yard at Devil's Point situated one hours drive

from the Department. The broodstock yard is a groove of 10 m long, 2 m wide and 2 m deep situated in the rocky shore. Since the groove submerges under water 1-2 m deep at high tide, a fence encloses the groove to avoid escape of the green snail. The green snails were kept there for fifty days without any feeding. Survival rate of the green snail was 100% during the period.

Packing the green snails

All green snails were recovered from the broodstock yard at around 15:00 on 8 August and were transferred to FRP circular tank at the Fisheries Department. Water temperature of the brood stock yard was 25.9 °C while that in the FRP tank was 24.6°C. Packing started at 18:00. Ten snails were placed in aperture-down position in each of the five 60-liters plastic garbage bins. Paper towels wetted with seawater, which contained 50 ppm streptomycin sulfate, were put under, between and top of the snails. Dry paper towels were crumpled to plug the space between snails. Then the lids of the bins were fixed with adhesive tape and plastic ropes.

Air transportation of the green snails

The authors carried all the plastic bins as hand luggage by air. The flight departed from Vanuatu at 19:30 and arrived at Nadi, Fiji, at 22:00 local time. Custom formalities were very permissive because Tongan Ministry of Fisheries had already been given the permit for transhipment of the live green snails by the Fiji Ministry of Primary Industries. The snails were kept overnight by the Fiji Quarantine Service at the airport terminal. In the morning on 9 August 1993 at 7:45, the authors checked the snails and found no mortality. The flight departed from Fiji

at 10:10 and arrived at Fua'amotu, Tonga, at 12:30 local time. All the snails were placed in the tank at the Ministry of Fisheries in Nuku'alofa at 13:20.

Results and Discussion

It took seventeen hours and twenty minutes for the transport, from packing in Vanuatu to reimmersing in Tonga. The temperature inside the containers ranged from 22.5°C to 24.0°C during the transportation. Survival rate of the green snails was 100% after one week in the rearing tank. It has been shown that the green snail can be transported alive by the present method at least for seventeen hours if the temperature inside the container is controlled in the range mentioned above. It is necessary to conduct further experiment if transport of live green snail from other countries including Japan is considered. The most serious problem in the transport of longer time is the long transhipment time in Fiji. Special care must be taken to keep the green snails in an air-conditioned room to avoid high temperatures during the transhipment.

Acknowledgements

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