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STUDIES OF TURTLE-GRASS ECOLOGY AND PRODUCTIVITY IN SOUTH PACIFIC WATERS

by

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Introduction

In his recent report to SPIFDA, Dr Hirth claimed that the turtle resources of the areas of the South Pacific he visited consituted a valuable potential source of protein and of income for the people of the area. The marine turtle resource can be considered to be of special value to those island communities, distant from urban centres, whose terrestrial resources are severely limited and whose reefs and lagoons have, in some cases, been over-fished.

Turtle populations have been over-exploited in the South Pacific as elsewhere. The protection of nesting beaches, where it is practicable, can produce results only in the long term. For short term gains attention must be given to the development of ranching and/or farming of turtles.

Some good work in this direction is under way in Western Samoa and in the Torres Strait but much more needs to be known about the population dynamics of turtles, their physiology, behaviour and diets.

The diet of Chelonia mydas (the green turtle), perhaps the most important species (commercially) of the region, consists commonly of algae and the so-called "turtle-grasses". These grasses include species such as Syringodium isoetifolium, Halodule uninervis, H. pinifolia, and Posidonia spp.

If commercial exploitation of turtle resources is to be considered, even at the village level, knowledge is needed of the extent of turtle-grass pastures, the conditions under which they grow and their growth potential.

Present state of knowledge

During 1971 I have made a superficial examination of turtle grass pastures in some of the Lau islands and off the coast of Viti Levu in the Suva area. Two species appear particularly promising and some preliminary information is presented here:

Halodule uninervis. Location of study area: Fulaga, S. Lau. This species constitutes an important part of the diet of the green turtles commercially exploited in the Gulf of Aden (reported by Hirth and Carr). It has only recently appeared at Fulaga and occurs nowhere else in the Fiji group even though conditions apparently suitable for its growth are widespread.

The weight of leaves (oven-dried) in this pasture at any particular time are of the order of 2 - 3 tons per acre. Since the rate of regrowth after cutting, or grazing by turtles, is not known, it is not possible to estime the yield on an annual basis.

Syringodium isoetifolium. Location of study areas: Naselai and Nukubutho, near Suva. This species is common in Fiji waters where it forms extensive pastures. It is probably the same species as forms an extensive pasture near the Western Samoan turtle hatchery and, no doubt, is widespread in other parts of the South Pacific. This species has a pale green, cylindrical leaf which floats and is often seen in drift lines. Not uncommonly, green turtles graze this flotsam.

The oven-dried weight of leaves is in excess of 2 tons per acre in reasonably dense pastures and has a protein content of 6.1%.

Proposed study of Syringodium

I intend soon to initiate detailed studies of Syringodium isoetifolium at Nukubutho, near Suva. Monthly samplings of standing crop of Syringodium leaves and roots, and associated algae will be taken. This will show any seasonal variations in growth of this grass.

Turtle-grass pastures, in addition to providing a diet suitable for turtles, also provide a habitat suitable for the development of the larval stages of various fish and crustaceans. Monthly samplings of zooplankton will be designed to reveal the nature of these larval populations and their seasonal variation.

Simulated grazing of Syringodium will be undertaken and monthly measurements of regrowth made. An understanding of the capacity of this grass to recover after grazing is vital to any farming project.

Sea-grasses grow by rhizomes so transplantation will be an important part of any farming system. However, transplantation of turtle-grass is not easy and several techniques will have to be studied.

The wide range of fauna and flora associated with turtle-grass pastures (e.g. various algae, molluscs, fish, worms and fungi) will, wherever possible, be recorded. Any of these associated organisms might, under a farming system, become a pest and limit turtle-grass productivity. On the other hand some of these associated species could perhaps be contributing to the diet of turtles.

Physical and chemical factors associated with the growth of Syringodium will be measured over the period of the study (2 years). These include nutrients in seawater, tides, currents, dissolved oxygen, light, turbidity and temperature.

Obviously such a detailed study can only be undertaken in an area close to laboratory facilities such as are available at the University of the South Pacific. Various simple aspects of this study (e.g. monthly standing crop of turtle-grass and regrowth after grazing), however, can and should be undertaken in other parts of the South Pacific.

I am willing to offer advice to any individual who wishes to institute any studies of turtle-grass ecology and productivity. If interested people would contact me then a proposal for funds to cover the costs of simple harvesting equipment, drying ovens, thermometers, etc. could be drawn up to cover everybody's needs. Further, coordination of this type will mean better planning of experiments and add considerably to the value of the data.

Study of other turtle-grass species

Other promising species need to be studied along the lines described above. If funds can be found for graduate students from U.S.P. or overseas universities I can direct such students in studies of, for example, Halodule uninervis at Fulaga or in some other more accessible South Pacific location.

Meanwhile, the data which might come from individuals interested in undertaking the simple studies referred to above, will be of great value in our search for an understanding of the ecology of turtle-grasses, their significance for turtle grazing and as a zooplankton habitat, and their commercial potential.