

Edible Seaweeds - An Important Source of Food and Income to Indigenous Fijians

G. ROBIN SOUTH

The collection and consumption of edible seaweeds is widespread among Polynesian and Melanesian peoples of the South Pacific Islands, but up to now very little indeed has been written on the subject. The uses of seaweeds as human food have been summarized in several accounts (e.g., Chapman and Chapman 1980; Abbott and Cheney 1982; Abbott 1988). Abbott (1984) has written an excellent overview of their uses by Polynesians in Hawaii. In a recent study of edible seaweeds in Fiji (South, in press), the taxonomy of the species involved, their collection and marketing, and the

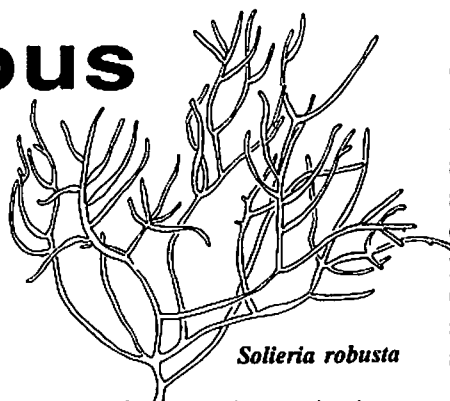
social aspects of seaweed harvesting have been reported.

In Fiji, edible seaweeds form an important part of the diet, and information on the sales of seaweeds in Fijian municipal markets has been gathered for some years by the Fiji Fisheries Division (1981-91). These surveys provide the best database on edible seaweeds in the South Pacific region. The Fiji Fisheries Division has also developed posters displaying nonfish marine products which include photographs of edible seaweeds, with their scientific and Fijian names.

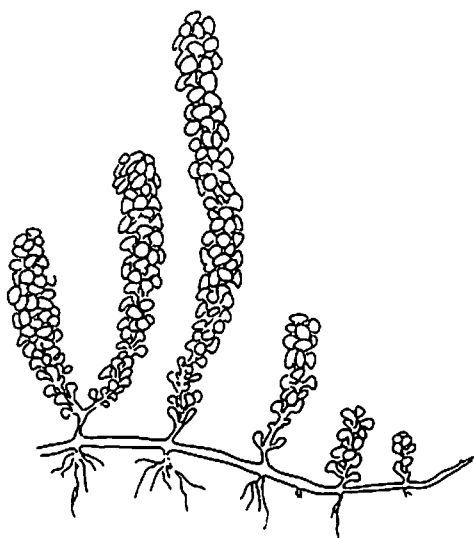
The collection, marketing and preparation of edible seaweeds is largely, but not exclusively, an activity of native Fijian women and girls; men and boys

play only a minor role. It is also a family- or village-based activity that follows a fairly regular pattern throughout the country. Seaweed harvesting is thus community-based, with the work being shared among family and village groups. It is also combined with reef gleaning and capture of other nonfish species (e.g., shellfish, *bêche-de-mer*) and the income derived is therefore only part of the overall income from the women's fishing. Most of the women work in village groups, and girls from the age of six years and upwards accompany their mothers and other female relatives to the lagoon and reef, where the algae are collected on a weekly basis, stored, and then taken to market for sale at the end of the week. Most of the sales take place at Fiji's eleven municipal markets on Fridays and Saturdays with the greatest sales taking place in Suva, Nausori, Nadi and Lautoka. There has been a rapid increase in seaweed collection, sale and consumption during the past few years, and quantities of up to 36 t, valued at FJD50,000 (US\$31,000) per year have been recorded from Fiji Fisheries Division surveys.

A total of seven species of seaweeds are harvested: the green algae (*Chlorophyta*) *Caulerpa racemosa*, *C. racemosa* var. *occidentalis*, and *Codium bulbopilum*, and the red algae (*Rhodophyta*) *Hypnea pannosa*, *Gracilaria verrucosam*, *Solieria robusta*, and *Acanthophora spicifera*. The preferred species are *Caulerpa*, *Hypnea* and *Gracilaria*.



Solieria robusta



Caulerpa racemosa



Acanthophora spicifera



Hypnea pannosa

For *Caulerpa* (Fijian name *nama*), experienced harvesters normally collect only the upright shoots, leaving the stolons to regenerate more shoots. Harvesting practice includes rotation of collecting areas over at least a 3-4-week cycle, to allow regeneration. Good harvesting sites are protected by the villagers and appear to have been harvested over many generations. The knowledge about the sites, harvesting methods and rotation of sites is passed from one generation to another, largely through the senior women of the family and village.

The shoots are sold in heaps, at a price ranging from FJD0.50 to FJD2.00 per heap, depending on the season, quality and the market site. A single vendor may sell between ten and twenty heaps on a market day, and earn from FJD20.00 to FJD40.00 per market day, or up to FJD80.00 per week. Some vendors may exclusively collect and sell *nama*, but the normal practice is to combine *nama* sales with those of other seaweeds and nonfish products such as shellfish. *Nama* is displayed for sale in a number of ways, the more sophisticated of them being in the Suva market, where heaps are sold in small baskets woven from coconut leaves, and accompanied by a small plastic bag of grated coconut (*lolo*) and one or two chilies. Considerable effort is made to keep the shoots fresh, by splashing them with water and keeping them in the storage sacks until ready for display.

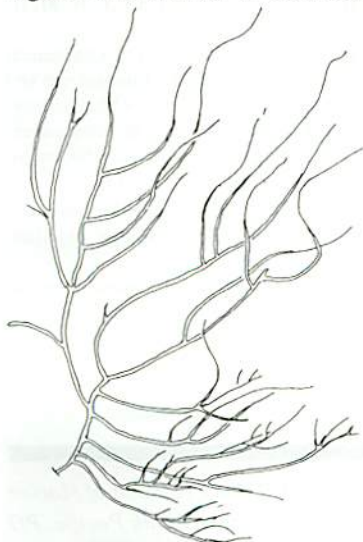
Nama is consumed uncooked: a popular method of preparation includes marinating it with lemon juice, then adding *lolo*, some finely chopped chili, and canned fish (usually herring or pilchard). Fijians regard this dish as a delicacy, highly



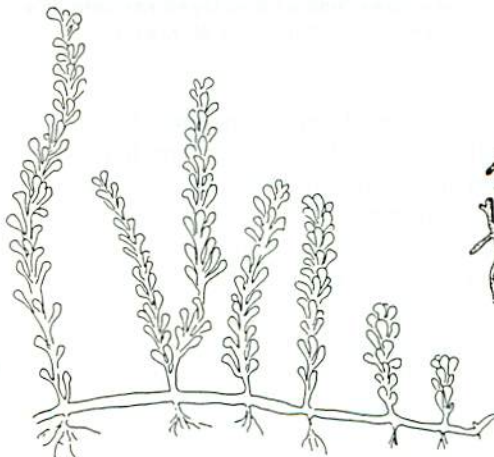
Cleaning Hypnea (lumihevata), on sale in Nadi Market, Fiji.

enjoyed by all of the family, and traditionally consumed on Sundays with the special meal normally served after morning church services. The addition of canned rather than locally caught fish is a fairly recent phenomenon, and in part is a reflection

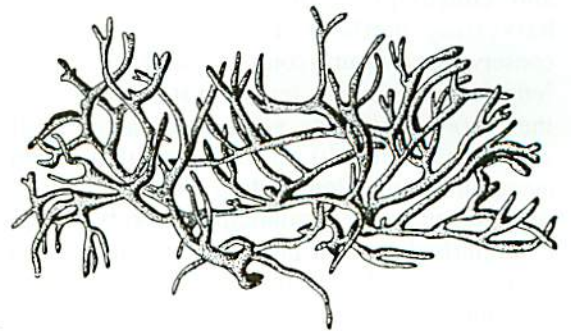
of the growing scarcity of reef and lagoon fish, the higher value of fresh fish than canned fish (and thus the preference to sell the fresh fish for cash income), and a dietary preference for the canned fish,



Gracilaria verrucosa



Caulerpa racemosa var. occidentalis



Codium bulbopilum

which is mostly imported from Korea. It is also possible that the addition of chili is a reflection of the introduction of Indian tastes into the Fijian diet.

Hypnea (Fijian names *lumicevata* and *lumi-vakalolo*) and *Gracilaria* (Fijian names *lumiwawa*, *lumiwara*) are harvested by hand from the sheltered, back-reef areas where they are abundant throughout Fiji. Plants are stored prior to market in sacks, either immersed in seawater, or kept damp in the shade, where they may remain fresh for four to five days.

Plants (especially *Hypnea*) are often entangled with other seaweeds and debris, and the women spend considerable time cleaning the clumps prior to market, since dirty material cannot be readily sold.

There are several variations on the method of preparation and consumption of *Hypnea* and *Gracilaria*. Plants are cleaned and washed, then mixed with chopped onion, *lolo*, chili (optional) and canned fish, and cooked. The seaweeds add a distinctive flavor, and act as a thickening agent.

There is considerable evidence to suggest that the native Fijians have a long tradition in the collection and consumption of seaweeds, and that this is in common with consumption of seaweeds by coastal peoples throughout Melanesia. Current evidence in Fiji includes the existence of various names for seaweeds; traditional methods of preparation and consumption of seaweeds; harvesting methods and "crop" conservation measures consistent with long-term customary tenure systems of the reefs and marine areas associated with villages. It is likely, however, that the commercialization of edible seaweeds, such as regular sale in municipal markets, is a relatively recent phenomenon, and coincides with the expansion of the cash economy.

The consumption of seaweeds in Fiji is an almost entirely ethnic Fijian activity, even though approximately half of the country's resident population of 750,000



Heaps of *Hypnea* (*lumicevata*) on sale, Lautoka Market, Fiji.



Caulerpa racemosa (*nama*) displayed for sale in a coconut basket, with chili; Suva Market, Fiji.

people is made up of Indians. There is little evidence that Fijian Indians harvest, consume or purchase edible seaweeds in Fiji, although this may not suggest a lack of interest or desire, since reef gleaning and access to reefs fall under the strict customary tenure of the native Fijian people, and access by others is possible only with permission of the appropriate village fishing groups (*qoliqoli*). Seaweeds are, however, regularly purchased by Chinese Fijians, other Pacific Islanders

(who together comprise about 5% of the total population), and to a lesser extent by Europeans resident in Fiji.

The Fijian study has shown that there are significant differences between the preferred species and their consumption in Fiji, compared with Hawaii (Abbott 1984), yet there is a similarly rich tradition and language associated with edible seaweeds. Since this is currently not documented for other cultures in the South Pacific Islands, it would seem worthwhile recording this information,

before it is lost.

Given the increasing harvest of edible seaweeds in Fiji, and their importance in the cash economy, some indication of the sustainability of the crop should be determined. In addition, the effects of seaweed gathering on the environment have not been assessed, and the potential for developing the edible seaweed resource in a sustainable manner has yet to be evaluated.

Further Reading

- Abbott, I.A. 1984. *Limu, an ethnobotanical study of Hawaiian seaweeds*. 3rd ed. Pacific Tropical Garden, Lawai, Hawaii. 35 p.
- Abbott, I.A. 1988. Food and food products from algae, p. 135-147. In C.A. Lembi and J.R. Waaland (eds.) *Algae and human affairs*. Cambridge University Press, Cambridge.
- Abbott, I.A. and D.P. Cheney. 1982. Commercial uses of algal products: Introduction and bibliography, p. 779-787. In J.R. Rosowski and B.C. Parker (eds.) *Selected papers in phycology II*. Phycological Society of America, Lawrence, Kansas.
- Chapman, V.J., and D.J. Chapman. 1980. *Seaweeds and their uses*. 3rd ed. Chapman and Hall, London. 334 p. + ix.
- Fiji Fisheries Division. 1981-1991. *Annual Reports*. Ministry of Primary Industries, Suva, Fiji.
- South, G.R. Edible seaweeds of Fiji: an ethnobotanical study. *Bot. Mar.* [In press].

G. ROBIN SOUTH is Professor of Marine Studies, University of the South Pacific, PO Box 1168, Suva, Republic of Fiji.