
Finding Better Crops for Seaweed Farmers in the West Indies

Allan Smith
Research Scientist
Caribbean Natural Resources Institute (CANARI)
Vieux Fort
St. Lucia, West Indies

Seaweed cultivation in the West Indies is **focussed** primarily on the production of agarophytes (*Gracilaria* spp.) used in the preparation of drinks and puddings that are a tradition in the **English-**speaking islands. Research on low-cost cultivation methods began in St. Lucia in the **1980s**, in response to declining wild stocks and the evident increasing demand. The transfer of a workable technology for *Gracilaria* cultivation began in the mid- **1980s**, and has since been established in three communities in St. Lucia, where both men and women operate **self-**sufficient farms. While this is obviously a profitable activity, the experience gained by the farmers in St. Lucia, and the results of extension efforts elsewhere in the region, both suggested that cultivation was not reaching its potential and that **further** development work was needed

The first problem related to the variation in agar quality among tropical *Gracilaria* species. In general, the best quality of agar, which is preferred by most processors, is found in slow-growing species. However, farmers have chosen to concentrate on faster-growing species whose poorer agar quality limits the range of marketing possibilities.

The second problem is the fact that the crop is susceptible to **infestation** by epiphytic algae, the severity varying with location and season. As a result, crops would be discarded at certain times or sites would be abandoned completely. Attempts were made to select superior strains of St. **Lucian** *Gracilaria* species, but all were affected by epiphytes to some degree, and none showed the desired combination of good growth rate and agar quality.

In 1996 CANARI began a project to search for new crop candidates among species in the Caribbean flora. The first to be tried was the agarophyte *Gracilariopsis tenuifrons*. This species is being

cultivated on the north east coast of **Venezuela** and is intended as raw material for the agar industry. Its rapid growth and excellent agar quality appeared very promising. Unfortunately its performance in St. Lucian waters was poor, and agar quality was low. The **Venezuelan** site is characterized by a localized upwelling system and high nutrient levels, and it is most likely that the different water conditions in St. Lucia were the cause of the difference in performance here. Another candidate was *G. cornea* from **Anguilla**, which grew approximately twice as fast as St. Lucian plants of the same species and deserves further investigation.

While most of the species harvested for food in the region are widely distributed agarophytes, there is also one carrageenophyte of interest, *Eucheuma*, which has a comparatively limited distribution. *Eucheuma* is represented in the region by a single species, *E. isiforme*, which produces iota carrageenan. It is found in Florida and Belize, and a few islands in between. It was harvested commercially in Barbuda until the 1980s but is now commercially extinct there, apparently as a result of a lack of management of the harvest. Belize is now the only place in the Caribbean where *Eucheuma* is still harvested commercially from wild stocks.

Past attempts at cultivating *Eucheuma* in the region showed mixed results. Trials by French researchers in the neighbouring island of Martinique had been unsuccessful in the 1970s, and trials in Belize by a carrageenan extraction company were discontinued after being devastated by a hurricane in 1978. In Florida, the species was shown to die back after reproducing in the autumn, both in culture and in field trials, making it unsuitable for mariculture there. To test the response of this species under mariculture conditions in St. Lucia, a sample of plants was collected from the barrier reef in Belize in February 1996 and established at one of the *Gracilaria* farms on the south east coast of the island. The plants were propagated vegetatively using the same method as that used for *Gracilaria*, whereby fronds are inserted into the strands of long lines which are anchored at each end and buoyed at the water surface. The growth rate and general performance of the **Belizean** material was monitored for the next 12 months.

The first encouraging result was that the growth rate of this species was evidently good, with doubling times of individual tagged fronds of around 10 days. This compared favourably with the *Gracilaria* that the farmers were growing. With the onset of the wet season in the latter part of the year, the *Eucheuma* continued to demonstrate its suitability as a crop. The increased run-off and nutrient input during the wet season is correlated with the appearance of epiphytic algae which can smother the crop plants and trap a layer of silt that makes the plants unusable. Much of the *Gracilaria* crop was discarded during this period but *Eucheuma* on the same lines remained clean and totally free of epiphytes. By the end of the year it was also apparent that the plants could be maintained year-round, without the seasonal die-back that was reported for the Florida populations.

Seed material has now been distributed to five groups of farmers in communities on the south and east coasts of St. Lucia. These farmers are now concentrating on producing crops to be used for seed material to expand the area under cultivation. In early March, 1997, the first harvest for processing and sale was made on a family-owned farm on the south coast. In April, seed material was transported to two locations in Jamaica where cultivation of *Gracilaria* had been tried with some success in the past, and the initial results from Little Bay, near Negril, and Discovery Bay, are very promising. The next step will be to determine how the requirements for *Eucheuma* cultivation and processing differ from those established for *Gracilaria*. For example, *Eucheuma* is comparatively stenohaline, which will mean revising some of the current recommendations for site selection.

After a period of relative stagnation in the development of seaweed production in St. Lucia, due to limits in marketability of the *Gracilaria* species, and to biological factors that adversely affect its productivity, it seems clear that the characteristics and qualities of *Eucheuma* will provide the farmers with the opportunity to produce a superior crop and thereby enhance their returns from this occupation.