# *Gracilaria coronopifolia*

J. Agardh 1852

***Limu manauea*, or *Gracilaria coronopifolia*, is one of the most popular edible endemic Hawaiian algae. Due to overharvesting and competition with *G. salicornia*, *limu manauea* is only locally abundant and, when reproductive, is protected by law.**

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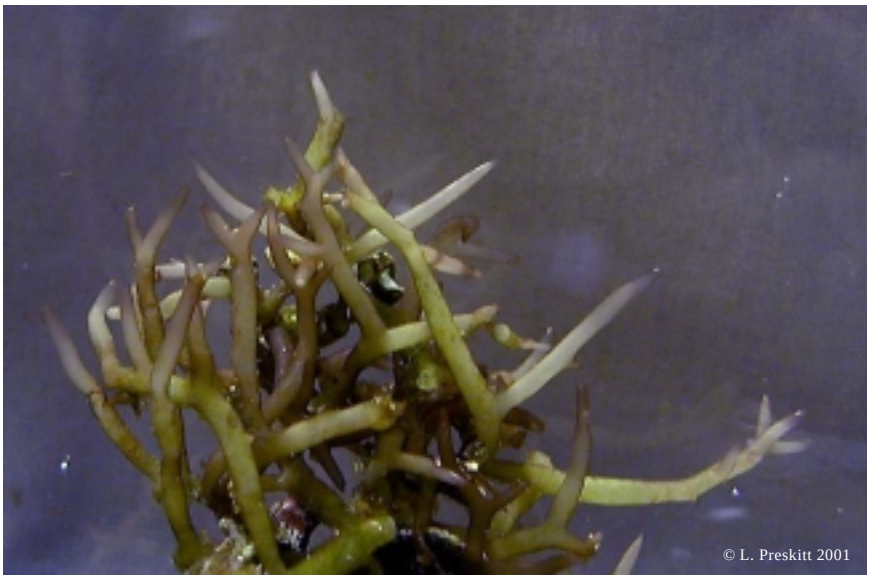
| **Division** | Rhodophyta |
| **Class** | Rhodophyceae |
| **Order** | Gracilariales |
| **Family** | Gracilariaceae |
| **Genus** | *Gracilaria* |




## Identifying Features

### DESCRIPTION

*Gracilaria coronopifolia* has solid, cylindrical branches, 1 - 2 mm in diameter, with short pointed tips. The plant may arise from one to several branches that undergo frequent branching, with each subsequent branching shorter, but not thinner, than the previous. The upper plant becomes more densely branching and forms a small bush, to 15 cm tall, with a rounded profile arising from a discoid holdfast.

*Gracilaria* spp. are extremely variable in Hawaiian waters. Although normally cylindrical, the branches are frequently found flattened, and sometimes plants are compressed throughout.

### COLOR

The plant is often red, but may bleach to pink or white in bright sunlight.

## Habitat

*Gracilaria coronopifolia* is found on reef flats and eroded limestone, from mid-intertidal tidepools to shallow subtidal, up to 4 meters deep.


## Structural

Cortex is single layer of pigmented cells 4 µm by 10 µm, subcortical region of 3-4 layers of cells loosely arranged with extended pit connections, providing loose tissue between cortex and large-celled medulla, bases of hair cells common. Tetrasporangia oval, 31 by 40 µm, usually collected in clusters but occasionally scattered, sterile cells surrounding them modified in shape and size. Cystocarps occurring singly or in groups of 3-5, often in rows, globose, rarely beaked, to 2 mm diam.; nutritive cells abundant.

## Distribution

### HAWAI'I

Widely distributed throughout Hawai'i: on limestone substrate in Kaua'i, O'ahu, western and central Maui, Moloka'i, Lana'i. Rare on basalt substrate in Maui and Hawai'i Island.

### WORLDWIDE

An Hawaiian endemic.

## Ecology/Impact

*Gracilaria coronopifolia*, like other *Gracilaria* species, is a hardy subtidal red algae that attaches to limestone or occasionally on basalt substrates. This species is one of the 10 most common intertidal algae in the Hawaiian islands. It is widely distributed and was fairly common, but, due to its popularity as an edible algae, has been seriously overharvested. The invasive alien *G. salicornia* is now dominant in many regions typical of the native habitat for *G. coronopifolia.*

*Gracilaria coronopifolia* is endemic to Hawai'i and is one of the three most sought after seaweeds for food in the Hawaiian Islands ( (*G. coronopifolia* or *limu manueaua* and *Asparagopsis taxiformis* or *limu kohu* the other two). Overharvesting for subsistence and commercial sale accounts for serious shortages in the natural population. A law passed in 1988 prohibits the collection of plants with "dark bumps" or cystocarps, denoting a fertile, reproductive plant. The shortage of *G. coronopifolia* and *G. parvispora* led to the introduction of *G. tikvahiae* from Florida in the mid 1970's for mariculture as a possible produce replacement for the more popular but rare native species.

## References

Abbott, I.A., 1984. Limu: An Ethnobotanical Study of Some Hawaiian Seaweeds. National Tropical Botanical Garden. Lawai, Kau'i, Hawai'i.

Abbott, I.A., 1999. Marine Red Algae of the Hawaiian Islands. Bishop Museum Press, Honolulu, Hawai'i.

Doty, M.S. 1986. Experiments with *Gracilaria* in Hawai'i, 1983-1985. Hawai'i Botanical Science Paper, no. 46, University of Hawai'i, Honolulu, Hawai'i.

Magruder, W.H., and J.W. Hunt, 1979. Seaweeds of Hawai'i. Oriental Publ. Co., Honolulu, Hawai'i.

### WEB LINKS

Endemic algae of Hawai'i. http://www.botany.hawaii.ed/natives

Ecological Success of Alien/Invasive Algae in Hawai'i. http://www.botany.hawaii.edu/GradStud/smith/websites/ALIEN-HOME.htm

*Gracilaria coronopifolia* herbarium sheet