

# Gracilaria Gall Syndrome

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Most people in Hawaii know *Gracilaria tikvahiae*, or ogo, as a long, thin, flavorful green seaweed frequently included in poke (raw fish) appetizers. However, few realize that this alga isn't used only as a tasty ingredient in popular local dishes; *G. tikvahiae* is also an important producer of phycobillins, a class of photosynthetic pigments employed in a variety of medical and biotechnology applications. Ogo can be grown by farmers in tanks or ponds or harvested after being washed up along the shoreline. But in recent years, Hawaii's commercial ogo production has been threatened by *Gracilaria* Gall Syndrome (GGS), an illness that slows or stops growth, reduces shelf-life and disfigures the seaweed, making it difficult to market.

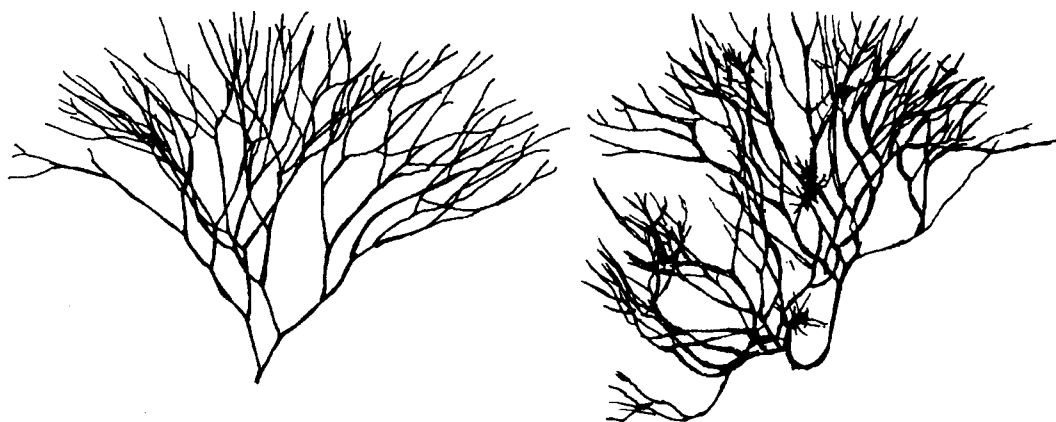
In the past, the only method of combatting GGS has been to discard the entire crop, sterilize the tank hardware and plumbing and start over. For the past year, scientists at the University of Hawaii at Hilo, the University of California-Santa Cruz, Brookwood Biomedical Laboratory in Alabama and the Hawaii State Aquaculture Development Program have been working to better understand the nature of the pathogen causing GGS, in order to develop cost-effective strategies and minimize the negative impacts of the disease.

## GGS—The Symptoms

Ogo afflicted with GGS typically have abnormal lesions or galls (small bump-like structures) along their stems or branches. Growth beyond the gall becomes twisted or contorted, and structures “witch’s-broom”-like structures may also appear at the ends of the branches. The surface tissue of *G. tikvahiae* may appear scalloped and, if touched, can slough off as if it were decaying. GGS develops and takes hold rapidly, with infection rates jumping from 10 percent to 90 percent of the crop in less than a week. In addition to being rendered visually unmarketable by the disease, infected *G. tikvahiae* usually display considerably reduced growth rates and diminished post-harvest shelf-life.

## New Research

The primary goal of GGS research has been to identify the exact nature of the agent causing the disease. Scientists have successfully isolated several abnormal varieties of bacteria found in GGS-afflicted ogo. However, researchers are still trying to ascertain which bacteria, or combination of bacteria and environmental conditions, can induce an outbreak of the disease. At the present time, the evidence linking GGS to a bacterial



The *gracilaria* on the left is healthy, and the *gracilaria* on the right exhibits signs of *Gracilaria* Gall Syndrome.

agent is still anecdotal, based on the experience of scientists who have curbed the progression of the disease with the antibiotic penicillin.

After successfully identifying the GG agent or agents, researchers hope to devise a management strategy that will help prevent outbreaks. Farmers have had some success with use of less sensitive strains of ogo. Researchers are also looking into manipulating environmental conditions to control rapid outbreaks of the disease.

## Where Should I Turn for Help?

If you believe that your seaweed crop may be afflicted with GGS, or if you would like more information on this disease, please contact one of the following experts:

### **Dr. Jim Brock**

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