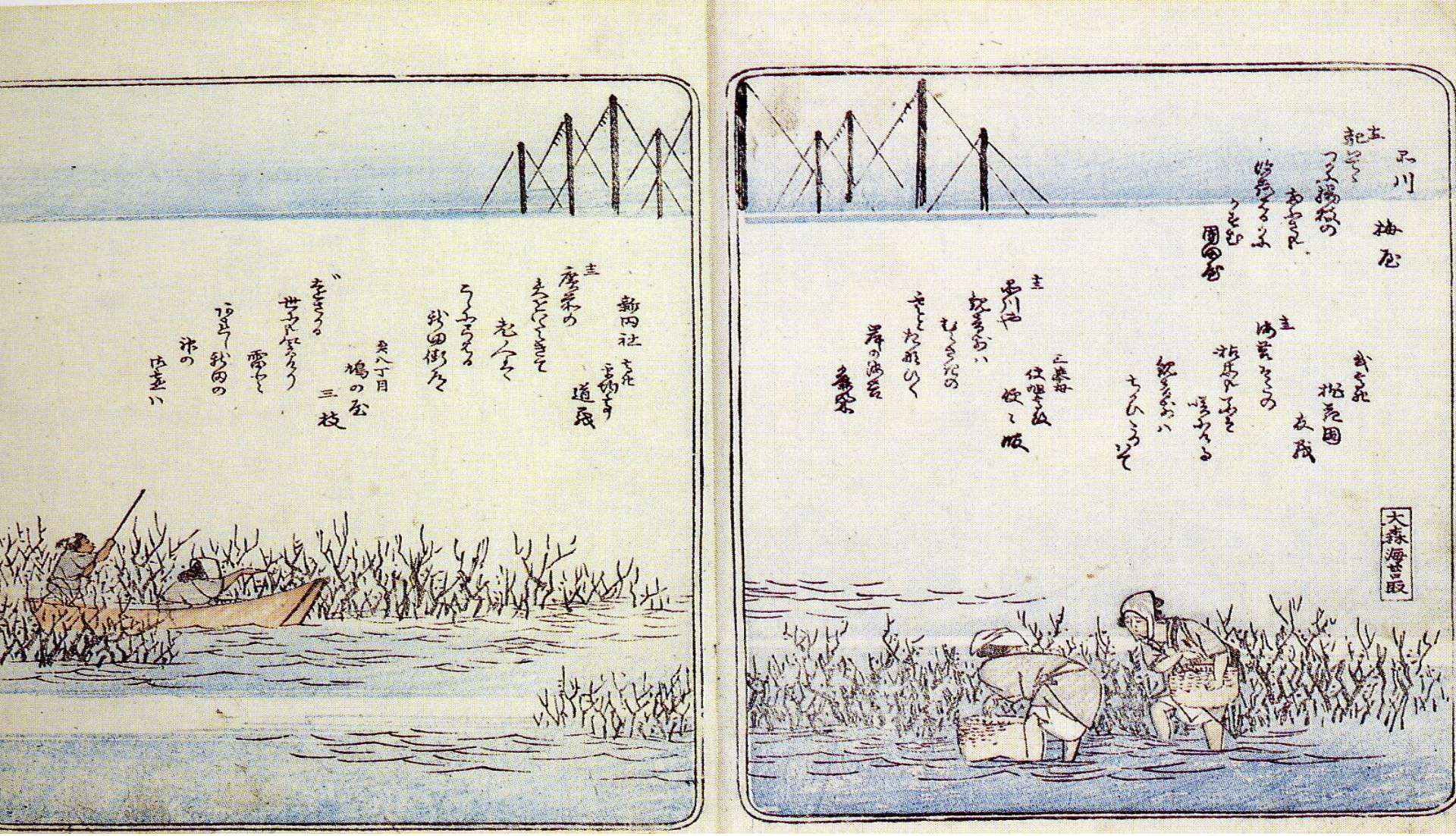
Advances in seaweed cultivation in the Asia Pacific Region:past, present and future prospects

Masao Ohno
Usa Marine Biological institute, Kochi University
Usa-cho, Tosa, Kochi, 781-1164, Japan



Cultivation of *Porphyra* (Nori) began before 250 years, in Japan

Processing of nori sheets shown in the traditional picture

Cutivated *Porphyra tenera* strain
Nori in Japanese

Susi

Sennbei

Onigiri

Nori menu

Yakinori

Oyster shells provided for the settlement of carpospores

Setting poles for nori cultivation in the sea, Ariake-kai

Washing nursery nets during low tide

Nori cultivation of pole system in Ariake-kai

Nori cultivation by floating system in off shores

Harvesting by boat

Nori harvesting by boat at floating cultivated system in Chiba

Porpyara cultivation in Korea

Change of *Porphyra* net siz

2.1 m x 100 m

1995s ~ Present

Submerged culture net

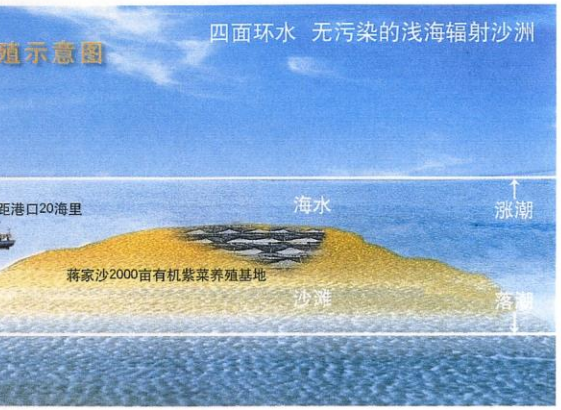
Turning over the culture nets by ship

Exposure culture nets on the air

With the introduction of this treatment, the production of dried nori sheets and the income of fishermen increased by as much as 144% and 408% respectively (Oohusa, 1993).

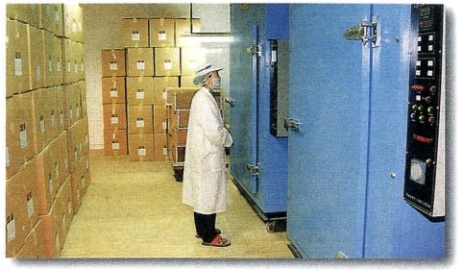
New exposure treatment

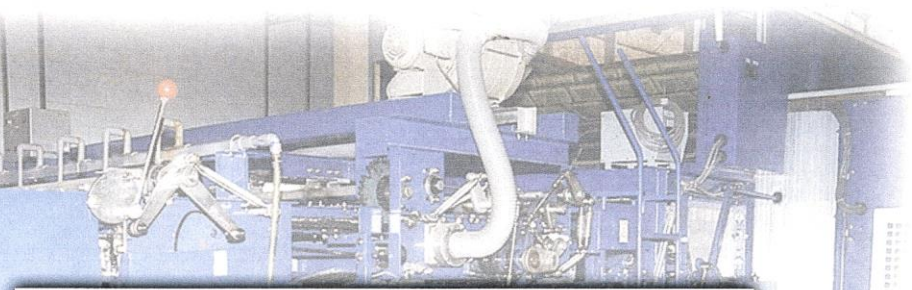
有机紫菜养殖基地



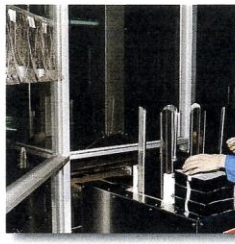
菜养殖基地位于A:32° 42' 793N, 121° 10' 755E; B: 32° 21° 11' 020E; C: 32° 41' 910N, 121° 11' 420E; D: 32° 21° 11' 066E。

紫菜一次加工





紫菜二次加工



Northern type

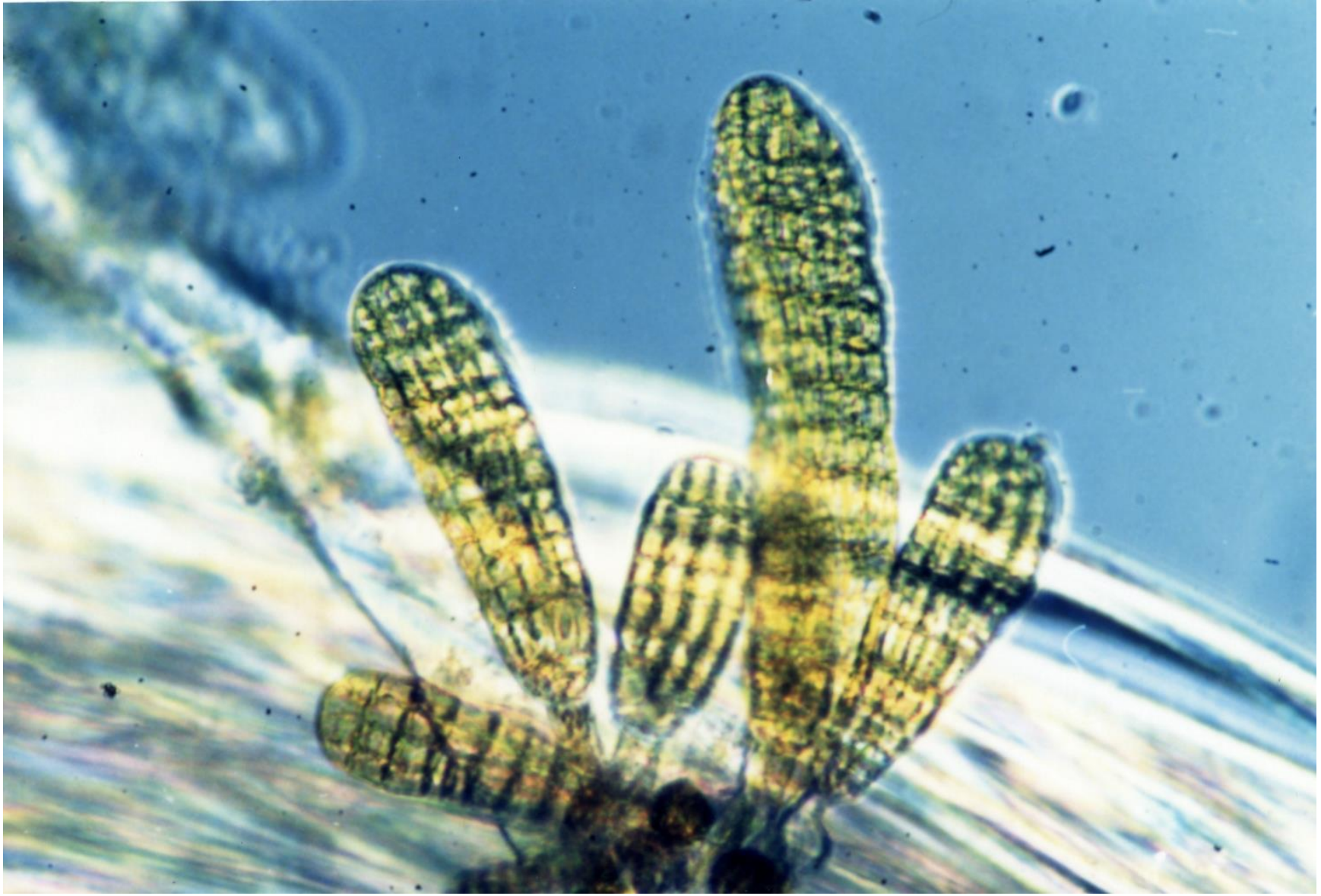
Southern type

Undaria pinnatifida

Wakame in Japanese

Wakame soup and salad

Seed collectors culture in tank
gametophyte phase



Germling on the seeding string

Young fronds on the seeding string

Juvenile fronds inserted between the strand of the main rope

Undaria **cultivation ground by floating system in Naruto**

Harvesting of *Undaria* fronds from the site of the boat

Boiling of fronds in outdoor facilities


신준오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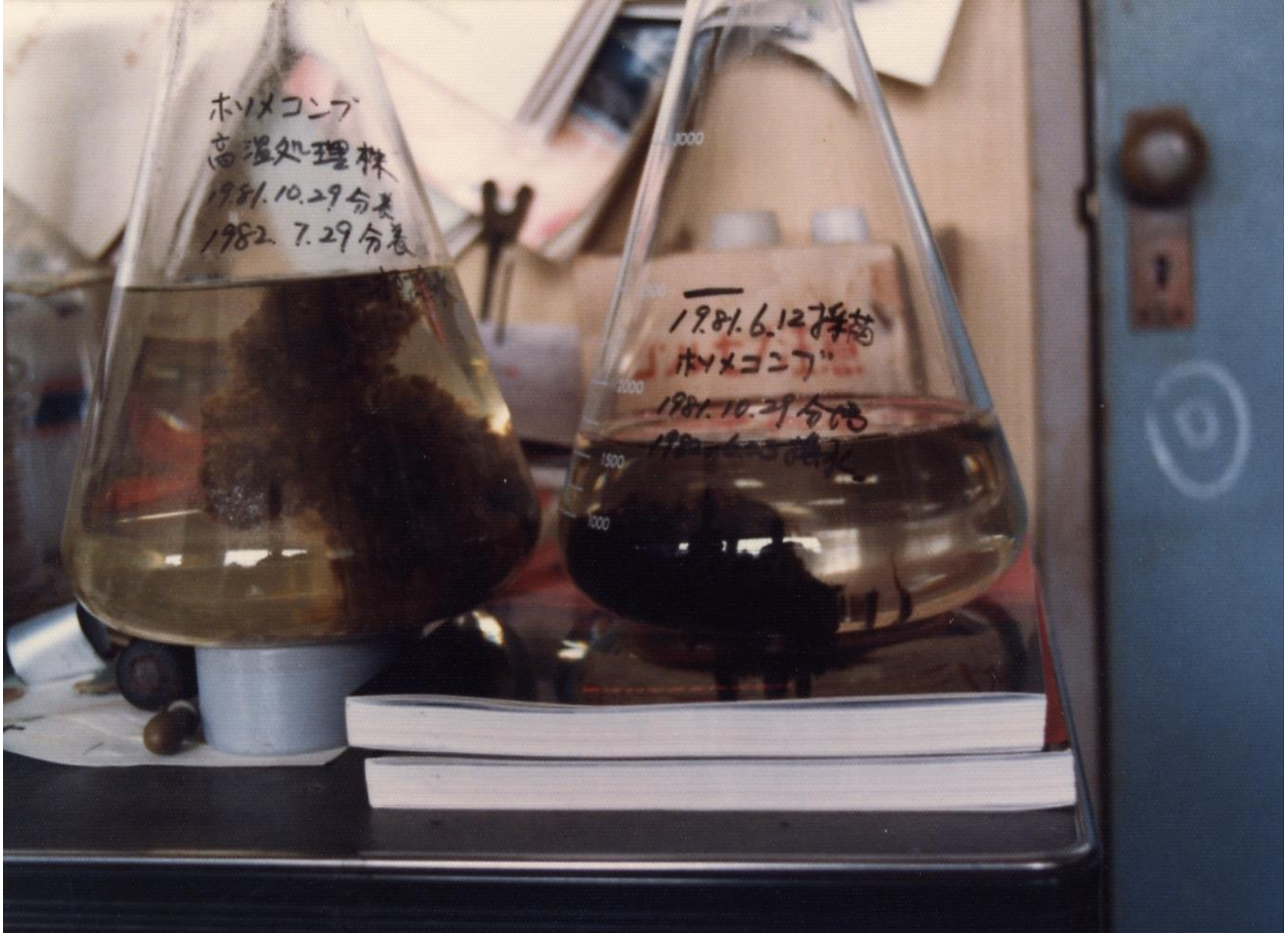
Cultivated *Laminaria* **fronds (4 m of length) in Naruto, warm waters**

Konbumaki

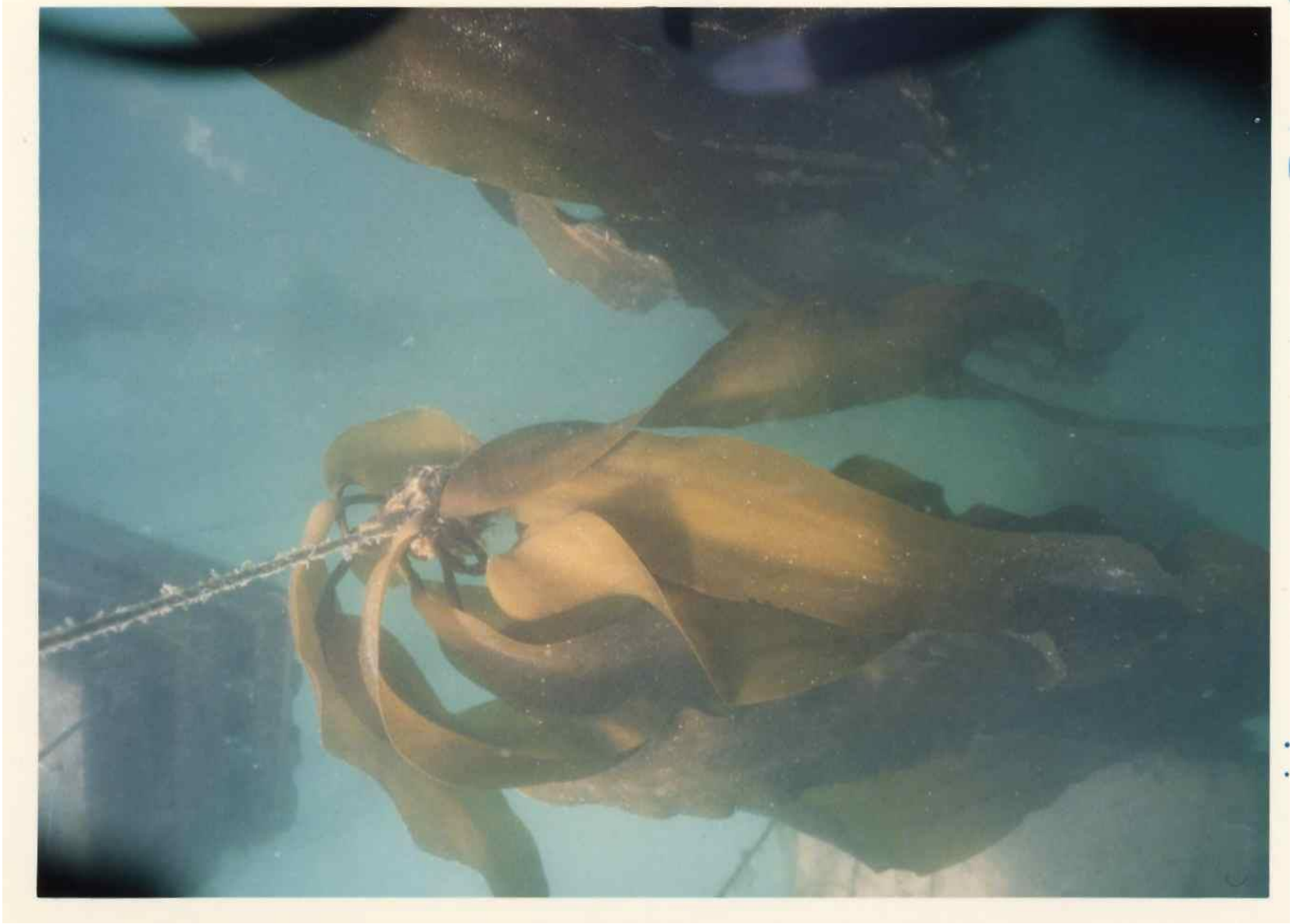
Oboro-konbu

Konbu-tukudani

Konbu dishes



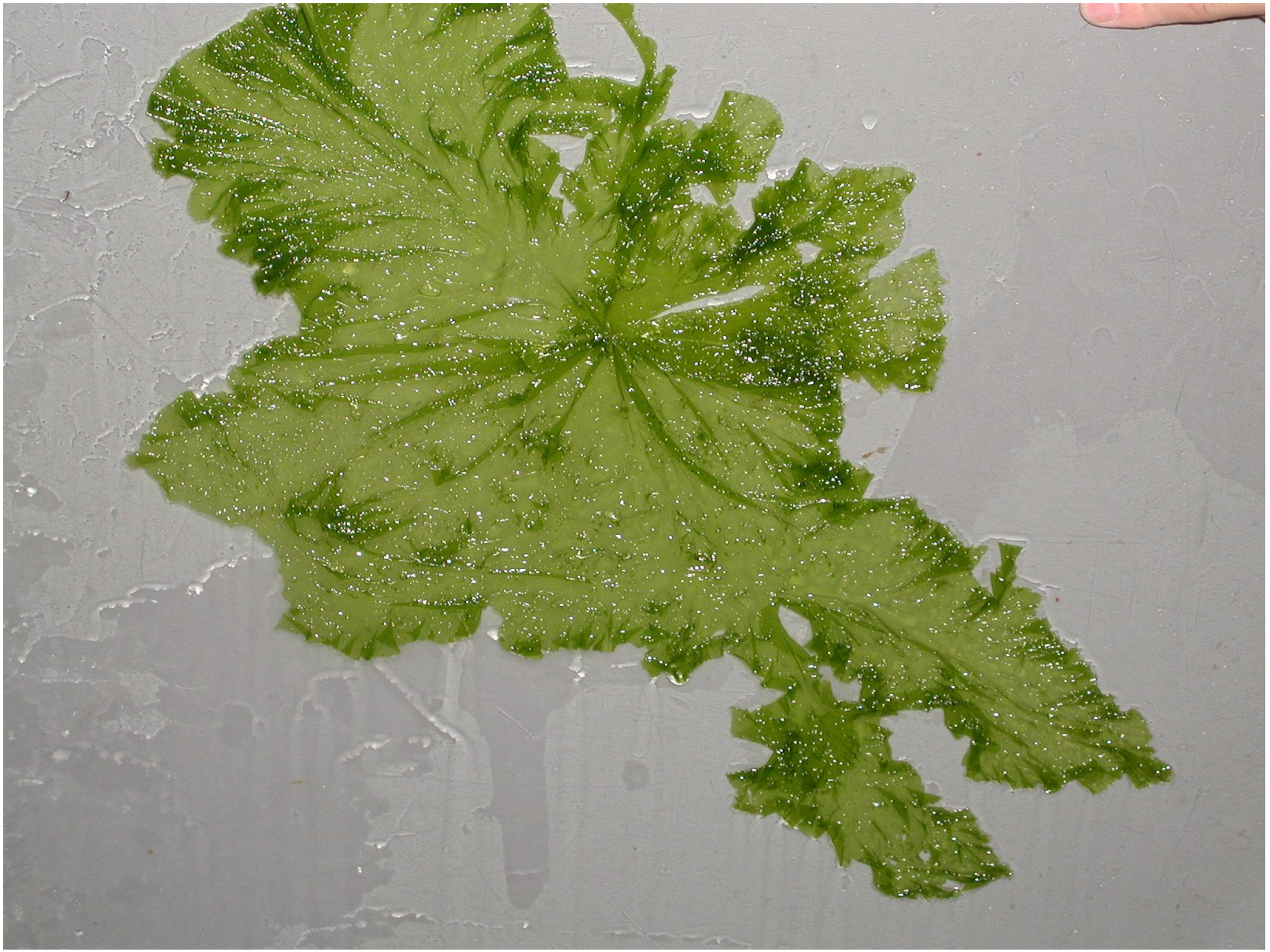
Gametophyte phase free living culture for the strain keeping



Laminaria **cultivation by rope system**

Harvesting of force-cultivated *Laminaria japonica* **in Hakodate, Hokkaido, cold waters**

Figure 18. *Laminaria* cultivation. A: Culture ground, B: Harvesting, C: Processing of *Laminaria* by salting, D: Sun-drying.



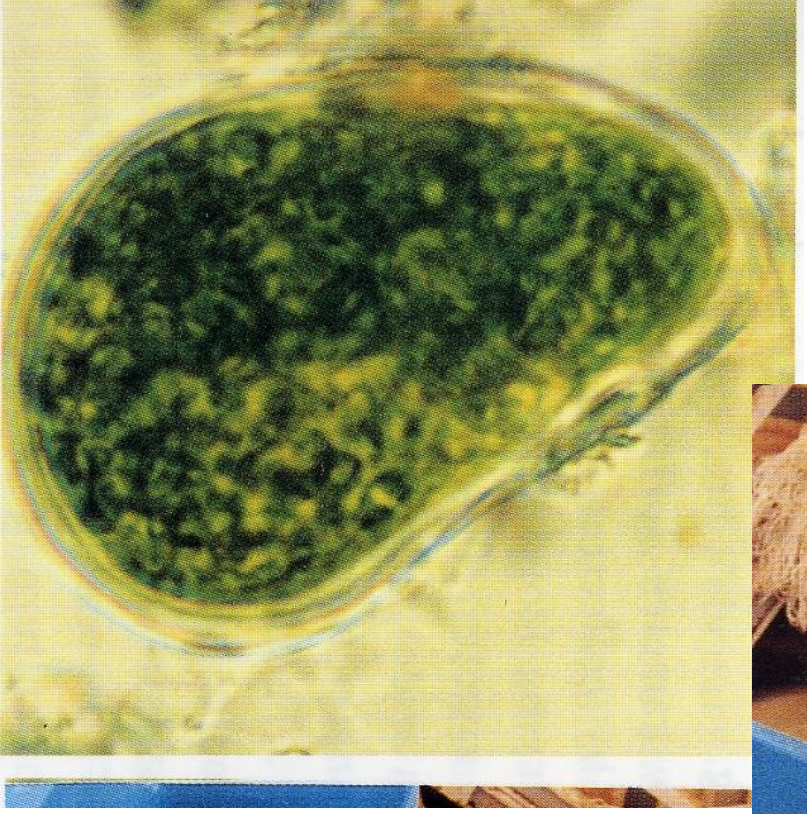
Monostoroma nitidum

Hitoegusa in Japanese

Nori-tukudani Boiling with soy sauce and sugar

Ochazuke

Monostroma proccesing (nori-tukudani) and cooking



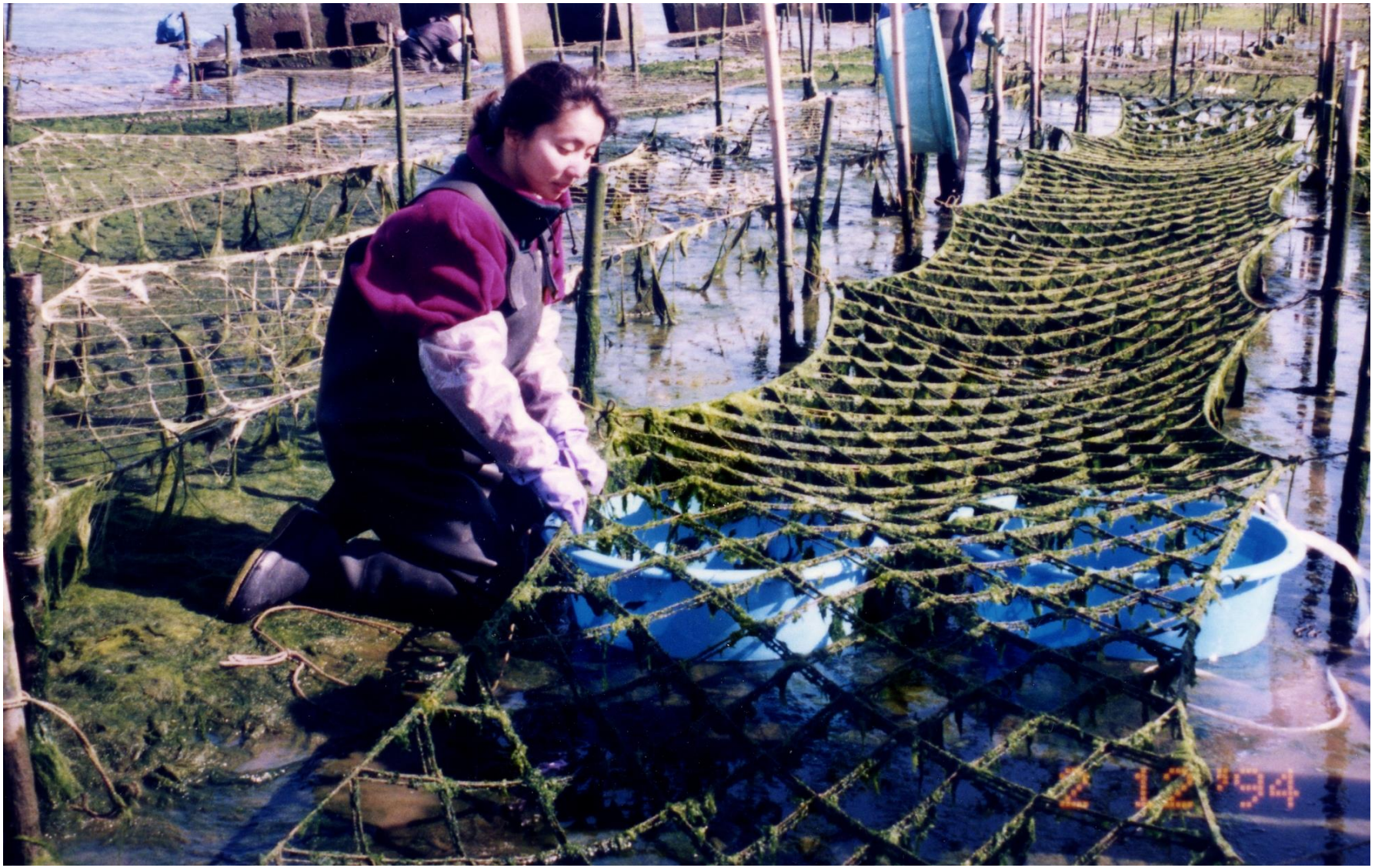
Zoosprongia

Zoosporangia and
plastic settlement boards with attached zygotes

Zygote culture in the tank in summer season

Seeding nets attached zoospores kept for one night

Monostroma **cultivation by pole system in brackish waters of the river**



Harvesting fronds by hand during low tide

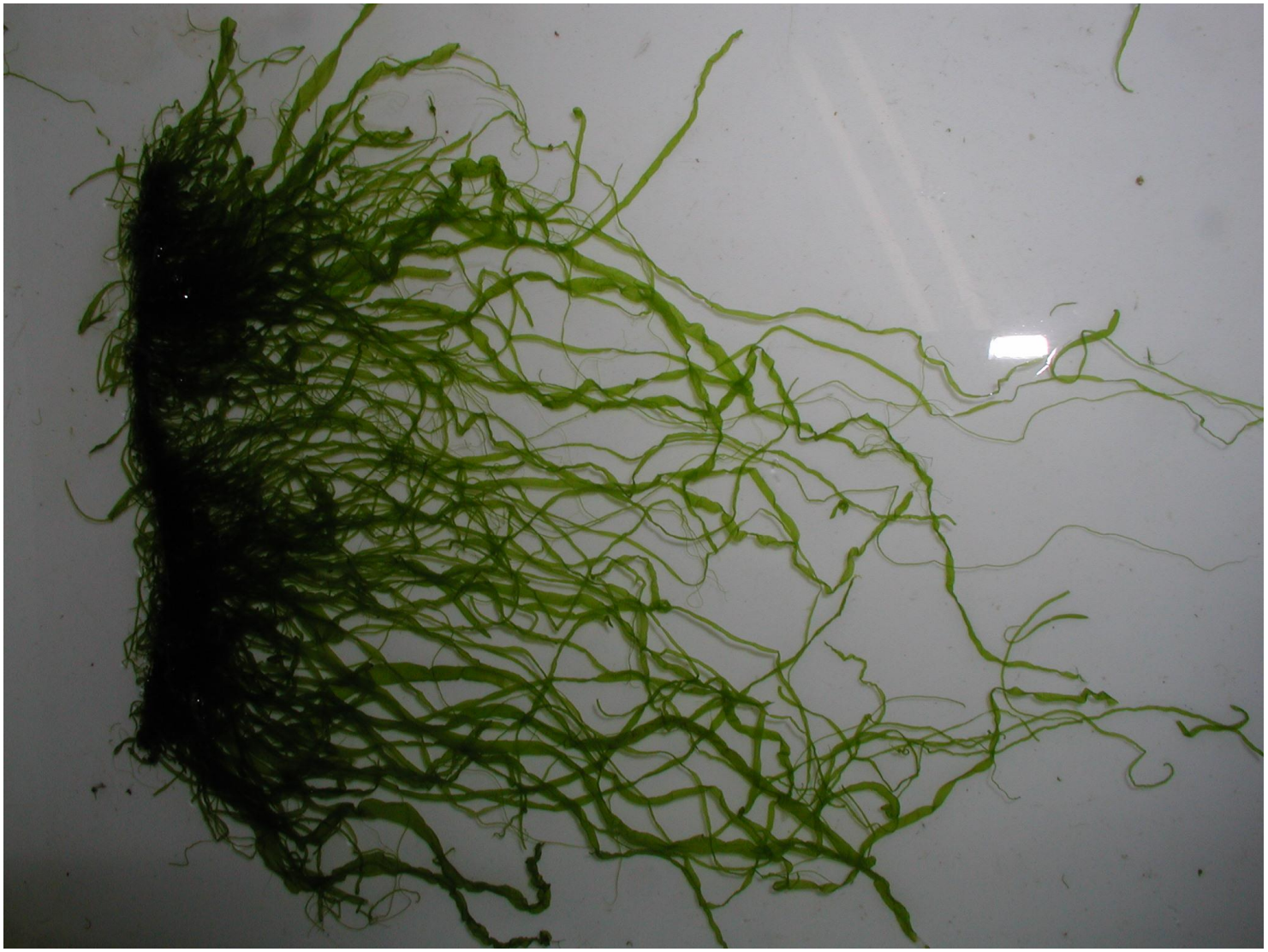
Drying fronds in outdoors by sunligh

New seaweed cultivation since 1990

New utilization with *Enteromorha*

Seaweed salad with *Cladophora*

Drying *Enteromorpha* fronds
Aonori in Japanese



Enteromorpha prolifera **fronds cultivated**

Harvesting of *Enteromorpha* fronds cultivated by floating system in the brackish waters, Yoshino River

Crushed machine for *Enteromorpha* powder

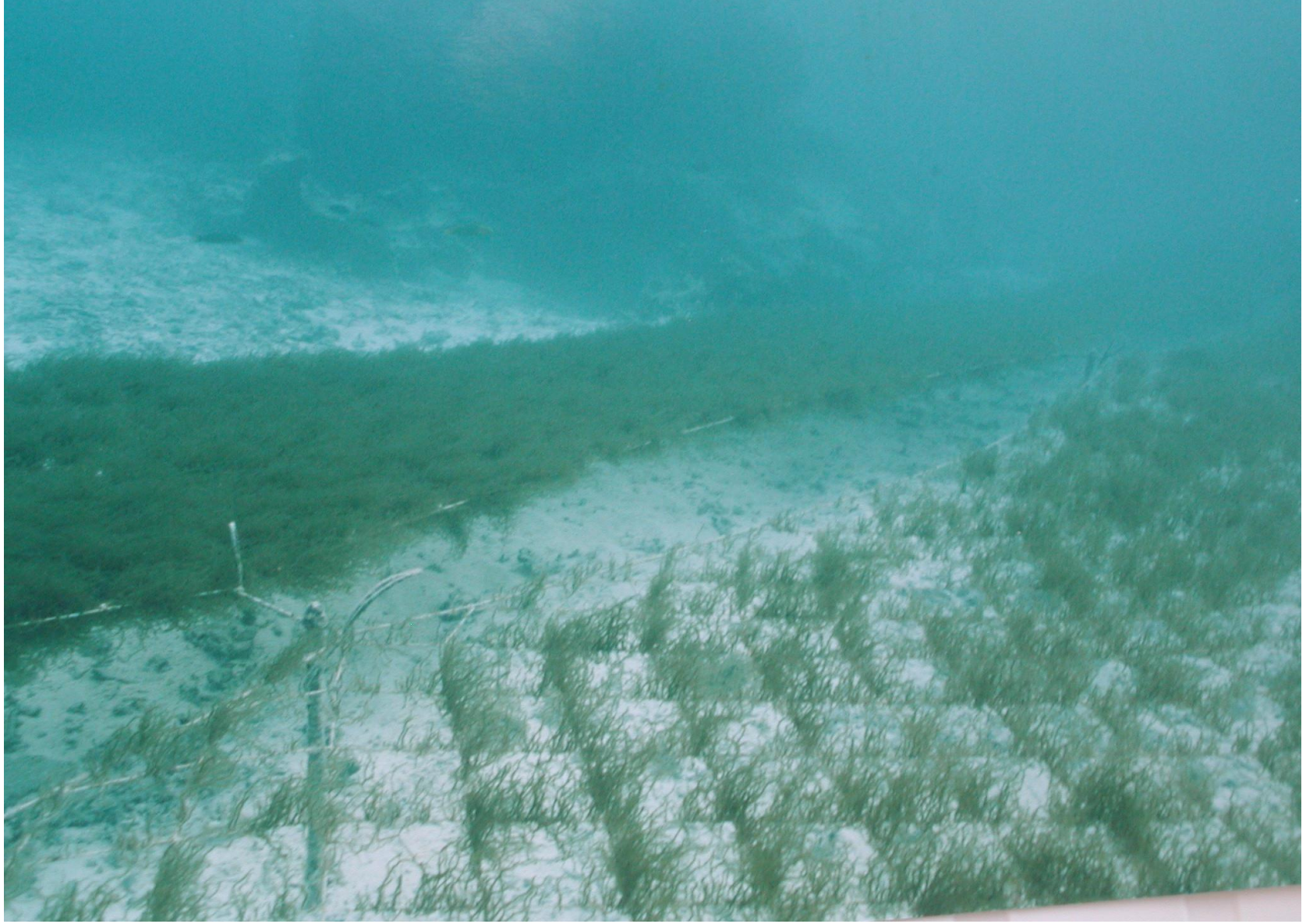
Enteromorpha **powder is used many Japanese cakes**

Cladosiphon okamuranus

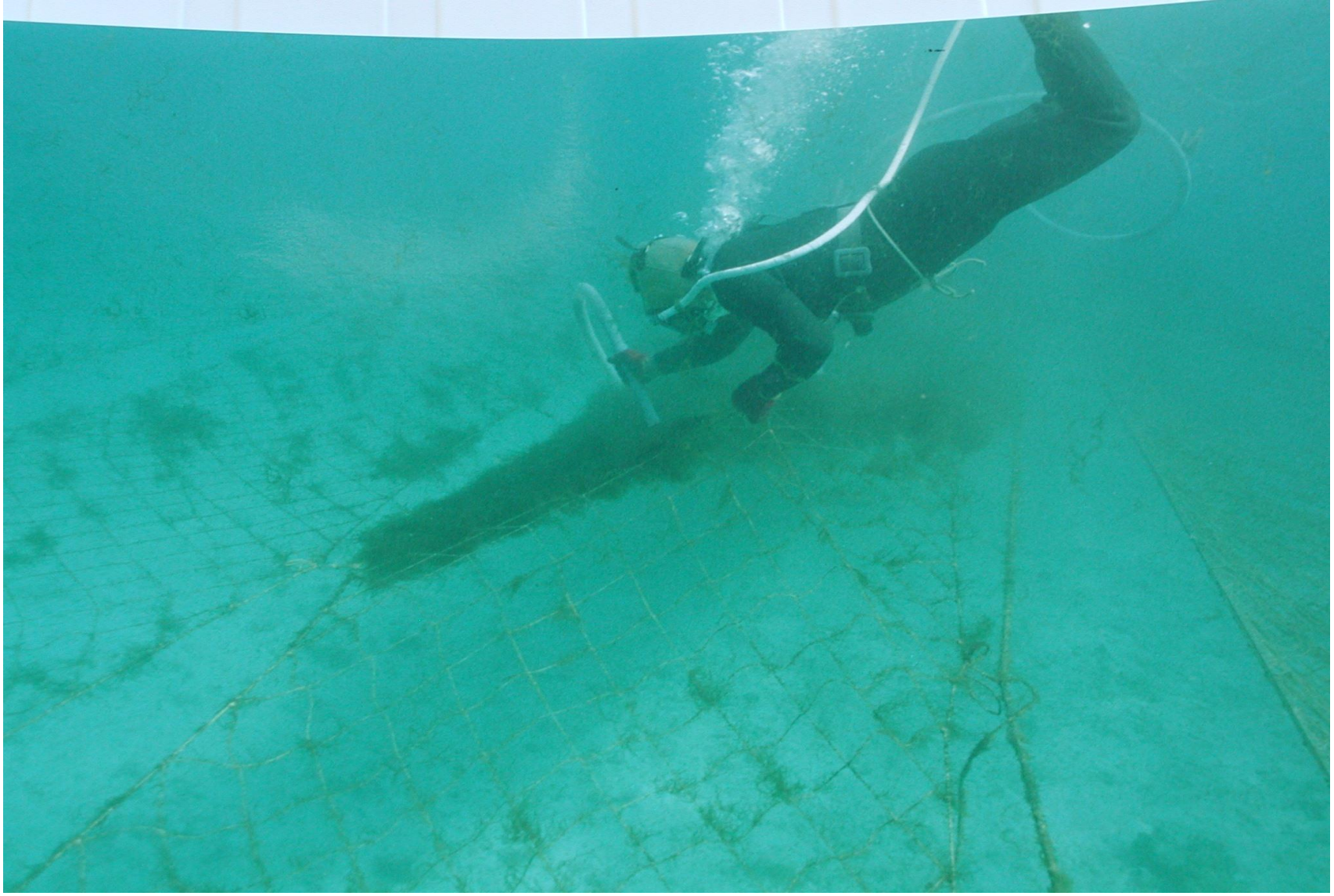
Mozuku in Japanese

Seaweed salad with *Cladophora* fronds

Cladosiphon **cultivation ground in the coral reef, tropical waters, Okinawa**



Cladosiphon **cultivated nets fixed at the bottom of 1-2 m depth**



Suction pump for harvesting

Harvest stored in a large basket , floating a boat

Washing and cleaning

Salting fronds at the processing factory