Technology of seaweed, *Kappaphycus /Eucheuma* cultivation In the tropical waters

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- **Production of *Euchuema* cultivation**

- **Total production of the world: 170,000 ton**
  Philippines: 110, 400 ton (dry)
- **65 % of total production**
  Indonesia: 30,000 ton (dry)
  China: 3,000 ton (dry)
  Vietnam and Cambodia: no data

Method of the cultivation

1. Mono line system (main Philippines)
2. Floating system (main Indonesia)
3. Long line system
(new method, Malyasia, Vietnam)

Green type

Brown type

Kappaphycus alvarezii "cottonii in commerce"

main cultivation species- *Kappa* carrageenan-

Brown type **Green type**

***Eucheuma denticulatum"* spinisum in commrce"**

-Iota carrageenan -

Main *Eucheuma* cultivation grounds : Philippines , Malaysia and Indonesia

Euchuma **material for food, Cebu, Philippines**

Edible *Euchuema* in Cubu, Philippines

***Eucheuma* salad, Philippines**

Mono line system of the cultivation in Philippines

Farming place of mono-line system in side of coral reef

Sea grass bed in the coral reef

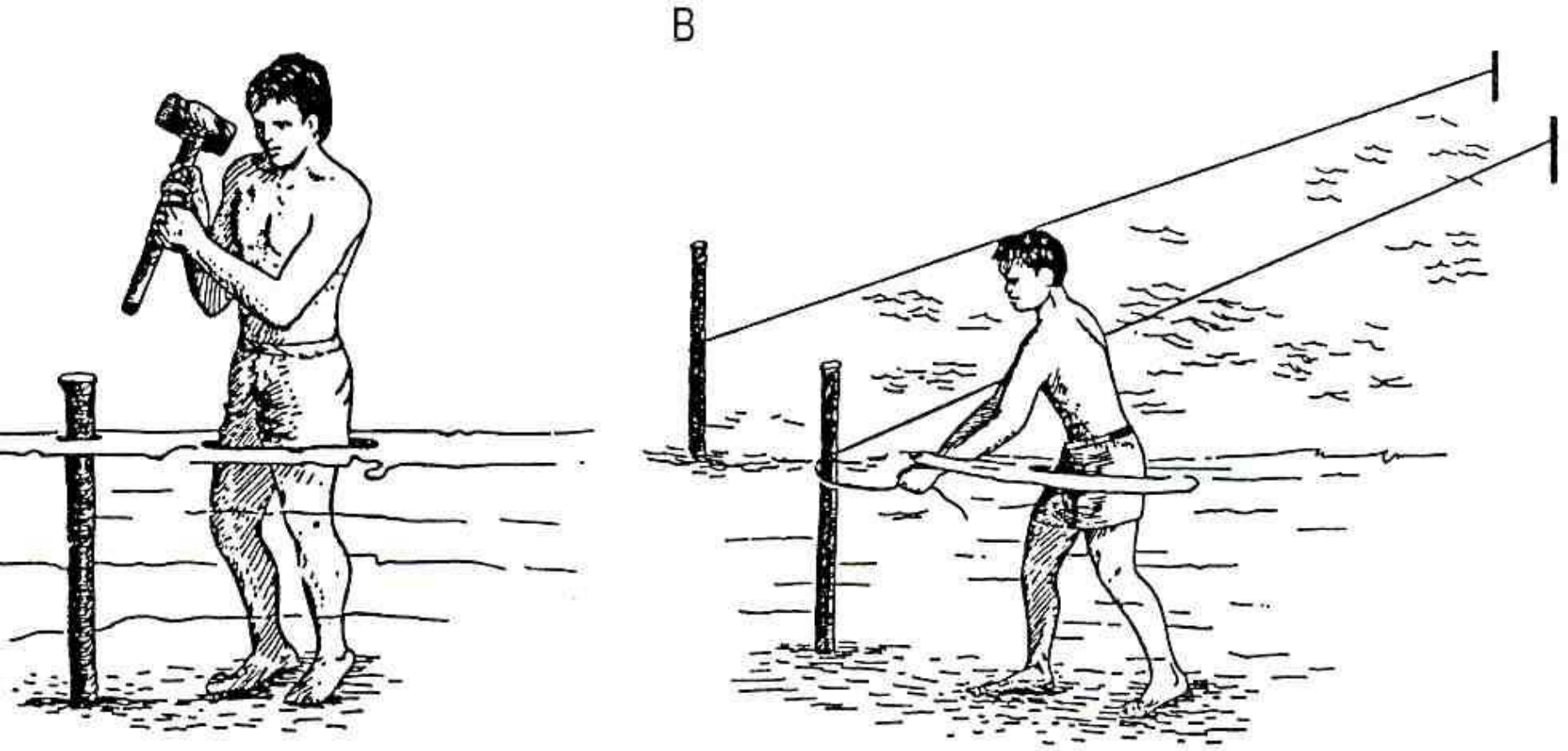

Figure 8. A. Construction of the support system starts with knocking holes in the substratum using a pointed iron bar. B. Monofilament line for attaching *Eucheuma* seedlings is attached and stretched tightly between two wooden stakes.

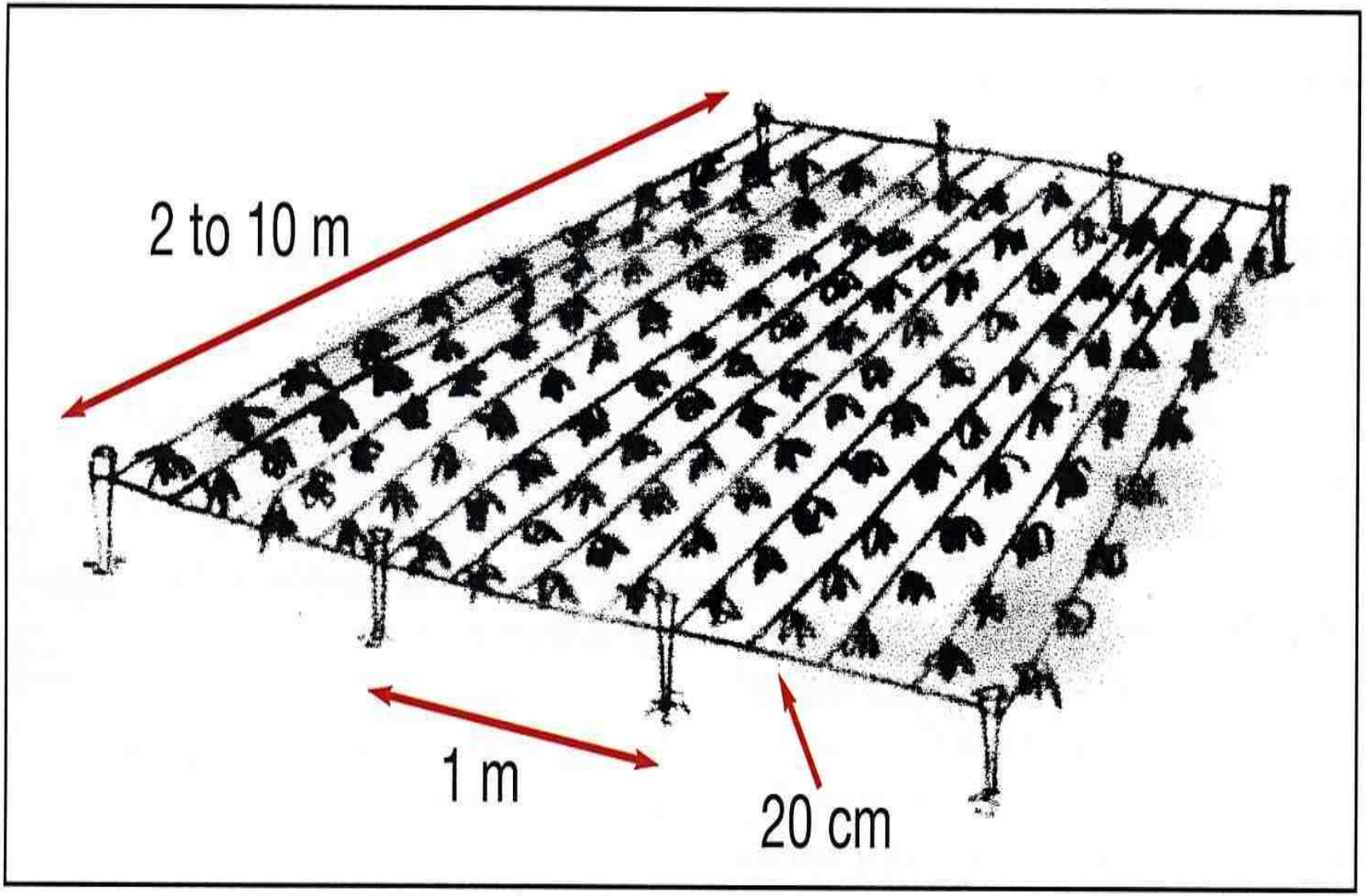

Figure 2.2 The newer style high density Off Bottom farm design with stakes still one meter apart but end lines are added allowing spacing of 20 cm between nylon lines. Again, nylon lines are 2 to 10 meters long and propagules are tied every 20 cm on the nylon lines.

Seeding of cultivation

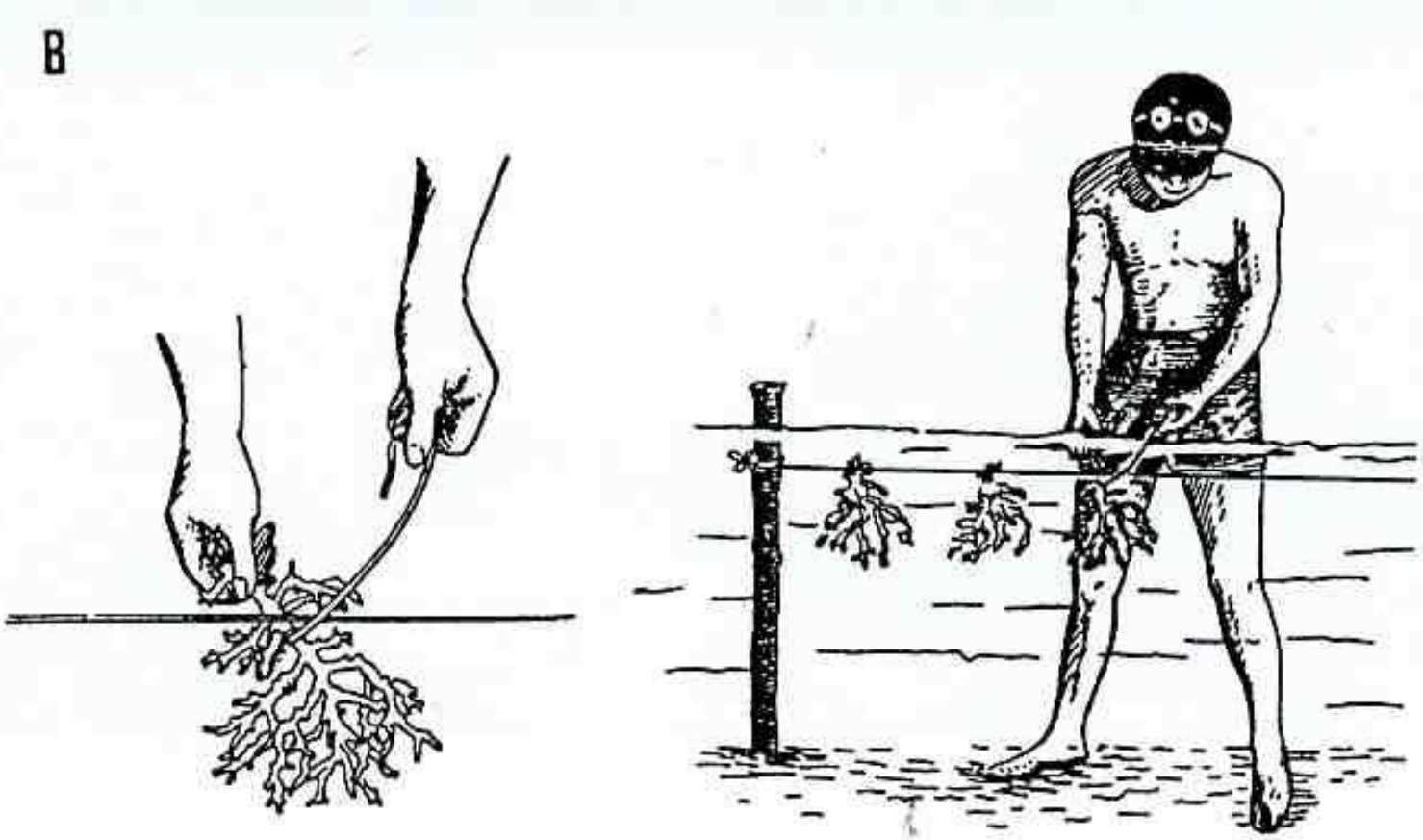

Figure 11. A. Seeds for planting are prepared by tying 50-100 pieces of cuttings with soft plastic tying materials commonly known as "tie-tie". B. Cuttings are tied at 20-25 cm intervals to the monolines.

Harvesting size of plants after one month

Mono line system in Vietnam

Growing *K, alvarezii* by mono line system

Kappaphycus **cultivation in the shrimp pond**
Shrimp in summer: ***Kappaphycus*** **in winter**

Growing fronds of mono line cultivation in Lagoon

Floating cultivation in the bay, Indonesia

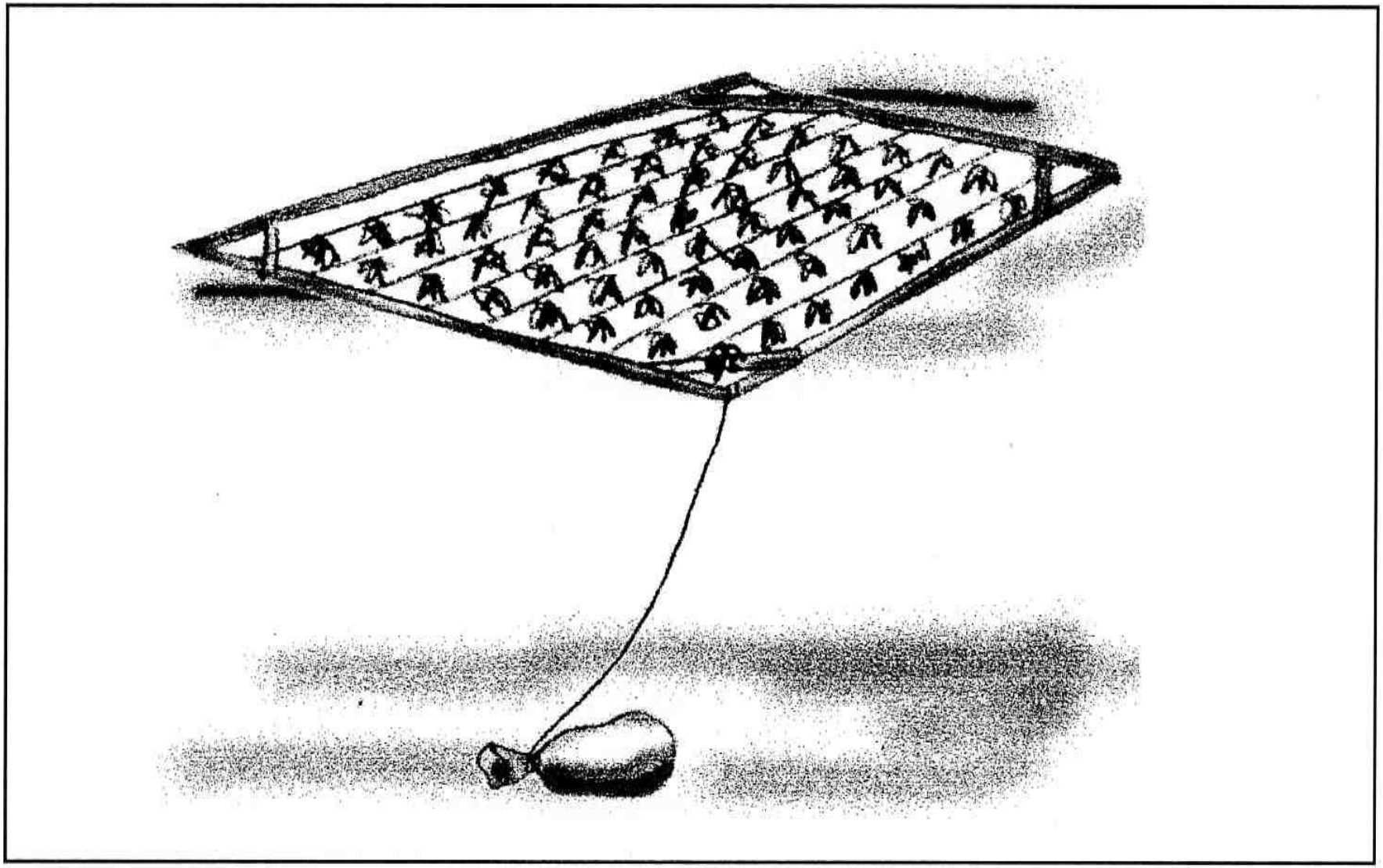

Figure 2.5 Drawing of raft with one sand bag anchor. The raft is about 8x8 meters and lines are tied every 20 cm apart. The raft should be weighed down, usually at the corners, so the plants are at least 20 cm beneath the water's surface.

Terms

Raft system made with bamboo

Seeding with family

Long line cultivation in Saba, Malaysia length of 100 m

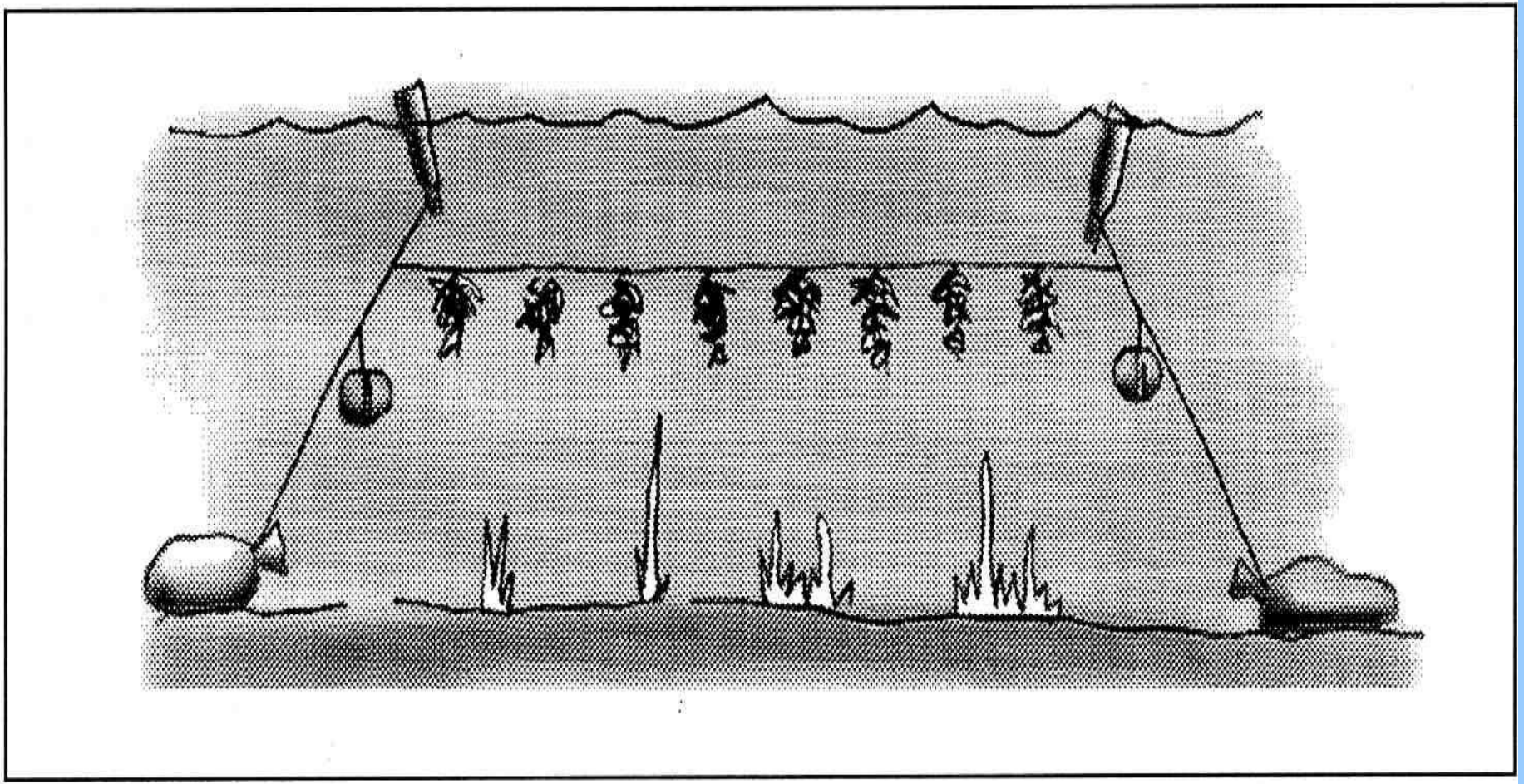

Figure 2.7 Sketch of extensive long line system. Individual lines are spaced two meters apart. Long lines, as the name implies, can be up to 100 meters long, with floats tied on every 5 meters.

Long line cultivation :Lager scale system

Long line cultivation in Vietnam

Growing fronds of long line system

Long line system in Malaysia

Euchuema **cultivation ground in the water person**

Floating station with family

Long line method of *Euchuema* cultivation

Seeding


2005 1 30

Harvesting

Figure 4.1 On the ground dryers allow for foreig material contamination such as sand.

Figure 4.2 Another problem with on-the-ground dryers is that people and animals step on the seaweed.

Seaweed disease -ice ice-

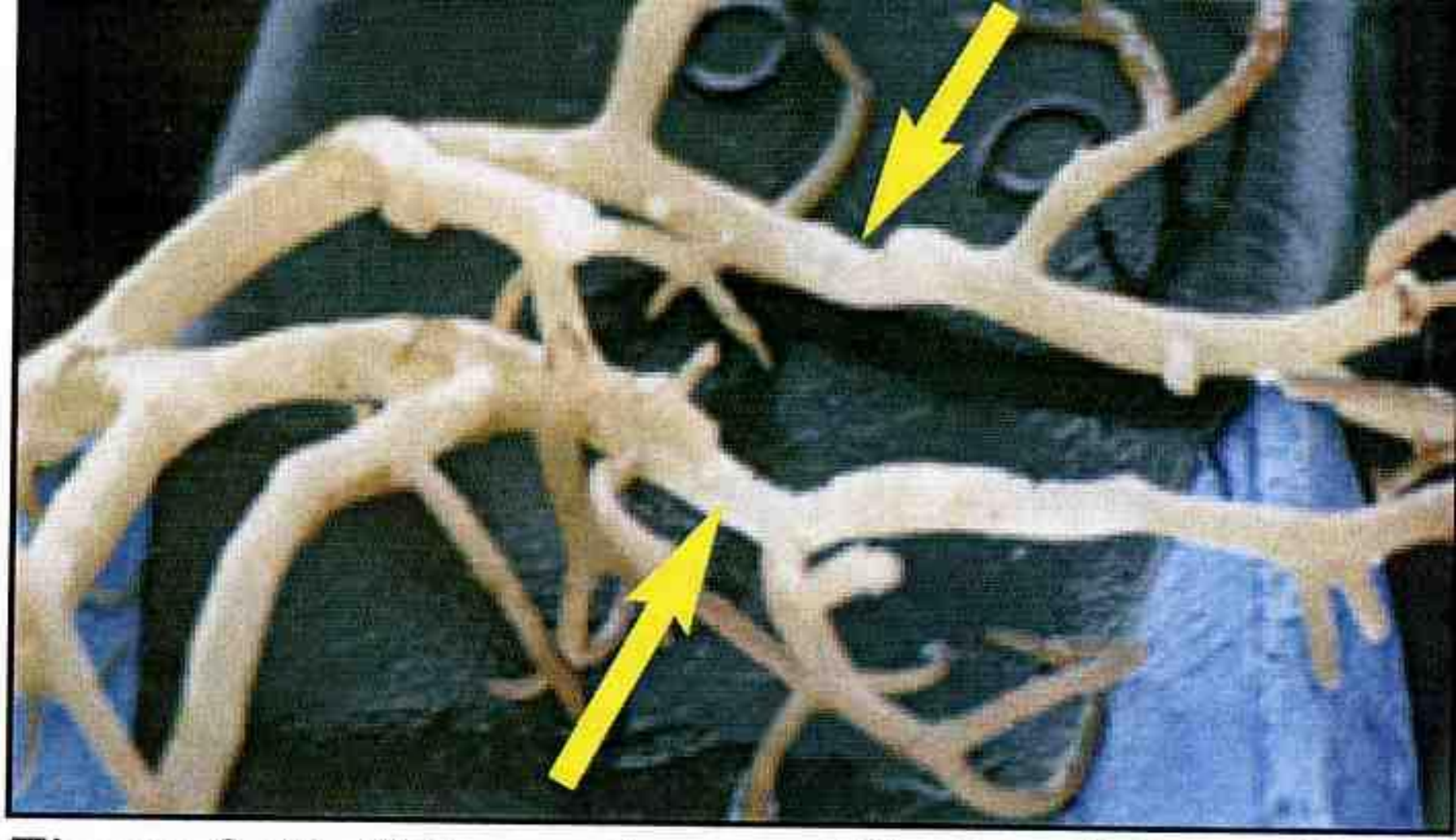

Figure 3.18 Tripneustes gratilla has "planed" the branches of this cottonii plant (yellow arrows). Not only is the pigment gone, but the branches are heavily gouged.

White fronds covered by Epyphyte

Herbivores

There are four types of herbivore damage which are listed in table 3.1 and discussed in detail below.

A. ***Nipped Tips***: It has been observed that adult rabbitfish (Siganidae), filefish (Monocanthidae) and cowfish (Ostracidae) are the primary perpetrators. Triggerfish (Balistidae), surgeonfish (Acanthuridae), parrotfish (Scaridae), porcupine-fish (Diodontidae) and pufferfish (Tetradontidae) have been observed eating tips but only on rare occasions. Examples of these fish families are depicted in figures 3.6 to 3.12).

Figure 3.6 Type of rabbitfish (family Siganidae)

Figure 3.7 Type of filefish (family Monacanthidae)

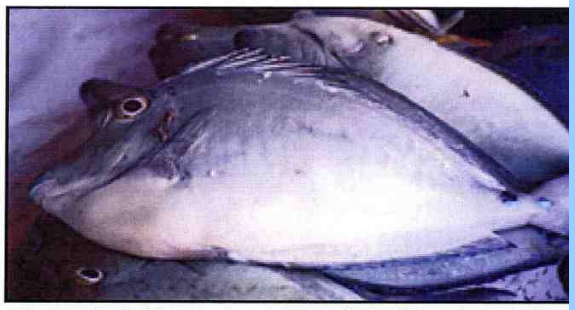

Figure 3.8 Type of surgeon fish (Family Acanthuridae)

Figure 3.9 Type of triggerfish (family Balistida

Figure 3.10 Type of parrotfish (family Scaridae

Figure 3.11 Type of porcupinefish (Diodontidae)

Application of carrageenan