LETTERS

Marine Transplantations

Recent interest in mariculture and an increasing interest in the biology of marine organisms have caused many to consider transplanting marine species. The feasibility of such transplants is enhanced by the availability of rapid long-range transportation and essentially nonexistent governmental regulations. Because of economic and population pressure man *will* introduce species to foreign shores. Considering our present knowledge it will be many years before we will be able to predict with any degree of certainty the effects an introduced species may have on an existing ecosystem.

Transplantations may cause considerable damage. For example, earlier in this century the Japanese oyster (*Crassostrea gigas*) was first introduced as spat to the northeast Pacific. This species is presently of considerable economic importance, and its introduction does not seem to have caused any direct harmful effects. However, two species of oyster drill (*Ocenebra japonica* and *Purpura clavigera*) were introduced with the spat and remain potential pests (*1*). Further, *Sargassum muticum*, a large, gregarious, brown seaweed, was accidentally introduced with the oyster spat. This weed has since become well established in sheltered low intertidal and shallow subtidal waters (*2*), a position normally occupied by eel grass (*Zostera marina*). If *Sargassum* is displacing eel grass, the results may be disastrous. Destruction of Atlantic eel grass beds by wasting disease demonstrated the importance of this plant as a nursery for many marine species. During the spring of 1972, Japanese oysters from British Columbia were introduced to French waters. I predict the establishment of *Sargassum muticum* in the eastern Atlantic as a result of this transplant.

Recent attempts have been made to establish the Atlantic lobster (*Homarus americanus*) in British Columbia, the British Columbian abalone (*Haliotis kamtschatkana*) in Japan, and Japanese species of the edible red alga *Porphyra* in the northeast Pacific. All of these introduced species are potential vectors of undesirable plants and animals. Once they have been introduced, control will be virtually impossible, particularly for those having pelagic stages.

At the Seventh International Seaweed Symposium held in Sapporo, Japan, from 8 to 12 August 1971, I sought the informal opinions of several biologists about the desirability of long-range transplantation. Without exception they considered it a mistake to undertake such action at that time. The question then arises as to how to regulate transplantation. The absence of international agencies with the ability to enforce regulations places the onus on individual nations to protect their shores. This solution is inadequate, as once species have been established, they could disperse along coasts without regard to international boundaries. One possible solution to this dilemma would be cooperation between countries with bordering shores. For example, Canada's newly formed Department of the Environment could collaborate in determining and enforcing regulations with a similar U.S. agency.

The scientific community must assist in formulating reasonable regulations which will apply to the introduction of exotic marine species for scientific or economic purposes. The formulation of these regulations may require a panel of scientists to evaluate the reasons for transplanting and possible dangers of such action. Further, inspection of the organisms to ensure that only the desired species would be introduced and a site inspection to assess the possibility of containment could be conducted.

Action is required now if we are to curb further disruption of the marine biosphere.

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References

1. D. B. Quayle, *Fish. Res. Bd. Can. J.* **21**, 1155 (1964).
2. R. F. Scagel, *Fish. Res. Pap. Wash. Dep. Fish.* **1**, 1 (1956).

Meetings in Mexico

The question of whether foreign nationals are to be allowed into a country to attend scientific meetings is a continual problem. Last August, approximately 15 people from at least five countries (India, Taiwan, Lebanon, South Korea, and Egypt) were unable to obtain visas to attend the American