Eelgrass (Zostera marina L.) in the Gulf of California: Discovery of Its Nutritional Value by the Seri Indians

Abstract. Zostera marina occurs in the northern Gulf of California. The grain of eelgrass is harvested in the spring and formed an important part of traditional Seri diet and culture. This is the only known case of a grain from the sea being used as a human food source. Eelgrass has considerable potential as a general food resource for mankind. Its cultivation would not require fresh water, pesticides, or artificial fertilizer.

The Seri Indians of Sonora, Mexico, are one of the last hunting and gathering peoples (1–3). Although the information content in their culture is rapidly decaying through acculturation, some of the older people can describe traditional knowledge and practices with clarity (4, 5). Our studies of the Seri reveal that the seeds of eelgrass were an important traditional food source. In this report we describe the involvement of the Seri with this plant.

Zostera is cosmopolitan and consists of about half-dozen poorly defined species. Zostera marina occurs in extensive pure stands along the coasts of North America and Eurasia. Zosteraeae is one of the few groups of fully submerged marine flowering plants (6).

The reproductive plant of Z. marina has long slender leafy stems. Increasing water temperatures in spring are associated with the death and disjunction of the upper stem, which bears the fruit, and this results in flotation (6). The fruit is a flask-shaped utricule, about 3.0 to 3.5 mm long and 1.0 to 1.5 mm in diameter. The single seed nearly fills the thin-walled utricule. Each spadix bears 5 to 11 seeds.

There are a few scattered mentions of eelgrass in the Gulf of California (7) and in the literature on the Seri (8); the documentation, however, is poor. The role of eelgrass in Seri culture demonstrates that the plant has long been in the Gulf, even though it is not mentioned in botanical surveys of the region. To unambiguously illustrate the importance of this plant in Seri culture, key Seri words (9) and knowledge associated with it are included here.

The Seri know of eelgrass at Kino Bay, in the Infrerimillo channel, and at El Desemboque (Fig. 1). It is abundant in the Infrerimillo. The Seri claim that earlier in this century there was a great growth of eelgrass in the bay at Desemboque, but that by the 1940’s it had disappeared. In spring 1970 it began to reappear at Desemboque.

The month of April corresponds approximately to the Seri moon or month known as Xnois ?aat lissnaX ‘Xnois when—there—is moon’—that is, when eelgrass grain is ready for harvesting (8, 9). A certain species of duck which dives to feed on the plant is called Xnois kakassos Xnois the foreteller,” because when seen diving, it is said to foretell the season of the eelgrass. A small rock islet, Marito de Turner, off the southeast shore of Turner’s Island (Fig. 1) is called ?aat Xnois ‘rock Xnois’ (Xnois rock). The fact that a month of the year, a duck, and a geographic landmark take the name of this plant is testimony to the antiquity of the use of eelgrass in Seri culture.

The seed was one of the most important traditional foods of the Seri and is still occasionally harvested. The ripe fruit, Xnois, is harvested in April or early May by both men and women. It is usually not harvested until the plant is floating loose in great masses close to shore. At such times the people wade into the water, often to their chests, to pull in bunches of the long strands hand over hand. A person who harvests éas, the floating plant, is called kapőee. It is a time of happiness, with much shouting and laughter, and “everyone gets wet.” It is a time of warm and pleasant weather.

One who harvests ?atám, the growing plant, is callec kotám. The growing plant is generally harvested only when one is “in a hurry” to eat the seeds.

The eelgrass is spread along the beach to dry, and seaweed and debris are picked out. The action of throwing away this debris is called kāpiX. The plant requires several days to dry. Then, after the dampness of the morning is gone, the job of separating the grain begins. Women sit with great bunches of eelgrass placed on deerskins, canvases, or cloths, or in baskets or other receptacles. They thresh it with wooden clubs. It is then rolled between the palms to loosen the fruit. Children may sit with their mothers and help with the harvest.

After the fruit is collected, it is winnowed to remove the relatively large amount of leaves, twigs, and debris. Winnowing is accomplished by tossing the fruit into the air and allowing the debris to blow away.

The grain is prepared by women. Traditionally a portion of the grain was stored in pottery ollas to be eaten during the time of fall rains. The toasted grain, called Xnois ?ap¿apa ‘Xnois toasted,’ is much preferred over the natural unroasted grain which is called Xnois ?apdnapa ‘Xnois haird.’ Traditionally it was toasted in a wide-mouthed pottery vessel or in a large sherd, and then poured into a basket or sea turtle shell, and pounded to break open the hard fruit or utricule. The chaff is separated from the seed by a second winnowing, which is also done by tossing the seed and chaff into the air. Finally the seeds are ground on a metate. The flour is placed in a basket and the basket tapped onto a stick to bring the remaining chaff to the surface at the edge of the basket, where it is allowed to spill onto the ground, leaving the pure flour in the basket.

The flour is cooked in water and made into either a thick or a thin gruel. Since it has little flavor (like most flours), it is eaten with other food, usually sea turtle oil or honey. Xnois kömis ‘eelgrass-seeds mix’ is made by grinding the seeds of cardón (Pachycreus pringlei), a giant columnar cactus, with eelgrass seeds. The Seri state that cardón seeds are rich in oil and add a good flavor to the eelgrass (10).
The Seri report that eelgrass is a favorite food of sea turtles, and is extensively grazed primarily by the green sea turtle, *Chelonia mydas*. Preliminary analysis of stomach contents of specimens of *Chelonia* from the Infernillo region confirms the fact that these turtles feed on eelgrass (*Z.†*). Seri turtle hunters often seek their prey near eelgrass beds. According to the Seri, turtles feeding on eelgrass have sweet, well-flavored meat; while those found off the west coast of Tiburon Island which eat algal seaweeds are káam ‘stinking’ (*Z.†*).

Eelgrass is primarily a food for the Seri; however, other uses for it figure in their culture. A child suffering from diarrhea is said to recover if he is fed *Xníd* s. Eelgrass is piled over a house frame for shade and roof. A basket or sea turtle shell lined with eelgrass provides a bed on which meat is placed in order to keep it clean.

Dry eelgrass was formerly used to stuff a mule deer or desert bighorn sheep scrotum to make a ball for children to play with. In the past, dolls were often fashioned from bundles of eelgrass (*éáñ*ō) bound into a cross with strips of cloth. Like most Seri dolls and figures, it is faceless and of haunting simplicity (see cover).

We know of no other case of the grain of an ocean plant being used as a human food resource (*Z.†*). The cosmopolitan distribution of *Zostera* in shallow coastal waters enhances its possible significance as a food plant. The protein and starch contents of the seed compare favorably with those of major terrestrial economic grains (*Z.†*). It has an unusually low fat content, which may have certain nutritional advantages (*Z.†*).

References and Notes

8. In a little-known, privately printed publication, Davis [C. R. Quinn and E. Quinn, Eds., *Edwards H. Davis and the Indians of the Southwestern United States and Northwestern Mexico* (Elena Quinn, Downey, Calif., 1965), p. 164] briefly described the use of "a green grass growing on the sea bottom," which can only be *Zostera*, E. Y. Dawson *Desert Plant Life* 18, 132 (1944) claimed that the

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Cover

Eelgrass doll made by Ramona Case-

novia, El Desemboque, Sonora, Mexi-

coco, April 1972. Eelgrass and cloth,

31 centimeters long. See page 355.

[Photograph by Helga Teiwes-French,

Arizona State Museum]