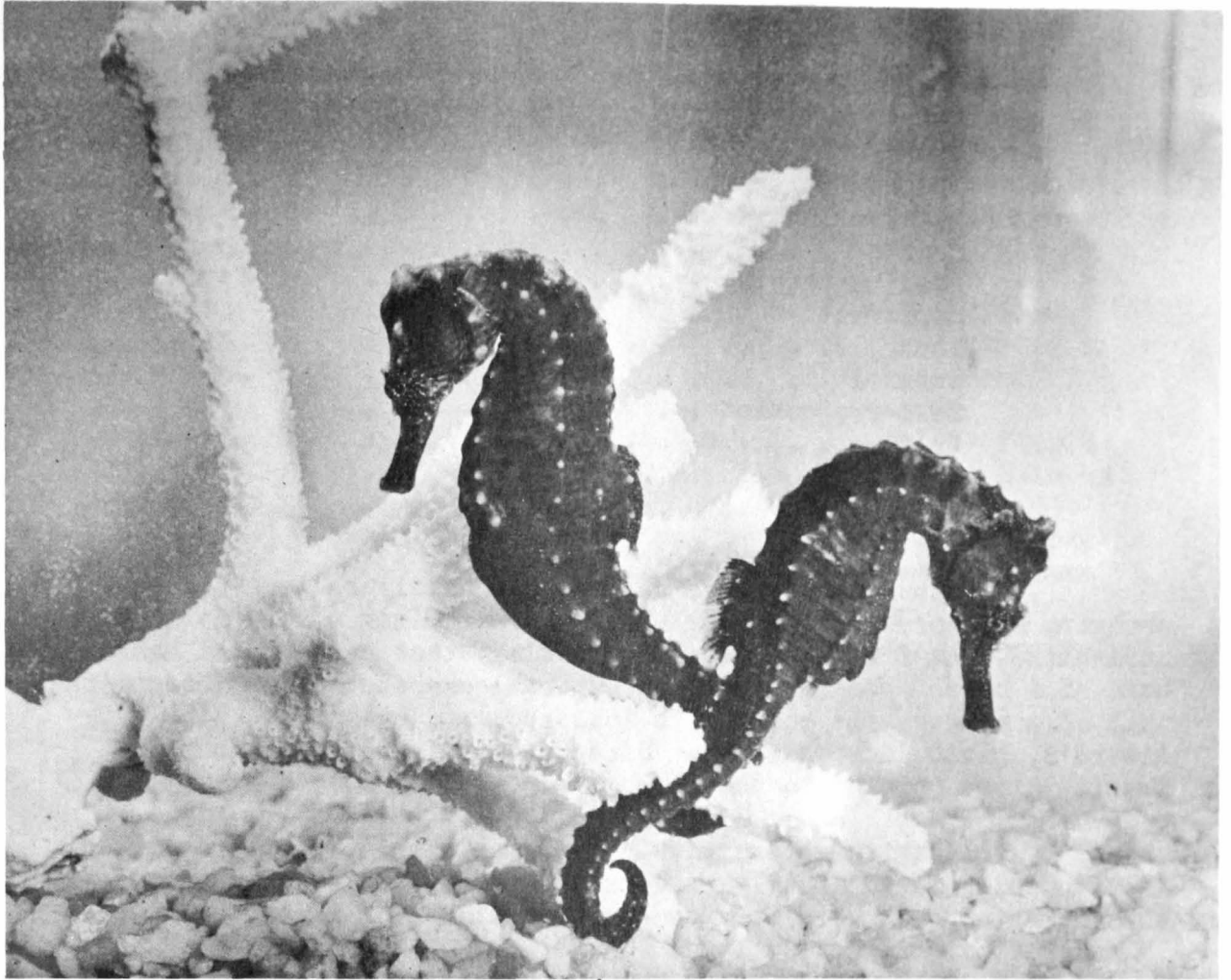


# SEA HORSES



Courtesy of the Miami Seaquarium

Male (left) and female (right) sea horses (Hippocampus hudsonius)  
against a white coral background.

FISHERY LEAFLET 495

UNITED STATES DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BUREAU OF COMMERCIAL FISHERIES  
WASHINGTON 25, D. C.

# SEA HORSES

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Visitors at marine aquariums can hardly believe that the engaging sea horses are fishes because their bizarre form is so unfishlike. At first glance, one might say that a sea horse has the head of a horse, the hard-jointed external skeleton of an insect, the tail of a monkey, the pouch of a kangaroo, and eyes that, like a lizard's, pivot independently. Stranger still, the male, not the female, gives "birth" to the young.

Tolerating waters with a wide range in temperatures, they are typically found in eel-grass, sea-lettuce, and other plants near the shores of most warm and warm-temperate seas or in the open ocean in patches of drifting seaweed.

## SPECIES

There are some 50 species, which range in length from 1 inch to 1 foot. They comprise the genus Hippocampus (means horse caterpillar or worm) and belong to the family Syngnathidae and the order Lophobranchii.

Six of the species occur on the coasts of the United States. The common, rather large species, Hippocampus hudsonius, ranges from Nova Scotia to Florida, Cuba, and the Gulf of Mexico. It is sometimes locally abundant, but its occurrence varies extremely from year to year. It is known chiefly as a summer fish; its location and actions in winter are unknown.

Smaller and less colorful than H. hudsonius with which it lives compatibly in Florida waters is the pygmy sea horse, H. zosterae. It received its scientific name from its close association with the eel-grass, Zostera marina, which it resembles even in color, ranging from dull brown to golden yellow. When adult, this fish, the most popular sea horse for aquariums, is from 3/4 to 1-3/4th inches long. The breeding season at Cedar Key, Florida, extends from mid-February to late October (Strawn 1958). In this area, with water temperatures at about 85° F., the average male probably bears 2 broods a month which grow rapidly and mature within 2 or 3 months. At least 3 generations are produced a year. Few individuals live longer than a year.

The spotted sea horse, H. punctulatus, is not common. It occurs in the West Indies, casually north to North Carolina and was recorded once from New Jersey. It attains a length of about 5 inches.

The southern sea horse, H. stylifer, is found in Florida, usually in fairly deep water. Its maximum length is about 5 inches.

A still smaller species, H. regulus, occurs on the coast of Mississippi, Texas, and Mexico. Although it reaches a maximum length of only 1-1/2 inches, it matures and reproduces when about 1 inch long.

The largest species, H. ingens, occurs on the coast of southern California. It reaches nearly 12 inches in length, but specimens of such large size are uncommon.

#### DESCRIPTION

Since all species of sea horses are generally similar in structure, only one species, H. hudsonius, will be described in detail. Rings of rough bony plates protect the head and the body-- 12 rings on the trunk, 32 to 35 on the tail; each body ring is armed with 4 blunt spines.

The freely movable head, topped by a 5-cornered star-shaped "coronet" or knob, is at right angles to the general body axis. The body is flattened sidewise with a deep convex belly, resembling the bosom of a pouter pigeon. The small toothless mouth and the small jaws terminate the tubelike snout which probes for food. The solemn, bulging eyes pivot independently; one eye can look forward or upward while the other at the same time can look backward or downward, or one eye can remain stationary as the other swivels around. On each side there is a sharp spine above the eye and one behind it, a third over the gill cover, and a fourth on the side of the throat. These spines sometimes branch into short, fleshy filaments, called cirri,

which, with color changes, cause a sea horse to resemble the surrounding plants and help it to escape the notice of enemies. Between the nostrils there is a blunt horn. The gill filaments grow in the form of numerous small, rounded tufts and lie in the gill chamber which is covered by a flap-like operculum.

The body tapers suddenly behind the anal fin to a long, rounded, finless tail, which is 4-cornered in cross-section, curled inward in the direction of the head, and strongly prehensile. In the male the lower surface of the fore part of the tail bears the short, broad brood pouch which begins to develop when he is a few months old.

The conspicuous dorsal fin of about 19 rays is the main organ of propulsion and originates about midway of the length of the fish, opposite the vent. It extends backward over 3-1/2 rings or bony segments of the body and within half a ring of the tail. The small anal fin is opposite the rear part of the dorsal fin. The 2 transparent pectoral fins, which are behind the head, are of moderate size, broad based, and round tipped, and stabilize the sea horse when it swims. There are no ventral fins. All fins quickly regenerate when injured.

The internal skeleton is like that of a normal vertebrate.

This species, which reaches a length of about 5 to 8 inches and breeds at about 3 inches, is light brown or dusky to ashen gray or yellow. Sometimes it glitters with silver and gleams with white dots.

#### HABITS

Sea horses are not active swimmers, but remain motionless most of the time, resting and sleeping, with the graceful tail firmly coiled around stationary plants to keep currents from sweeping them away. Should the objects to which they are attached float, the currents may carry them long distances. If no other objects are available, sea horses may wrap their tails around one another. At a public aquarium, where they become balled up while frolicking together, an attendant may have to untangle them.

When sea horses swim, they, unlike other fishes, generally hold the body vertically, and, with the tail coiled, make slow and stately progress through the water by rapid movements of the dorsal fin and the pectoral fins which vibrate harmoniously. They do not use the tail because the trunk is too stiff for much sidewise motion.

When these feeble swimmers descend in the water, they curve

the neck and roll in the tail. To ascend, they straighten themselves out almost completely. Little movements of the body and the tail enable them to creep on the ocean floor.

### FEEDING HABITS

In feeding, the sea horse brings its mouth near the small organism which is to be captured and suddenly opens it. The cheeks are inflated at the same time and the food is captured with the inrush of water and then swallowed whole because sea horses do not have teeth.

The usually plentiful natural food of sea horses consists of tiny, live organisms, called zooplankton--copepods, Gammarus (a common amphipod), mysid shrimps, the larvae of various higher forms of crustaceans, and possibly the eggs and fry of other fishes. They will eat only live and actively swimming food.

### REPRODUCTION

Perhaps the most intriguing characteristic of sea horses, whose life span is brief, is their unparalleled manner of reproduction. As the season for reproduction approaches, the bodies of the males and the females change. The female's cloaca (the common chamber into which the intestinal, urinary, and generative canals discharge) extends and becomes an ovipositor (a specialized organ for depositing eggs in a position suitable for their development) and the walls of the male's shriveled brood pouch thicken and become highly vascular.

The courtship is an elaborate ceremony in which the male and the female, giving out intense mating signals, swim round and round each other. The female produces from a few to 600 or more brick-red eggs, varying with the species. She deposits a few at a time through the ovipositor in the brood pouch of the now passive male and then retreats. In a short time she again approaches the male and transfers more eggs. She continues this procedure which may last several days until her eggs are discharged and then, with her trim figure restored, she swims away carefree. Egg laying concludes her duties in the reproductive process and she shows no further interest in the male who received her eggs or in her young.

Males go through the motions of courtship even if females are absent.

As the eggs are deposited in his pouch, the male, who may receive the eggs of more than one female, fertilizes them. (Females outnumber the males, the season of the year and the environment prob-

ably influencing the sex ratio.) Each egg, isolated from the other eggs, is embedded in the tissues of the pouch. If an egg does not find a place in which to develop, it deteriorates. When the pouch is full, it closes and no water enters or leaves it during the incubation period.

Nourished on the male's blood, the eggs remain in the pouch about 10 to 45 days before hatching, depending on the water temperature and the species. A male pygmy sea horse carries the embryos for about 10 days (Zahl 1959). To speed the birth of his offspring, the long-suffering male, as delivery time draws near, may bump his swollen pouch against hard objects or stretch his body. With his tail securely clasped around a plant stem or other objects, he bears down to force delivery, bending rapidly backward and forward. This movement distends the pouch so much that an explosion of wriggling young occurs immediately, accompanied by fragments of egg shells and stillborn sea horses. A pygmy male usually bears 10 to 35 young at one delivery. While they usually emerge singly, sometimes tail first, sometimes head first, occasionally 2 or 3 burst out at once. In striking contrast, a male H. hudsonius may produce as many as 700 at one delivery, not singly but in bunches.

After the expulsion of the young, which may last a few minutes or several days, depending on the species, the male may flush out his pouch by turning it wrong side out with the aid of some hard object, as some species do when ejecting the young. His body shape and the tissues of the flabby pouch soon return to their normal condition.

#### YOUNG

Newly born sea horses are miniature adults except that their bodies are transparent and lack pigmentation. Pigment cells, shaped like 5-pointed stars, soon appear, however, and spread gradually, finally enveloping the young with the coloring of the adults.

Since the young sea horses cannot re-enter the protective pouch of the male, who does not concern himself with them after birth, they must fend for themselves. They soon swim away and, in an upright position, twine their tails around objects, sometimes trying to anchor to air bubbles or straws, and begin to feed. When only a few months old these rapidly growing young are gluttons. Even after they have satisfied their craving for food, they take in more food, mangle it, and then spit it out.

## ENEMIES

Sea horses have enemies in the form of large predaceous fish which indiscriminately swallow all small animals in their path. A sea horse was found in the stomach of a red snapper (Jordan and Gilbert 1882), one was found in the stomach of a yellowfin tuna (Herald 1949), and 20 sea horses were found in the stomach of a remora (Longley and Hildebrand 1941). Other enemies are people who profitably collect them (Zahl 1959) in the thick sea grasses, usually with push nets, beam trawls, and minnow seines, for aquariums, scientific investigators, and curio dealers.

## SELF-PROTECTION

Sea horses are not completely at the mercy of their enemies because they have some means of protecting themselves. To escape their enemies, they change color over the course of several hours, by means of minute changes in the pigment cells, so as to blend with their surroundings. Red sea horses may be found among brilliantly colored sponges and brown ones in drab grasses.

The form of the body contributes also to their protection. The filaments on some individuals of all species can scarcely be distinguished from waving plants. A species whose camouflaging is highly developed is the sea dragon of Australia, Phyllopteryx eques. The waving dorsal fin, the upright position, and the broken outline of the body of all species also help to further disguise them.

## CULTURE

Breeding and raising sea horses in captivity are difficult but can be accomplished by great care. Several aquarists reportedly have raised the pygmy sea horse through successive generations (Herald and Racowicz 1951). So far as known, however, no one has been able to breed the common sea horse, H. hudsonius.

A method offering some promise of success is to obtain from the ocean male sea horses which have eggs in the brood pouches and allow them to give birth to the young in aquariums. Larval brine shrimp make fine food for young sea horses.

A pair of adult sea horses can live well in a 4-gallon aerated salt-water aquarium at a temperature of about 67° F. (Innes 1956). They too feast on brine shrimp and can be trained to eat small guppies.

## VALUE

Besides being of constant interest to aquarium visitors, aquarists, writers, and fishery scientists, sea horses are in large demand as curios and souvenirs. Because of their firm external skeleton, drying does not distort them and, if properly prepared, they can be kept indefinitely. Some are mounted on driftwood blocks; others are affixed to pedestals for use on a chessboard instead of the knight; still others are used as jewelry, such as ear rings. So far as known no attempts have been made to use their pinkish meat as food for man; their small size probably accounts for this.

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April 1960

Ms #921