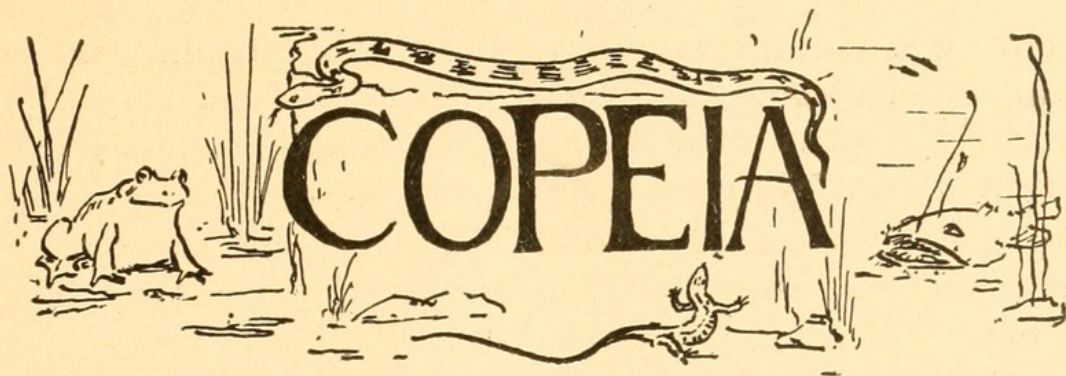




Published to advance the Science of cold-blooded vertebrates

NOTES ON THE TOTUAVA (*CYNOSCION MACDONALDI* GILBERT).

[In the northern part of the Gulf of California there is found in great abundance, a species of weak-fish which reaches a huge size, six feet or more in length, and which has much value as food. It is known locally as *Totuava*. I have received from Mr. Eiichiro Nakashima, a graduate of the Fisheries School at Tokyo, a man who has had considerable experience in the pursuit of this fish, a series of notes concerning it. I here present a condensation of his observations.—DAVID STARR JORDAN.]

CYNOSCION MACDONALDI GILBERT.

The Totuava is caught mainly about the mouth of the Colorado River and southward to Guaymas in Sonora. Shallow points with sandy bottoms are the best fishing grounds. These fishes are rare in winter, very abundant in summer. They live both in clear and muddy water. The preferable temperature is from 57 to 80 degrees F.

In the winter they go southward to Guaymas. Their migration is in part coincident with that of the small fishes on which they feed. These avoid the inflowing cold water of the Colorado. They spawn mainly in early May, apparently in shallow water. After this they are very lean. They often come into very shallow water. They are omnivorous, feeding on any kind of small fish or crabs, but especially on

shrimps. In pursuing small fish they often leap a foot or two from the water. They are not very shy or very active; when one is hooked or speared the others crowd around as if in curiosity.

The male makes a very peculiar noise, "gu-gu," when caught. The female is larger than the male and deeper in the body. The air-bladder is very large and thick, spread in the greater part of the abdomen. The bladder in the male is thin, like paper.

In the spring the young of three inches swim close to the shore; by the rings on the scales we estimate these to be a year old; those of three feet in length as four years old, those of 6 to 6½ feet, 8 or 9 years old, this being the maximum size. The males seem to breed at the age of four years; the females develop more slowly.

Along with the *Totuava* occurs a related species, *Cynoscion reticulatus* (Gunther). It is much smaller, less than three feet in length. Its colors are more lustrous, very beautiful green, blue and purple above and below posteriorly light yellow.

The eggs are larger than in the *Totuava* and the spawning season comes earlier. [This species, (unlike the *Totuava*) extends southward to Panama, and with other related forms, it is known as *Corvina*.]

EIICHIRO NAKASHIMA,

Kingsburg, Calif.

EVIDENCE OF THE PRESENCE OF *CARCHARODON* ON THE NEW JERSEY COAST DURING THE PAST SUMMER

As there exists some doubt whether the Great White Shark, *Carcharodon carcharias*, was among the species present on the coast in this vicinity during the recent shark scare, the following evidence seems worth noting.

In a Broadway window there were recently on view two teeth of a freshly caught shark, indubitably



Jordan, David Starr and Nakashima, Eiichiro. 1916. "Notes on the Totuava (Cynoscion macdonaldi Gilbert)." *Copeia* 37, 85–86.

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