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SURVIVOR: The True Story of Post-Release Roosterfish

Because of their extremely aggressive nature, their ability to endure long fights, and the fact that they can be readily taken on both live and artificial baits, roosterfish (*Nematistius pectoralis*) are highly prized among inshore anglers of the eastern tropical Pacific. This species draws the attention of anglers from all around the world, with entire vacations centered on the hopes of catching a roosterfish. Fortunately for the rooster, they are often released when caught by recreational anglers and are not typically the target of commercial fisheries, likely because the rooster is not considered to be excellent table fare. Its white muscle (the muscle that powers burst swimming) is unusually rich in myoglobin, contributing to its darkened-red appearance. Although this muscle is certainly edible, it is typically not as highly prized as many of the other inshore snapper and jack species caught within the rooster's habitat.

Despite the rooster's importance to recreational fisheries and its prevalence among inshore ecosystems of the eastern Pacific, few scientific studies have focused on this species, with no information available on several aspects of roosterfish biology. Because the rooster supports vast catch-and-release fisheries from Baja to Ecuador, an important aspect to address is whether or not roosterfish survive the effects of capture. What is known is that roosterfish can endure long fights with repeated runs, usually continuing until they are fully fatigued. Upon release, the fish (especially if they are 30-plus pounds) are typically lethargic, barely kicking downwards, or sometimes sinking slowly out of sight. Post-release mortality rates have been shown to vary tremendously from species to species, with some displaying relatively low mortality and others proving to be quite fragile when it comes to capture and handling.

In an attempt to assess whether roosterfish survive catch-and-release fishing, PIER researchers initiated a study that focused on post-release survivorship. The study used acoustic telemetry to document the post-release movements of fish caught using standardized techniques. Acoustic tracking is a labor-intensive technique that has been used to quantify the fine-scale movements of several fish species. It involves the use of acoustic tags that emit a coded pulse that is detected by a hydrophone. A receiver downloads the pulse and decodes the information, revealing both the temperature of the water and the depth of the fish. These techniques require that the fish be tagged and subsequently followed using the intensity of the sonic pulse emitted by the tag. Difficulties associated with this type of research include acoustic noise, such as that associated with heavy surf, fast or erratic movements of the tracked specimen, weather (for example, rain makes it difficult to hear the acoustic signal), as well as signal dampening associated with underwater structures. Despite these difficulties, tracking studies are an effective way to assess fine-scale movements, providing real-time data over time periods ranging from hours to several days. Off the California coast, tracking studies have been used to acquire movement information from a wide variety of fish, ranging from striped marlin and mako sharks to coastal species, like kelp bass and sheephead.

STUDY AREA

Fieldwork was performed off the Pacific coast of Costa Rica outside of the mouth of the Golfo Dulce, an area known for a high density of roosterfish of all sizes (small juveniles to large adults), which can be readily found throughout the year. Furthermore, this area is home to several sportfishing operations and has world-class inshore fishing opportunities that lend to its relatively high recreational fishing effort.

CAPTURE AND TRACKING PROCEDURES

Because roosterfish can be found close to shore along remote stretches of beach (within 10 to 15 feet of water), the fishing was typically performed from the larger sport fisher, accompanied by a smaller tracking skiff.

Although roosters can be caught on flies or targeted with either ultra-light or even heavy tackle, PIER researchers replicated the techniques that are more commonly used by roosterfish anglers; thus, fly-lined thread herring (*Opisthonema*) or big-eye scad (*Selar crumenopthalmus*) were typically slow-trolled tight to the beach or around deeper structure. Baits were rigged using Eagle Claw 7/0 circle hooks and 30-pound test. Once hooked, the fish were fought with moderate drag pressure (less than seven pounds) and brought to the boat as soon as possible.

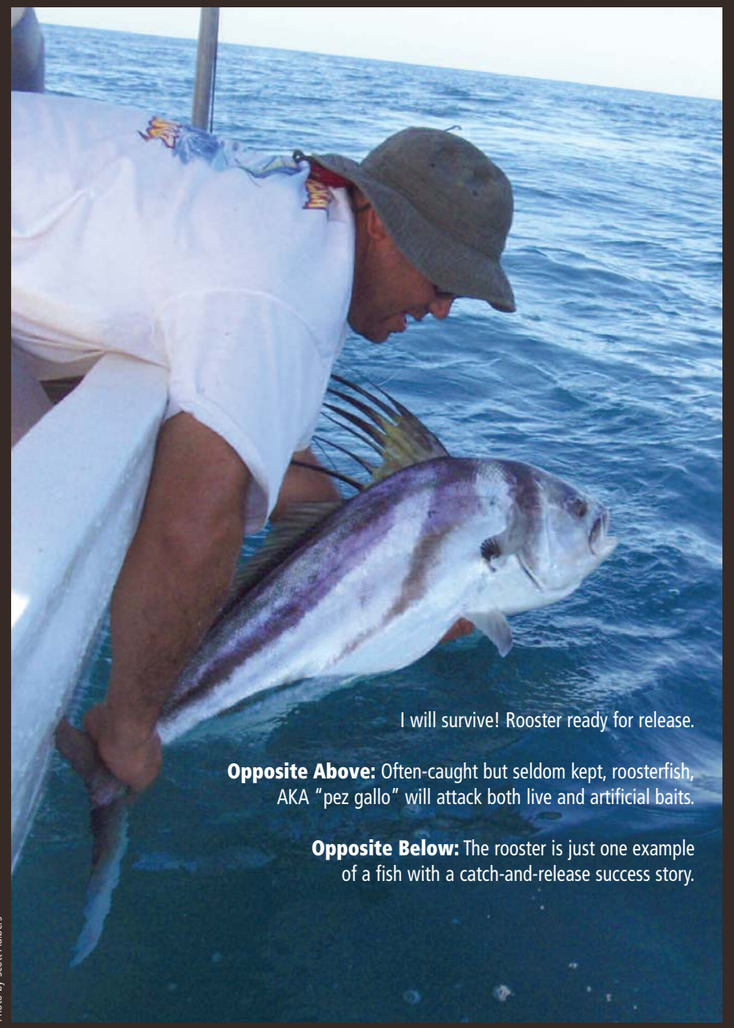
At the boat the roosters were quickly measured and tagged just beneath the comb in the dorsal musculature with a small acoustic tag and a conventional identification marker. Upon hook removal and release, the tracks commenced, and it was up to the tracking team to make sure that the signal was not lost. Because of the shallow water, wave action, and other acoustic noise (for example, snapping shrimp, marine mammals, fish) the transmitters used in this study had a limited range of approximately 1,200 feet. Intensity of the sonic pulse emitted by the tag was used to gauge distance from the boat, and direction was determined by rotating the hydrophone, which was mounted on a tiller that extended six feet below the hull of the vessel. An onboard acoustic receiver collected information every three seconds throughout the track duration on the vessel's position, depth of the fish, and water temperature.

SURVIVORSHIP

Over the past two years, eight roosterfish have been caught, tagged, and tracked in this study. Tracked individuals ranged in size from 15 to 65 pounds and were followed continuously for periods of up to 30 hours. All eight individuals survived the acute effects of capture, with no immediate mortalities observed. Further, two of the tagged individuals were subsequently recaptured and released by recreational fishers following 28 and 42 days at liberty.

MOVEMENT PATTERNS

Initial post-release movements were markedly similar among all individuals, with the roosters moving relatively quickly into deeper water. Once in deeper water, the roosters moved relatively slowly (two knots) and remained at a constant depth. After approximately two to four hours, the movement patterns typically changed, with the rooster beginning what seemed to be a more linear trajectory back into either shallow water or towards structure. Other tracking studies have iden-



I will survive! Rooster ready for release.

Opposite Above: Often-caught but seldom kept, roosterfish, AKA "pez gallo" will attack both live and artificial baits.

Opposite Below: The rooster is just one example of a fish with a catch-and-release success story.

Photo by Scott Aalbers

All in a day's work. Research efforts, such as the roosterfish-tracking project conducted by PIER, help ensure the future of the fishery.

Photo by Scott Aalbers

tified similar recovery periods, which typically result in a shift in horizontal movement patterns or depth distribution.

Following the initial recovery period, the roosters typically fluctuated in depth from near the surface to the bottom, making the tracking effort more difficult as the fish hugged rocks and frequented the shallow waters of the surf zone.

Findings to date suggest that even small individuals move along broad stretches of coastline (20 nautical miles) throughout the day and night, encompassing a relatively large home range. In fact, all roosters tracked showed considerable horizontal movements, with some individuals returning to the initial capture location. Typically, the roosters made directed movements to areas rich in schooling bait or obvious structure (such as river mouths or submerged rocks). Once in these productive areas, the roosters seemed to patrol a given spot repeatedly before moving on to the next location.

Depth records indicated that roosters can dive up to 180 feet, but most frequently they remained at depths of less than 60 feet. As one might expect, the movements often mirrored those of schooling bait that was observed on the depth sounder of the tracking vessel. Active periods of attempted feeding were also observed, where the tracked individuals were seen crashing through bait near the surf-line.

Tracking studies have shown that roosterfish, though commonly targeted along sandy beaches, have an assortment of movement patterns that are likely dependent upon prey abundance and availability. Among the larger individuals studied, it appears that deeper rocks and hard-bottom substrate may play a significant role in their daily movements.

This work was initiated to answer the question of whether or not roosters survive the effects of catch-and-release. We acknowledge that some delayed mortality may occur, but from our tracking studies it appears as if the rooster is capable of withstanding catch-and-release fishing, especially mouth-hooked individuals caught using the techniques employed in this study (that is, circle hooks and 30-pound test).

Much remains to be learned about this important recreational species, but we have gained valuable information about their fine-scale movements and resistance to post-release mortality.

FUTURE DIRECTIONS

The next step for PIER's roosterfish research is to gain a broader knowledge of their basic biology. We are currently initiating studies on age and growth, stock structure, and maturation rates.

After capture an accoustic tag is attached to the fishes dorsal musculature for active tracking.

Photo by Scott Aalbers

PIER is a non-profit 501(c)3 research institute dedicated to scientific research and the sustainable management of the marine environment. Special thanks are offered to Mr. Thomas Pfleger and Family, the Harris Foundation, Scott Aalbers, Tommy Fullam, Billy Seiler, Lorraine Bohnet and Vicki Wintrode. To read more about PIER research projects please visit us at www.pier.org.