Recommendations for Handling Ridgeback Shrimp

Introduction

Ridgeback shrimp (*Sicyonia ingentis*) occur from Monterey, California to Cedros Island, Baja California. They are found at depths from less than 145 feet to 525 feet. Their maximum life span is five years. Females reach a maximum carapace length of 1.8 inches, and males 1.5 inches. Sexes are separate and the shrimp are free spawners and do not carry their eggs. Studies suggest that ridgeback shrimp undergo multiple spawning during June through October. Following spawning, both sexes molt and continue molting through winter and spring.

The California fishery for ridgeback shrimp began in 1966 after regulations were formulated to allow harvesting with small mesh nets (1.5 inches or greater mesh size). The fishery is centered in the Santa Barbara Channel and off Santa Monica Bay (Sunada and Richards, 1992).

Maintaining the quality of ridgeback shrimp at sea and ashore is essential to produce a high quality product. This publication provides information on how to produce high quality ridgeback shrimp, including: 1) discoloration problems and controls, and 2) recommended handling and storage procedures.

Markets, Prices and Yields

During the winter of 1995-96, the primary market for ridgeback shrimp was for whole fresh shrimp, with an expanding secondary market for live shrimp. Live markets were primarily in the San Francisco Bay and Los Angeles areas. A limiting factor in the marketing of live shrimp was the availability of live tanks for holding and transporting the shrimp. Ex-vessel prices were about $2.00/lb. for live shrimp and about $0.62 - $1.35/lb. for whole fresh shrimp.

Markets for fresh shell-on tails were evaluated in the Santa Barbara area. Tails and sand veins were removed by hand, a process which took about 2 minutes per pound of whole shrimp. Retailers indicated a willingness to purchase shell-on tails for $3.50 - $4.00/lb. Ridgeback shrimp harvested during the winter of 1995-96, averaged about 1.14 inches in carapace length and weighed about 13 grams (35 per pound). Shell-on tails averaged about 7 grams and ranged in weight from 58-65 per pound. Yields for shell-on tails were about 54%, based on whole weight.

Blackening in Ridgeback Shrimp

When ridgeback shrimp die, enzymes in the shrimp continue to function and start to digest or breakdown the flesh. One of these enzymes, a polyphenol oxidase, catalyzes the formation of a bluish black pigment. Other enzymes and bacteria enhance pigment formation by producing small building blocks that the polyphenol oxidase uses to produce the pigment. The bluish black pigment begins to form quickly and is usually visible inside the head and body of the shrimp within a day or two. The intensity of the color increases with time, changing the bright colored body to black and reducing consumer appeal for the shrimp.

Enzyme reactions are affected by temperature. Low temperatures slow the reactions. Polyphenol oxidases, unfortunately, remain active down to freezing temperatures (32°F, 0°C). Rapid chilling of the shrimp will slow the enzyme reactions, but does not stop them.

Sodium bisulfite is a inhibitor of polyphenol enzymes, but appears to be ineffective in slowing discoloration in ridgeback shrimp. In one study, a one-minute dip in a 1.25% sodium bisulfite solution did not appear to delay darkening of the shrimp. This is probably due to the inability of the sodium bisulfite to penetrate the shrimp's shell.

The best way to prevent darkening of ridgeback shrimp is to keep the shrimp alive on the vessel and throughout distribution. Dead shrimp darken within a day or two and should have their heads removed as soon as possible. If the heads are left on, the discoloration will spread to the tail, lowering the quality significantly.

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Recommended Handling Procedures at Sea

Prepare the deck. Clean and sanitize the deck area and the seawater or slush ice tanks before each trip. Scrub the deck, sorting table and holding areas with detergent and water, and sanitize with a dilute solution of household chlorine bleach (1 teaspoon per gallon of fresh water) or other approved sanitizer solution. Rinse table and holding tanks with fresh water after sanitizing them. Have the seawater and slush ice tanks ready to receive shrimp. With a slush ice tank, drain melt water from the ice and add seawater just before hauling in the net. Fill seawater tanks with fresh seawater.

Trawling. Keep trawls short. Most ridgeback shrimp will survive tows of 1½ to 2 hours. Longer tows increase the percentage of dead and damaged shrimp.

Sorting Shrimp. Sort shrimp as quickly as possible after landing. Wash mud from shrimp with clean seawater. Keep shrimp moist during sorting by frequently spraying them with a fine seawater spray. Sort live shrimp into seawater tanks, if possible, or into clean onion bags. Sort dead and damaged shrimp into separate slush ice buckets or tanks.

Storage at Sea. Store live shrimp in circulating seawater tanks. Increase the oxygen content of the water by pumping air into the tanks through an air stone to produce fine bubbles. Keep the water cool. Increased oxygen and cooler water improves shrimp survival.

If shrimp are stored in 50-pound onion bags, fill the bags loosely with no more than 25 pounds of shrimp per bag. This will prevent crushing or other damage to the shrimp.

Store dead shrimp in slush ice to slow darkening of the shrimp. Wash the shrimp with clean sea water after removing them from the slush ice

Handling Dead Shrimp. Dead ridgeback shrimp will darken quickly and become lower in quality. Remove the heads from dead and damaged shrimp and as much of the sand vein as possible. Removing the head and sand vein prevents rapid spoilage of the shrimp. Store tails in ice or under refrigeration at or below 40°F (4.4°C). Check current Department of Fish and Game regulations for your area before heading shrimp at sea.

Recommended Handling Procedures Ashore

Handling Equipment. Clean and sanitize the live-holding tanks at least weekly to prevent a build-up of bacteria. Scrub the tanks detergent and water, and sanitize with a dilute solution of household chlorine bleach (1 teaspoon per gallon of fresh water) or other approved sanitizer solution.

Live Shrimp. Store live ridgeback shrimp in clean circulating seawater. Treat seawater with ozone, ultra violet light, or other suitable treatment to prevent excessive bacterial growth. Cull out dead shrimp daily and remove their heads and sand veins.

Shrimp Tails. Store fresh shrimp tails on ice or under refrigeration at or below 40°F (4.4°C). For long-term storage, freeze the tails in 1-pound seafood containers and glaze the tails after freezing with fresh cold water. The tails also can be vacuum packaged in one-pound or smaller packages before freezing. Freeze the packages in single layers in the freezer and store at 0°F (-17.8°C) or lower. The tails will retain a bright color for a week or more fresh, and for six months or longer frozen.

Summary

Ridgeback shrimp has a tremendous potential for a variety of markets. Producing a consistently high quality product is a critical step for maintaining existing markets and developing new markets. Keep live shrimp alive and healthy in clean circulating seawater. Remove the heads from dead or damaged shrimp quickly to prevent discoloration. Store fresh tails at or below 40°F (4.4°C) and frozen tails at or below 0°F (-17.8°C).

References

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