

Mexico Baja California Sur blue and brown
shrimp – bottom trawl/cast net]
Fishery Improvement Project (FIP)

**Action 2. Evaluate the fishery bycatch
mortality.**

One Year Progress Report

October 2024

Evaluation of Survival/Mortality of Bycatch Ichthyofauna in the Artisanal Shrimp Fishery of Bahía Magdalena-Almejas, B.C.S., during the 2024 Closed Season.

Introduction

Shrimp by-catch in shrimp trawl fisheries (CWT) is a problem that has been addressed in several ways. In principle, this bycatch is either discarded at sea or used for human or animal consumption. Bycatch is considered a potential threat to species diversity and ecosystem health because this part of the catch is generally unregulated. In tropical shrimp trawl fisheries, bycatch often consists of juvenile edible fish species and is therefore a threat to food security and sustainable fisheries production.

In the lagoon system of Bahía Magdalena-Almejas, a turtle excluder and a fish excluder have been incorporated into the trawls established for this purpose, called “Magdalena I”. Thus, throughout the evolution of the shrimp fishery in this region there has also been a gradual decrease in the amount of bycatch, thus reducing the shrimp:FAC ratio. The reduction in the magnitude of the FAC has been of interest to fishermen, mainly because of the reduction in the time and effort involved in separating the shrimp during the work in each fishing set; there is also interest in the reduction in fuel costs by reducing the workload of the engine.

The Pacific Shrimp Program of the Mexican Institute for Research in Sustainable Fisheries and Aquaculture (IMIPAS), particularly at the Regional Center for Research in Aquaculture and Fisheries (CRIAP) La Paz, has carried out continuous work related to the biological and ecological characterization of the ACF in the lagoon system of Bahía Magdalena-Almejas. However, it is necessary to establish not only its biological characterization. It is also important to measure the mortality of the components of the ACF, in the understanding that artisanal fishing uses smaller boats (pangas) and motors, compared to those used in industrial fishing (boats). The artisanal shrimp catching system implies less trawling time in each of the fishing hauls and less time for the release of the catch, which is not retained for consumption or commercialization because it is of commercial species and sizes. Thus, it has been observed that the shrimp fishing system in the artisanal fleet entails a reduced mortality of the FAC components, compared to the industrial fleet. Therefore, in the 2024 closed season, in addition to recording the magnitudes of shrimp and FAC per fishing haul, the aim is to measure the mortality/survival of FAC after capture and release using qualitative and quantitative criteria. As factors in the experimental design, the use of at least two different fishing gears is foreseen, involving different designs and construction materials that impact different fishing systems (target species and working depth), as well as different trawling times.

Objective

To characterize and size the composition and magnitude of mortality/survival of shrimp accompanying fauna (ACF) species, after being extracted and discarded in fishing hauls in Magdalena-Almejas Bay, B.C.S., during the 2024 closed season.

Material and methods

In addition to the biological sampling activities carried out to evaluate the structure and population dynamics of shrimp species that make up the resource, within the monthly campaigns that are contemplated in the 2024 closure period, fishing hauls of variable duration (60, 90 and 120 minutes) will be carried out, using at least two different designs of trawl net construction.

Once the trawl time has been covered and the catch has been dumped (either on the bow or on the deck of the vessel), the shrimp FAC will be separated from the shrimp. The total catch (kg) of shrimp and FAC will be determined with the aid of a digital scale, as well as the time elapsed in the separation of shrimp and FAC. If the total catch of FAC represents more than 20 kg, a sample of 15 kg (one bucket) will be taken to perform the following experiment on board the boat:

1. With the help of a 200-liter plastic tub (containing seawater), gradually empty the tub with the 15 kg FAC sample, and determine what proportion (kg) of the FAC survives (can swim) in the tub and the proportion that does not survive (floats or sinks). Likewise, it will be determined which species (at the group or species level) survive and which do not. The state of well-being of the surviving organisms should be evaluated using objective criteria.

2. With the help of a spoon-type net, both the species that survived and those that did not (inside the tub with water) will be thrown into the sea to determine the proportion of species that are used as food by seabirds (pelicans, gulls, earwigs, etc.).

In each working set, the characteristics of the fishing gear will be recorded (design, mesh opening, length of the head and foot lines), as well as the working variables such as set speed, type of motor and power, depth of the set, time of day, etc. This experiment will be repeated in each of the sampling campaigns that are contemplated during the 2024 closure period.

Results to date

The evaluation protocol began in April and has been ongoing since then. Information continues to be generated and analyzed, indicating significant progress in data collection. To illustrate the progress, the following photos depict the entire process:

a) Shrimp capture set.



b) Captured shrimp and bycatch fauna.



c) Release of fauna to evaluate survival.



d) Separation of dead bycatch.



e) Identification of bycatch in the laboratory.





These steps are essential for assessing the impact of the fishery and refining the evaluation protocol.