



**PBF catch size-composition of the Mexican purse seine fishery
from data collected at pen rearing operations: an update for
2013-2014**

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Summary

An analysis of the PBF catch size-composition data for the 2013 and 2014 fishing seasons is presented based on length measurements taken from stereoscopic underwater cameras during pen transfer operations of live PBF tuna. PBF average size for the 2013 and 2014 fishing seasons were 103 cm and 104 cm, respectively (median values were located in 98-100 cm and 108-110 cm for those same years). The location of the peak of the dominant mode for 2013 was 88-89 cm and in 2014, 112-113 cm.

Introduction

Concerns have been raised at previous ISC PBF WG meetings about the representativeness of available Mexican PBF size-composition data obtained from IATTC at-sea observer and port sampling programs. One concern is that PBF size-composition data taken by at-sea observers are biased towards smaller-sized fish because the samples are taken exclusively from dead fish (potentially less fit, the smaller fish in the school). Finally, available sample sizes are small due to the opportunistic nature of the PBF sampling during purse-seine operations. A critical review of the PBF size-composition data for the EPO purse seine fishery is available (Aires-da-Silva and Dreyfus, 2012).

During recent years, collaborative efforts between Mexico/IATTC and the PBF fishing industry generated access to PBF size-composition data collected during pen transfer operations. Stereoscopic cameras have been recently introduced in the bluefin ranch sector and are utilized to obtain counts of fish and estimates of individual fish lengths, as well as weight composition data, under at-sea transfer conditions. This state-of-the-art technology provides a large volume of high-quality length-frequency data (Phillips et al, 2009).

PBF length-composition data taken by stereoscopic cameras during pen transfer operations which took place in 2010, 2011 and 2012 have been recently presented to the WG (Aires-da-Silva and Dreyfus, 2012; Dreyfus and Aires-da-Silva, 2014). The PBF size data collected during pen transfer operations by stereoscopic cameras compared very well with the IATTC observer programs data collected during the same trips, as well as the length-composition data used in the stock assessment model. This paper presents updated PBF size data from pen transfer operations for the most recent fishing seasons of 2013 and 2014.

PBF size composition estimates for 2013-2014

PBF size composition statistics obtained through the use of underwater stereoscopic cameras were previously presented to the WG. However, no attempt was made to raise those estimates to total catch due to the preliminary nature of the work. A first attempt at producing size-composition estimates representative of the PBF total catch for 2013-2014 is presented below.

A summary of the PBF data available for this study are presented in Table I. Sampling effort is shown with respect to catch and number of sets. More sampling effort was conducted in the 2014 fishing season, as compared to the 2013 fishing season. The percent of total sets sampled, total number of fish measured, the estimated tonnage of those fish, estimated tonnage of fish in sets sampled, percentage of PBF sampled in terms of tonnage of fish with respect to total catch in sets sampled and also with respect to total PBF catch by Mexican purse seiners is presented.

Table I. Sample size for the 2013-2014 fishing season

| | % of sets sampled | Number of fish measured | PBF tons sampled | PBF tons in sets sampled | % of PBF in sets sampled | % of total PBF catch sampled |
|------|-------------------|-------------------------|------------------|--------------------------|--------------------------|------------------------------|
| 2013 | 23.94% | 3600 | 103.4 | 1378 | 7.5% | 3.28% |
| 2014 | 35.89% | 13786 | 386.5 | 3024 | 12.78% | 7.94% |

Raising to total catch

Available PBF size-composition data were raised to total catch using the equation below:

$$N_{ik} = (n_{ijk} * C_{jk} / S_{jk}) * R_k$$

where

N_i is the estimate of the number of fish in size bin i for year k .

i = size bin (2cm bins from 60cm to 160 cm)

j = sampled set

k = year

n = # fish measured in a set

C = catch per set sampled (tons)

S = amount in tons of fish measured in a set

R = total PBF catch in year k / $\sum C_{jk}$ (where the sum is over j)

Results

The PBF average, minimum and maximum size (fork length) obtained from each set sampled are presented in Figures 1 and 2.

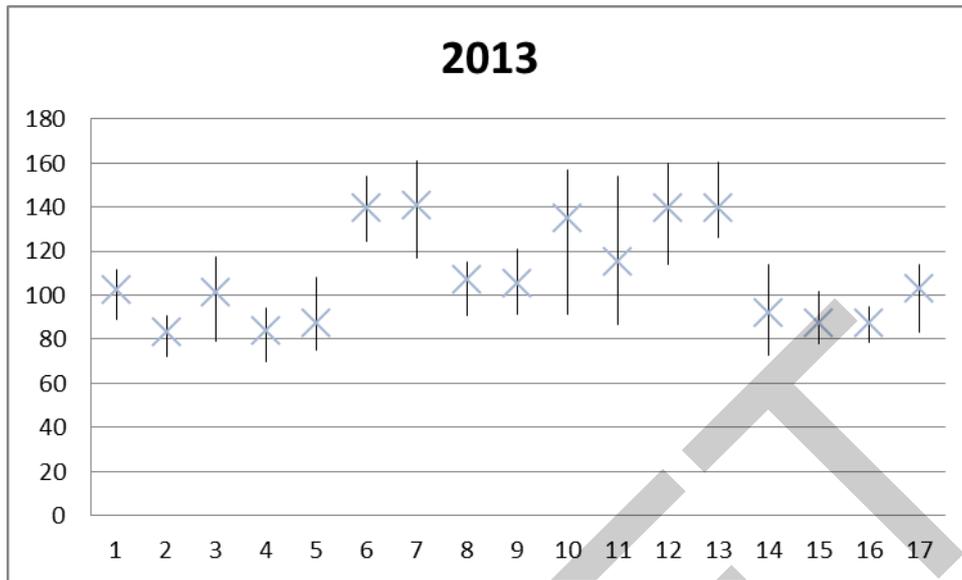


Figure 1. Average (crosses), minimum and maximum size (fork length) for each set in which PBF measurements with stereoscopic camera were recorded in 2013.

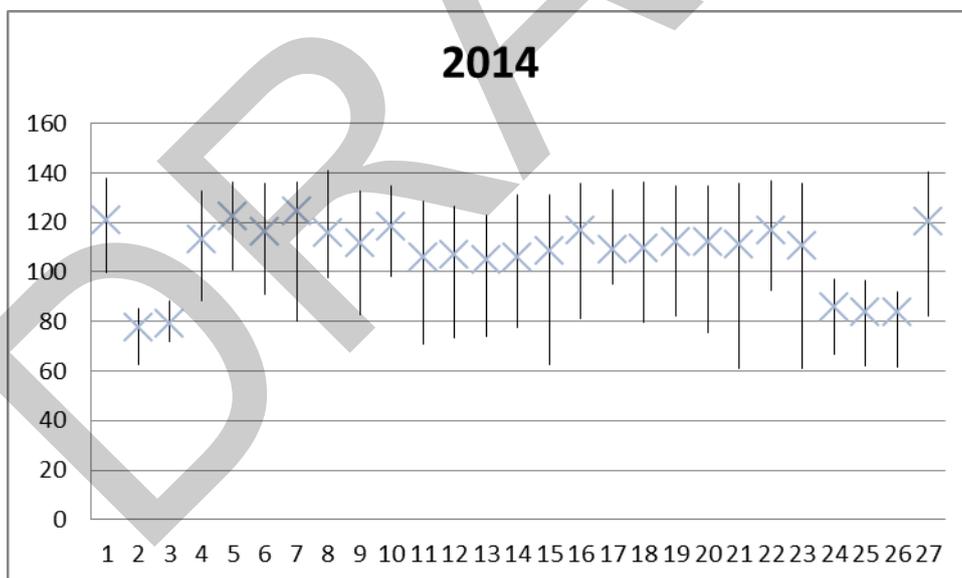


Figure 2. Average (crosses), minimum and maximum size (fork length) for each set in which measurements with stereoscopic camera were recorded in 2014.

The raised PBF size compositions of the Mexican purse-seine fishing operations for 2013 and 2014 are presented in Figure 3.

The size range is similar for both years (60 cm to 160 cm), although there are differences in the year classes visible in the size composition distributions.

In 2013 season, some relatively larger PBF (> 140 cm) were captured but fish > 140 cm did not appear in the catch in 2014. In contrast, more PBF were captured in the range between 100 cm to 132 cm in 2014, followed by the cohort between 76 cm to 92 cm. In 2013, this latter group dominated the fishery with also some relatively bigger animals as previously stated.

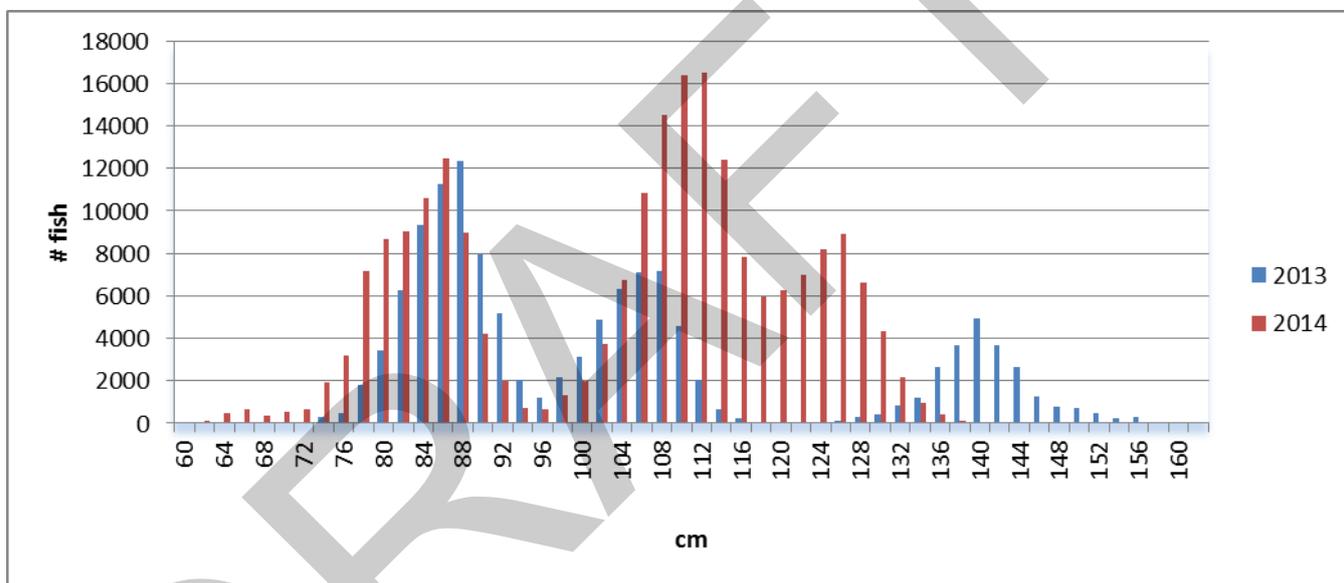


Figure 3. PBF size composition from the mexican purse seine fishery in the EPO, 2013-2014

PBF average size for the 2013 and 2014 fishing seasons were 103 cm and 104 cm, respectively (median values were located in 98-100 cm and 108-110 cm for those same years). The location of the peak of the dominant mode for 2013 was 88-89 cm and in 2014, 112-113 cm. An estimated total of 124500 fishes were captured in 2013 and 215712 fishes in 2014 based on this analysis.

This analysis and further improvements are expected to continue in the future with the aim of contributing to the PBF WG assessments.

References

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