



## **Update of Korean fisheries information for Pacific Bluefin tuna, *Thunnus orientalis*, in 2021**

**Junghyun Lim, Sung Il Lee, Mi Kyung Lee, Youjung Kwon and Doo Nam  
Kim**

National Institute of Fisheries Science  
216, Gijanghaean-ro, Gijang-eup, Gijang-gun, Busan, 46083, Rep. of Korea

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## Summary

Total catch of Pacific Bluefin tuna (*Thunnus orientalis*, PBF) in the first half of 2021 was 398 tons caught by offshore large purse seine, set net and trawl fisheries in the Korean waters, and catch proportion of set net has been increasing in recent years. The catch proportion of large PBF in 2021 was 14% of the total catch. Although most PBF were caught by purse seine fishery from March to April in the eastern part of Jeju island. The catches by set nets, which are located along the coast of the East Sea, were getting higher. As for the PBF size frequency, large size of PBF has increased since 2016 and is mainly caught in 1<sup>st</sup> and 2<sup>nd</sup> quarters. Compared to the previous years, fish larger than 100 cm were much caught from 2020.

## Introduction

Pacific bluefin tuna (*Thunnus orientalis*, PBF) mostly has been caught by Korean offshore large purse seine fishery (hereafter ‘purse seine fishery’, Fleet 3 for stock assessment) which targets pelagic species such as mackerels around the Jeju island in the Korean waters (Yoon *et al.*, 2012). It is also caught by set net and trawl fisheries in the Korean waters. For monitoring and managing of fisheries associated with PBF, the Ministerial Directive on conservation and management for PBF stock put established on 26 May 2011, since then it has been amended several times, and the latest directive was put into force in 2020. Under the Ministerial Directive, the annual catch limit of PBF has been set by fishery and province, and the catch reporting system has improved as well according to WCPFC CMM related to PBF and recommendations by ISC PBFWG.

This document describes the updated Korean fisheries information and size data related to PBF up to 2021 and the information for 2021 indicates the data collected during the first half of 2021 (from January to June).

## Catch and effort

Total catch of PBF was highest with about 2,600 tons in 2003, thereafter it has been decreased with annual fluctuations. The PBF catches in 2020 (from Jan. to Dec.) and 2021 (from Jan. to Jun.) were 605 tons and 425 tons, respectively. The number of vessels belonging to the purse seine fishery has been continuously declined, but in 2021, it increased by one vessel compared to 2020 (Fig. 1).

As for the purse seine fishery, the PBF catches in 2016 and 2017 were exceeded the allocated annual catch limit due to an unexpected huge amount of catch caught by most purse seine vessels at once only within one or two days. Accordingly, the over catches have been paid back through a 5-year schedule from 2017 to 2021. The catch by purse seine fishery in 2020 and 2021 were 567 tons and 398 tons, respectively.

Although the catch by purse seine fishery accounted for most of the total PBF catch, those of other fisheries, especially set net fishery, are getting much more catch proportion for recent years. The PBF catch by set net fishery began to be reported since 2013, and the amount and the proportion of catch by set net were around 35 tons and 6% in 2020. In 2021, the catch was 24 tons which is about 6% of total catch. The catches by trawl fishery had decreased and maintained around 3 tons in the recent years (Fig. 2).

Most PBF caught by fisheries in the Korean waters were small fish less than 30 kg in weight. However, the catches of large PBF began to be increased since the late 2000s, and the catch proportion of large PBF highly recorded at 46% in 2016 and 68% in 2020. In 2021, the proportion of large PBF catch was 14%, and most large fish were caught by purse seine fishery in March (Fig. 3).

### Fishing distribution

In general, PBF are mainly caught around the Jeju island by purse seine fishery from March to April. In recent years, PBF were caught by set net fishery which were located along the coast of north of 36°N in the East Sea during all the seasons. In 2021, the main fishing ground was reduced and mainly formed in the eastern part of Jeju island compared to 2020. And it was more distributed along the coast of the East Sea (Fig. 4). Most large PBF were caught in the southern and eastern parts of Jeju island.

### Size data

PBF size data were measured by researchers and observers at Busan Cooperative Fish Market where most PBF are unloaded from Korean purse seine fleets. Size data have been collected since 1996, but data before 2003 were not used due to low data coverage. Size data were weighted based on the amount of large and small PBF catches (Lee *et al.*, 2020). Fig. 5 and 6 represented the distributions of fork length of PBF from purse seine fishery by year and year-quarter, respectively, suggesting that the large size fish have increased since 2016 and is mainly caught in 1<sup>st</sup> and 2<sup>nd</sup> quarters. Compared to the previous years, fish larger than 100 cm were much caught from 2020. In particular, in the 1<sup>st</sup> quarter of 2021, fish larger than 150 cm were caught (Fig. 6).

The relationship between length (FL) and weight (BW) of PBF caught in the Korean waters was analyzed using data collected from 2009 to 2021, and it was  $BW = 0.00002FL^{2.9696}$  ( $R^2 = 0.9892$ ) (Fig. 7)

### References

- Kim DN, Lee MK, Lee SI and An DH. 2019. Update of Korean fisheries information for Pacific bluefin tuna, *Thunnus orientalis*. ISC/19/PBFWG-2/03.
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- Yoon SC, ZG Kim, SI Lee, MK Lee and DW Lee. 2012. Catch characteristics and resources management of Pacific bluefin tuna caught by offshore large purse seine in Korean waters. ISC/12-3/PBFWG/09.

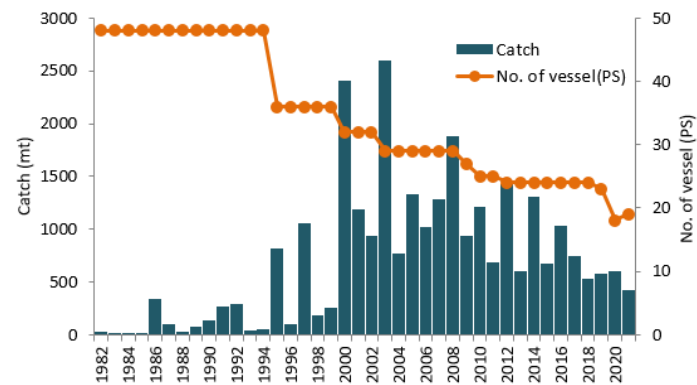


Fig. 1. Total catch of PBF and number of vessels belonging to the Korean offshore large purse seine fishery, 1982-2021.

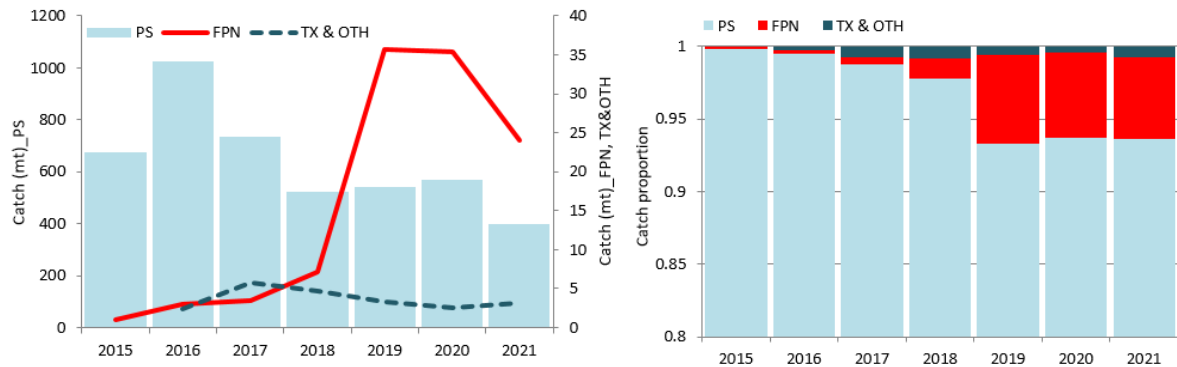


Fig. 2. PBF catch (left) and its proportion (right) by fishery, 2015-2021 (PS: purse seine, FPN: set net, TX & OTH: trawl and other fisheries).

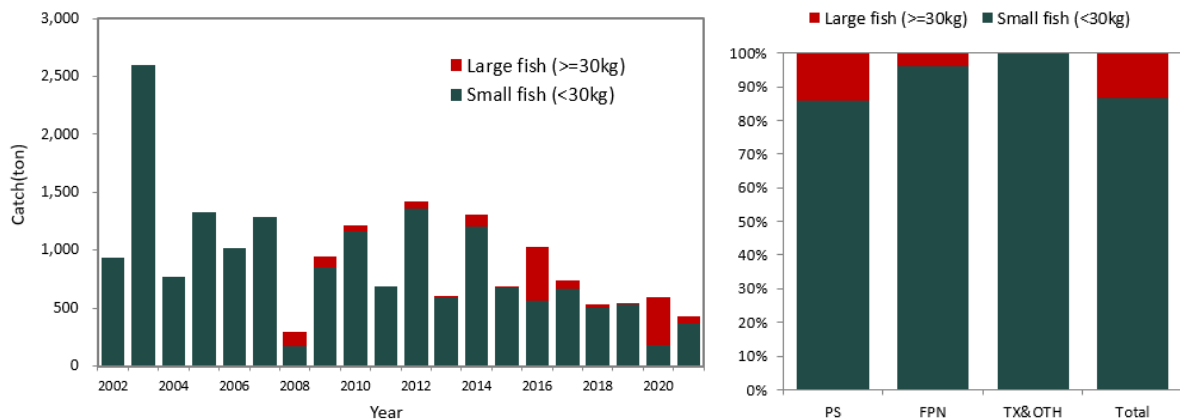


Fig. 3. PBF catch (2002-2021) (left) and its proportion by fishery (right) in 2021 by size.

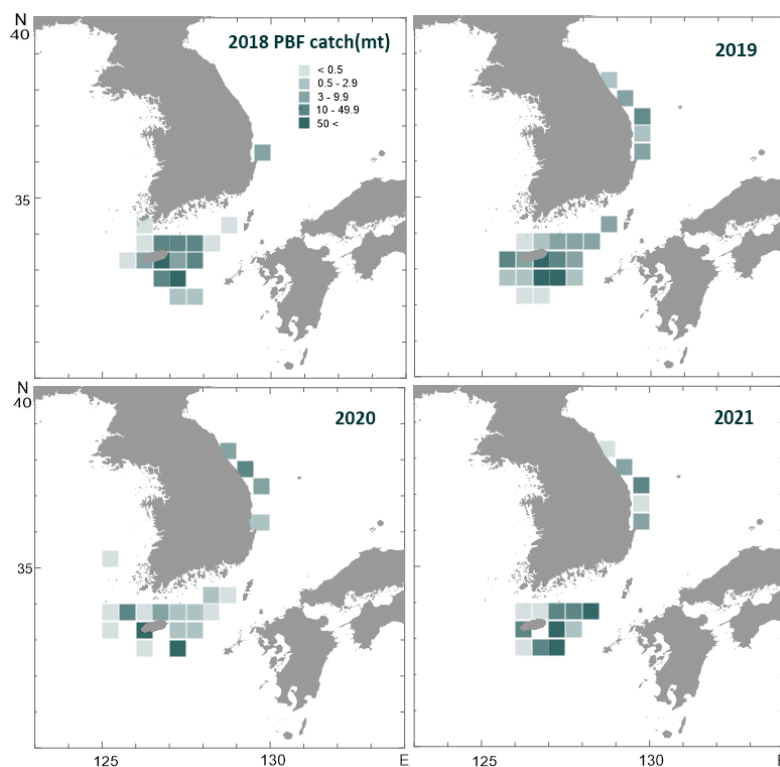


Fig. 4. The catch distributions of PBF caught in the Korean waters, 2018-2021.

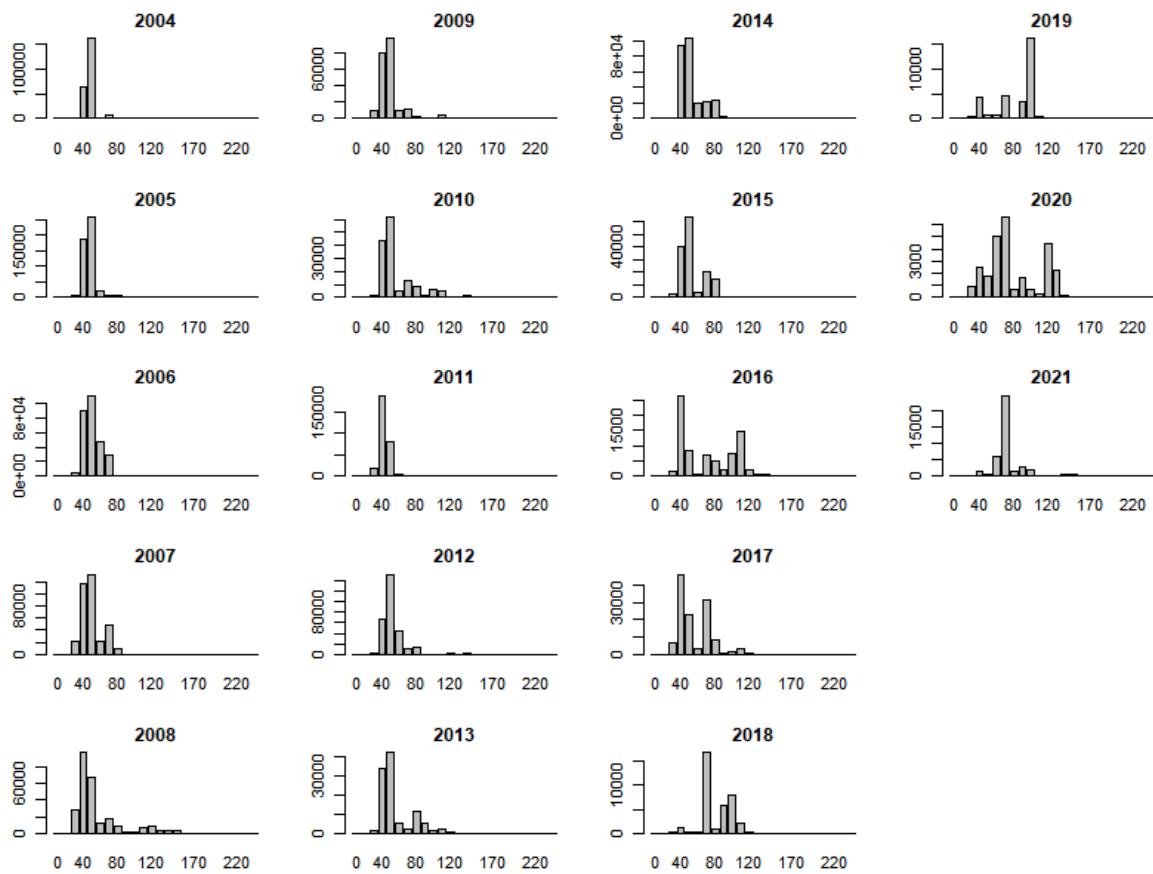


Fig. 5. The distributions of fork length of PBF from the Korean offshore large purse seine fishery by year, 2004-2021.

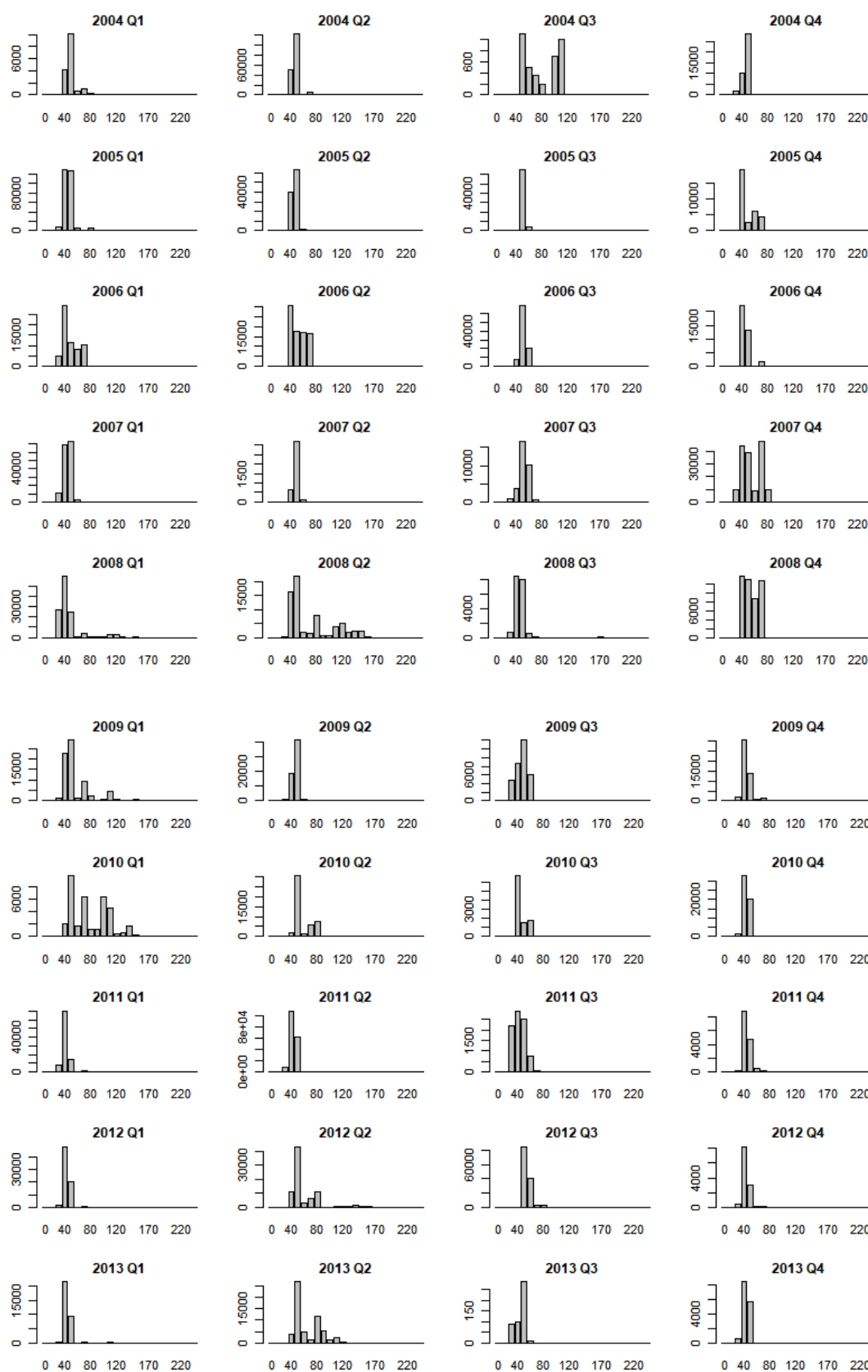


Fig. 6. The distributions of fork length of PBF from the Korean offshore large purse seine fishery by year-quarter, 2004-2021.

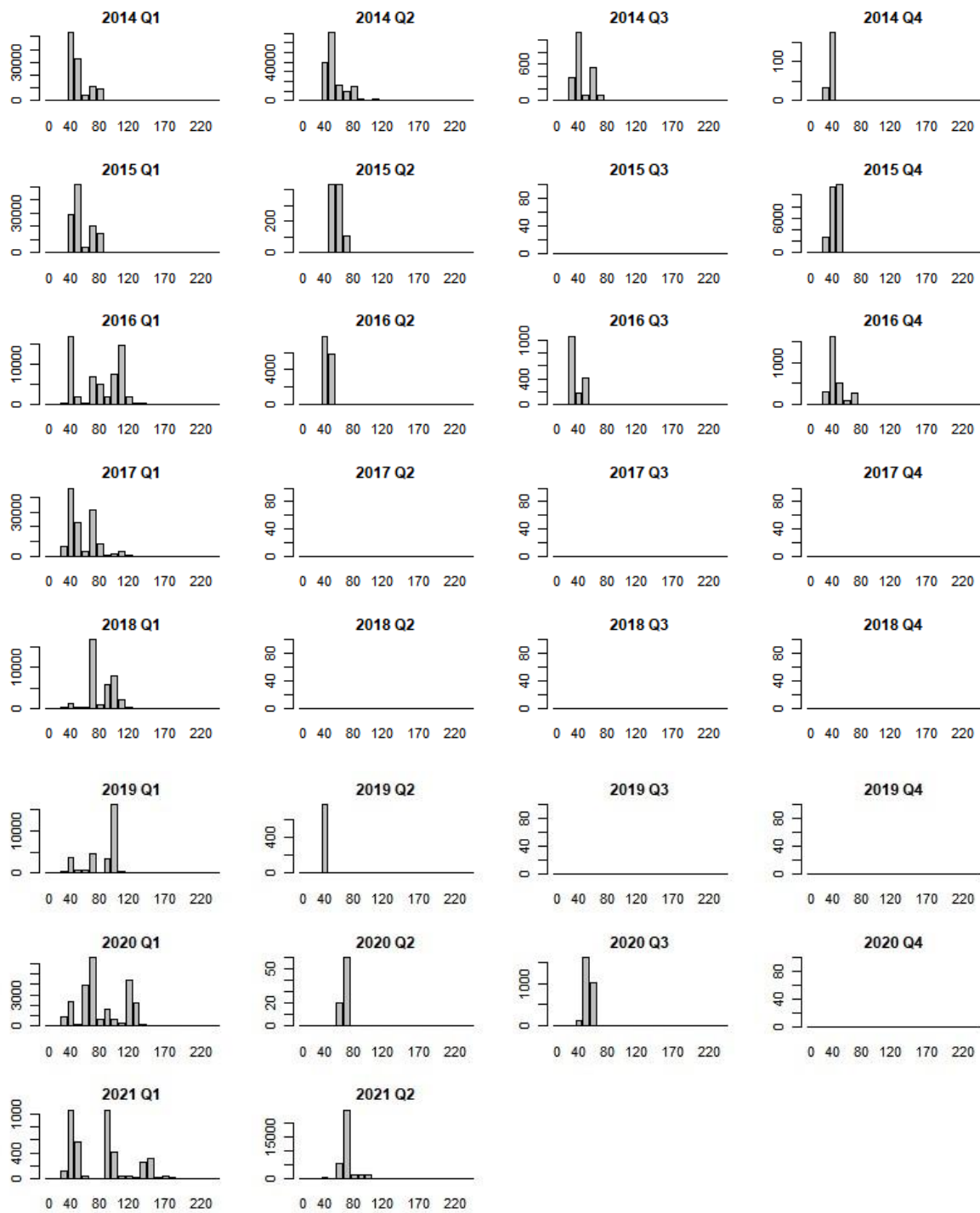


Fig. 6. Continued.



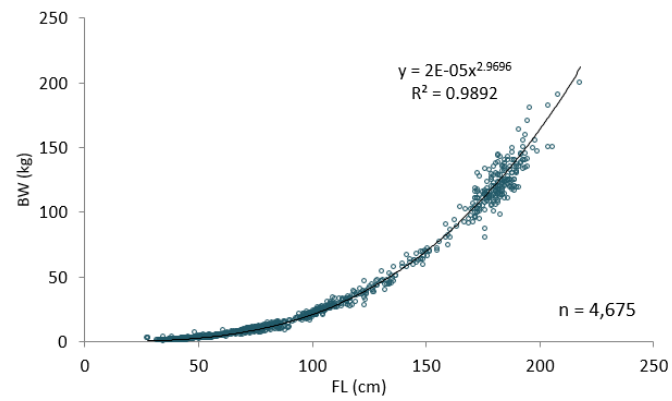


Fig. 7. The relationship between length (fork length) and weight (body weight) of PBF caught in the Korean waters from 2009 to 2021.