



Over 16,600 tunas tagged during the July–September 2019 cruise

Figure 1. FV *Soltai 105* in Palau.

Introduction

The Pacific Tuna Tagging Programme has been providing crucial data for the assessment of regional tuna stocks since 2006. In 2019, the Pacific Community (SPC) implemented a new tagging experiment from July to September. Following the recommendation of the 12th Scientific Committee meeting of the Western and Central Pacific Fisheries Commission (WCPFC), this experiment targeted skipjack tuna, a species that represents 70% of the catch volume in the western and central Pacific Ocean.

To achieve this work, SPC chartered a pole-and-line vessel (*Soltai 105*, see Fig. 1) from the National Fisheries Developments/Tri Marine fishing fleet based in Noro, in the Western Province of Solomon Islands. The fifth western Pacific (WP5) tagging cruise departed from Noro on 22 July and released

tagged tuna in the waters of Papua New Guinea (PNG), Palau and the Federated States of Micronesia (FSM) before coming back to its home port on 20 September (see cruise track in Fig. 2).

Fisheries authorities in PNG, Palau and FSM provided research permits and support to the work being implemented in their exclusive economic zones. In addition, special authorisations were obtained to undertake research within the different countries visited.

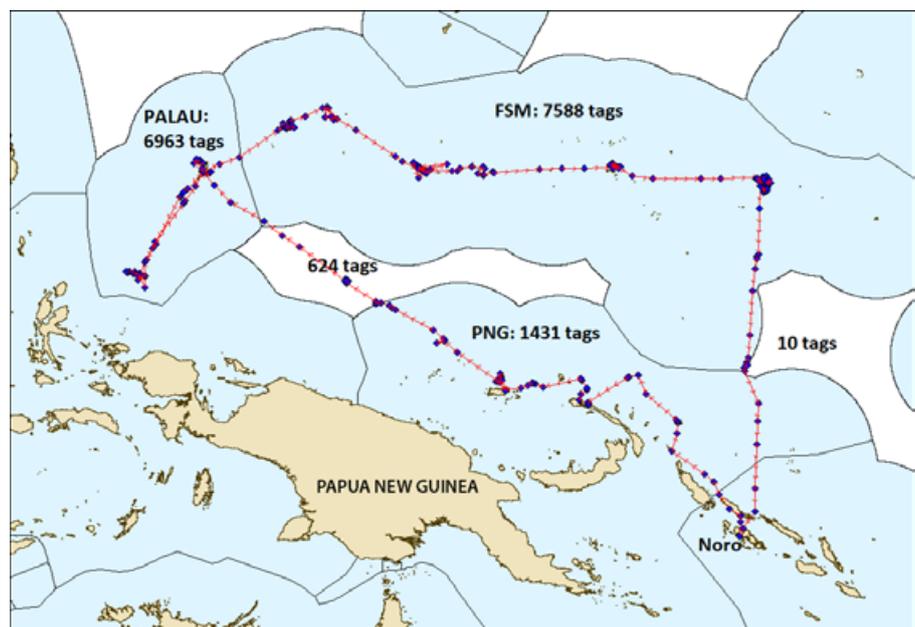


Figure 2. The track of the fifth western Pacific tagging cruise and the number of tags released per country. White areas are international waters.

Summary results

In total 16,616 fish were tagged and released during the cruise at an average of 446 fish per fishing day. The number of fish tagged in each country and high sea pockets is shown in Figure 2. The species composition was 93% skipjack, 6% yellowfin and only 1% bigeye.

The number of fish tagged per species and their school association are detailed in Table 1.

While the total and average number of fish tagged per fishing day were very similar to the results of tagging experiments conducted in the same area in 2008, the share of each species in the total, as well as the size distributions within those species were different, as shown in Figure 3.

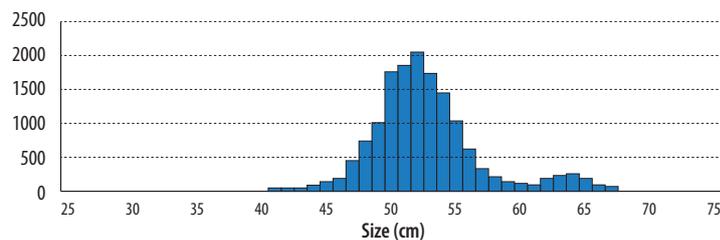
The absence of small-size (< 40 cm fork length) fish and the greater percentage of skipjack (93% instead of 64% in 2008) could be explained by the fact that the fish were, in large majority (70%), tagged from free schools, when those only constituted about 45% of tagged fish in 2008.

Within all tagged fish, 79 skipjack were implanted with an archival tag (associated with an orange conventional tag). Deploying archival tags in skipjack is challenging due to the rapid deficit in oxygen the animal experiences as soon as it is out of seawater. The induced stress often prevents the fish from staying calm enough to safely undertake surgery. Suitable individuals need to be inserted with the tag and released if possible within 30 seconds! It is expected that some of those skipjack will be recovered, bringing back a good amount of recorded data about their behaviour and movements.

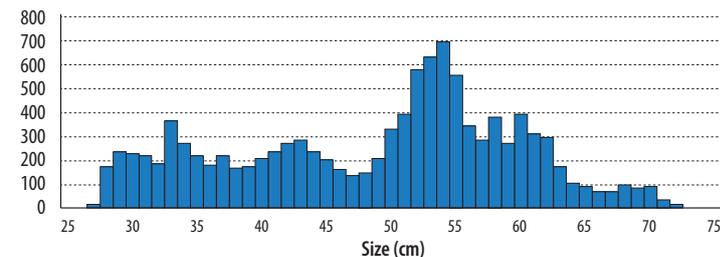
In addition, 492 skipjack and 9 yellowfin received an injection of strontium chloride (see Fig. 4) that will deposit a mark in their otoliths. When these fish are recaptured, scientists can then validate daily increment formation in the otolith and better evaluate the rate of growth in these species.¹ The injected fish were all tagged with a white conventional tag.

During the WP5 cruise, an important biological sampling effort was achieved with 475 fish sampled. Biological sampling during tagging cruises complements the work conducted by fisheries observers on board tuna fishing vessels, and allows an increase in the number of samples collected in the region during the year. This collection contributes to the WCPFC Tuna Tissue Bank by providing biological information and samples that become available to the scientific community to conduct biological and ecological studies of interest to the region.

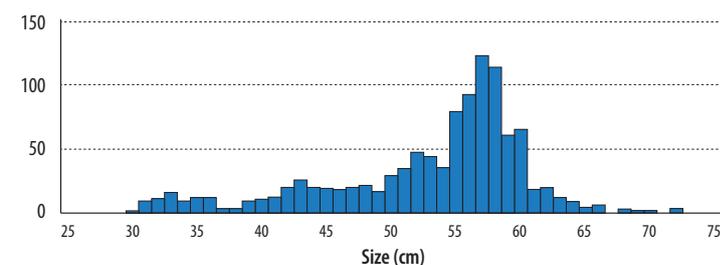
WP5/2019 – Skipjack, n = 15,393 (93%)



WP1/2008 (FSM & Palau) – Skipjack, n = 10,926 (64%)



WP5/2019 – Yellowfin, n = 1076 (7%)



WP1/2008 (FSM & Palau) – Yellowfin, n = 5639 (33%)

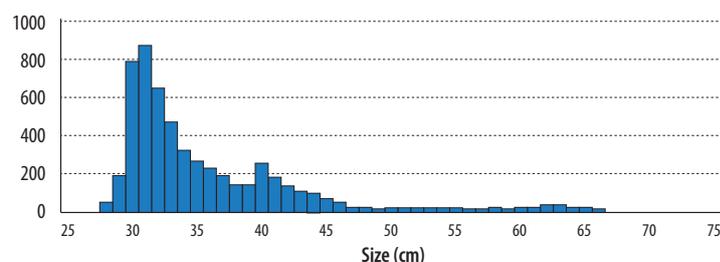


Figure 3. Tagged skipjack and yellowfin size frequency comparisons between 2008 and 2019.

Table 1. Number of fish tagged per species and per school association.

| School association | Bigeye | Skipjack | Yellowfin | Total |
|------------------------------|------------|---------------|-------------|---------------|
| Island or reef | - | 54 | 6 | 60 |
| Marine mammal or whale shark | 26 | 21 | 34 | 81 |
| Drifting FAD | 10 | 2330 | 460 | 2800 |
| Anchored FAD | 79 | 498 | 137 | 714 |
| Log | 31 | 1181 | 200 | 1412 |
| Free school | - | 11,309 | 240 | 11,549 |
| Total | 146 | 15,393 | 1077 | 16,616 |

¹ See article in Fisheries Newsletter #159 for more information (<http://purl.org/spc/digilib/doc/h97cg>).

The types of studies in progress that use – and potential studies that could use – data and samples collected during the tagging cruise include:

- Age and growth determination and validation (otoliths, spines);
- Reproduction period, fecundity (gonads);
- Condition index (fat content – Fig. 5);
- Length-weight relationships need to be updated for tuna and established for bycatch species (length and weight measurements);
- Diet studies (stomach);
- Trophic level determination (muscle, liver); and
- Stock structure (fin clips, muscle, otoliths).

Conclusions

The WP5 cruise results, in terms of total tag releases, slightly exceeded the expected number of target releases (15,000) set prior to the experiment. Close to 7000 fish (98% skipjack) were tagged in Palauan waters and over 7500 (90% skipjack) in FSM. Future recovery data from these fish should bring valuable information to their next stock assessment. The expected recovery of some of the skipjacks carrying archival tags will no doubt enhance our knowledge of their behaviour.

News from the Tag Recovery Network

The Tag Recovery Network is growing, with three new staff appointed in November by the SOCSKSARGEN Federation of Fishing and Allied Industries, Inc. (SFFAII) based in General Santos, Philippines, to collect the tags and biological samples from the tagged fish and provide rewards to stevedores and local fishers (Fig. 6).

White-tagged fish are already reported in General Santos but also in Pohnpei (FSM) where local fishers are bringing whole fishes to the National Oceanic Resource Management Authority for data collection and extraction of the otoliths and internal organs (Fig. 7).

On 8 September 2019, in the south of Pohnpei, the SPC tagging team caught a 51-cm skipjack that was tagged with white tag number L01850, injected it with a dose of strontium chloride, and immediately released it. Nearly three months later, on 4 December 2019, the skipjack was



Figure 4. Skipjack tuna receiving an injection of strontium chloride. The fish will also be tagged with a white conventional tag.



Figure 5. Using a fat meter to measure the fat content of bigeye tuna.



Figure 6. From left to right: Caroline Sanchez (SPC tag recovery coordinator), Cyril Villanueva (SFFAI field staff), Joanna Padua (SFFAI administrative staff) and Neil Lloyd (SFFAI field staff).



Figure 7. Local fishermen from the Federated States of Micronesia collecting their reward at the National Oceanic Resource Management Authority office in exchange for the whole fish.



Figure 8. Locations, within the exclusive economic zone of the Federated States of Micronesia, of tag-and-release (A) and re-capture (B) of skipjack (tag L01850).

caught by fishers half a nautical mile from Ant Atoll (Fig. 8). This mature fish seems to have stayed around Pohnpei over the entire period. Its marked otoliths will provide valuable data to fine-tune estimations of the rate at which mature skipjacks grow.

Keep an eye out for tagged fish, but do not remove the tag (Fig. 9) and bring the whole fish (not gilled and gutted) to your closest national fisheries office for your reward. Whole white-tagged fish are purchased at a rate of USD 10/kg (fish weight), and the finder also receives a reward of USD 100. Whole orange-tagged fish are purchased at the same rate but the finder receives a reward of USD 250 instead of USD 100. Observers on board fishing vessels will assist in collecting data and, on arrival at port, taking the fish to the local fisheries authority. Yellow tags, and orange or white tags that have been removed from the fish, have rewards of USD 10 each.



Figure 9. White tag left in the flesh of the fish for reward purpose. This tagged fish, which was reported in General Santos, was caught by a Philippine purse-seine vessel fishing in international waters south of the Federated States of Micronesia. The fish spent 101 days at liberty and travelled 627 nautical miles.

If by chance you encounter a white or orange tag on a tuna, please contact:

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