# Biological Sampling Newsletter

*for Observers and Port Samplers*

**SPC-OFP Ecosystem Monitoring and Analysis Section***

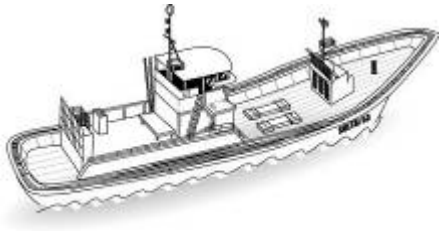
**Issue #16 — 15 October 2010**

## Welcome

to the 16th issue of the *Biological Sampling Newsletter*, which provides news about the Ecosystem Monitoring and Analysis Section of the Secretariat of the Pacific Community's (SPC's) Oceanic Fisheries Programme (OFP).

In this issue we 1) provide an update on the biological database, 2) keep you posted on the albacore project and summarise the final collection plans, 3) bring you insight into a global study on albacore population dynamics, 4) look at a prey commonly found in predators' stomachs, 5) keep you informed of staff movements, 6) report on the training of observers in Vanuatu and finally 7) present the plan for the next tagging mission in the central Pacific.

*We hope you enjoy this new issue!*















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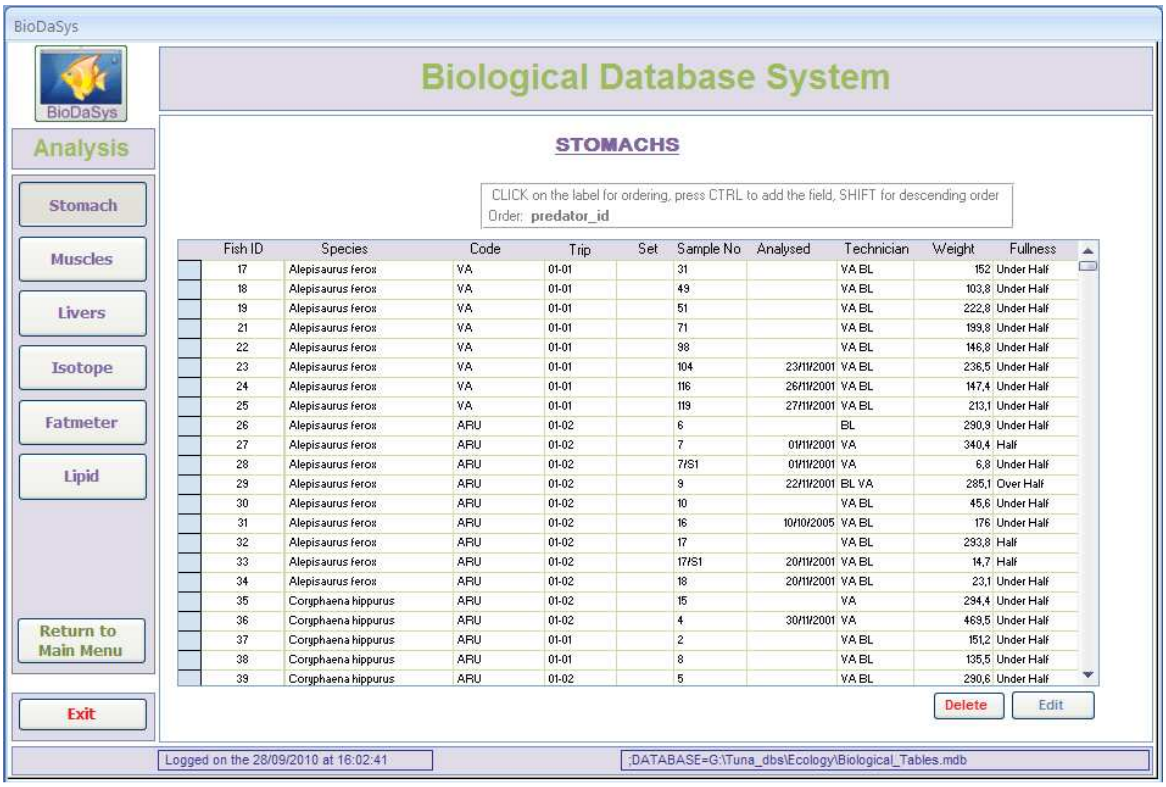
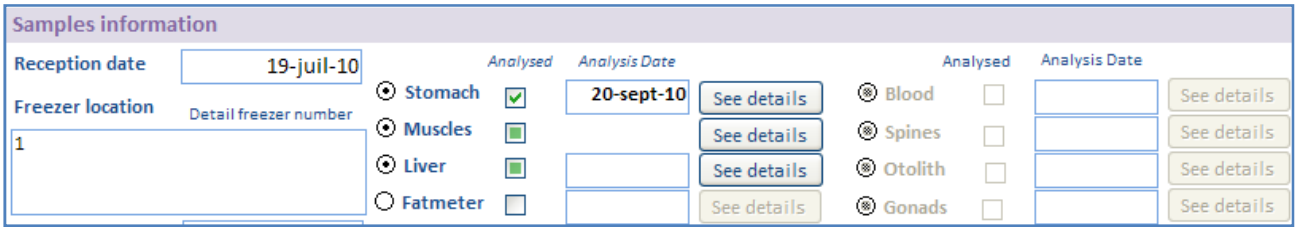
# BIODASYS: DATABASE UPDATE

BioDaSys, the new Biological Database System developed in the beginning of 2010 initially for storing stomach data, has been growing during recent months and is now integrating new types of biological samples and their associated data.




Through its user-friendly interface, it is possible to access multiple types of biological samples (stomachs, muscles, livers) for individual fish along with the different types of analyses carried out on them (lipid, fatmeter, isotope).

The next step is to integrate data from additional samples, such as blood, gonads, otoliths and dorsal spines. The result will be a full-featured and comprehensive application encompassing all biological information from each sampled fish.



# ALBACORE RESEARCH UPDATE

Since mid-2008, SPC has been conducting a study on albacore biology across the western and central Pacific Ocean (WCPO). Observers have played a major role in the collection of biological samples for this project, and to date they have collected samples from 1184 albacore across a wide area of the WCPO (Figure 1). Otoliths and gonads have been the main biological samples collected, although stomach, muscle, dorsal spines, liver and blood samples were also collected to assist with associated projects.

The sampling component of the albacore project is due for completion in December 2010, and we have identified a number of gaps in the sampling to date. We have asked observer coordinators in a number of countries to make a final effort to collect additional biological samples – mainly gonads and otoliths – between now and the end of 2010 (Table 1). This is a critical time for sampling, as the albacore spawning season commences in October, and gonads collected at this time can provide valuable information on fecundity and spawning frequency.

The albacore project will finish in late 2011. The main tasks to complete after the samples are collected include processing samples, reading otoliths and gonad slides, analysing data and writing up the results. Most of 2011 will be dedicated to these tasks, and a number of scientific publications describing the results will be produced by the end of next year.

We wish to warmly thank all the observers for their continuous support in collecting biological samples allowing us to better understand the ecology and biology of albacore tuna.

**Table 1:** Final albacore sample collection needs

| Country | Sample type | No. samples required |
|---|---|---|
| French Polynesia | Otoliths, gonads and spines | 200 |
| Cook Islands | Otoliths and gonads | 200 |
| American Samoa | Otoliths and gonads | 200 |
| Niue | Otoliths and gonads | 50 |
| Fiji Islands | Otoliths and gonads | 100 |
| New Caledonia | Otoliths and gonads | 100 |

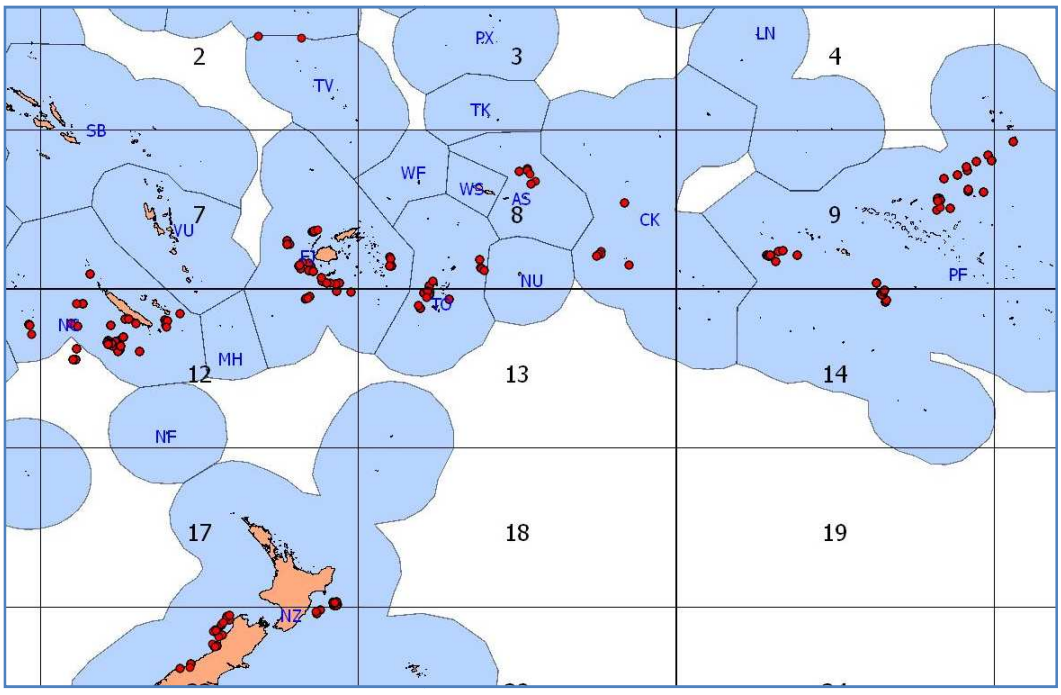



**Figure 1:** Spatial distribution of albacore biological samples collected since mid-2008.

# ALBACORE GENETIC STUDIES

About 100 albacore muscle samples collected in the southern Pacific were sent to colleagues in AZTI-Tecnalia (a research centre in Spain) in 2009 for the purpose of developing genetic markers. A genetic marker is a part of the DNA sequence that can be used to identify cells, individuals or species. For example, given tissue taken from different fish, genetic markers make it possible to determine if they belong to the same population or if they can be considered separate from each other. Their study (which is currently ongoing) aims to develop a specific kind of genetic marker that can be used on DNA samples that may have imperfections, such as a frozen piece of muscle tissue. Based on analysis of samples from different geographical locations around the world (Figure 1), the preliminary findings of this study suggest that albacore tunas, as a species, do not behave as a panmitic population (one where all individuals are potential partners). This would mean that albacore populations in different parts of the world do not necessarily mix. Ultimately, this study will be a useful step towards developing a better understanding of population structuring needed for effective management of large scale tuna fisheries.

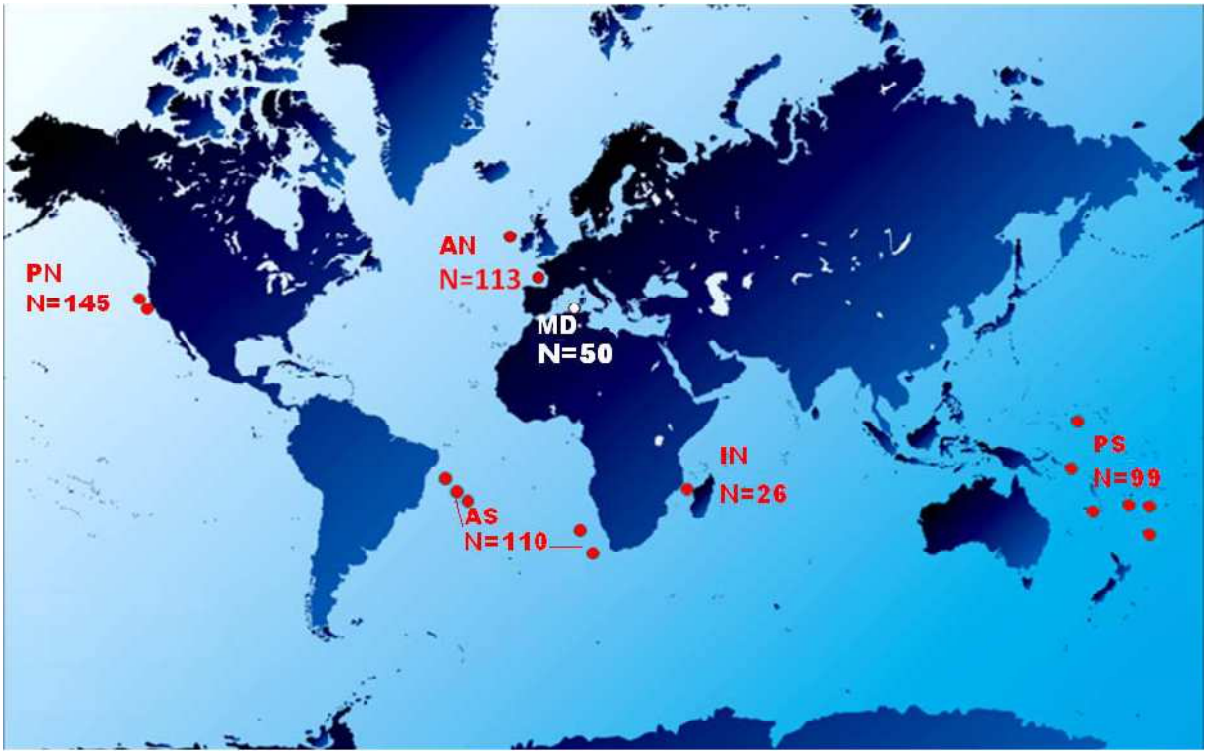



**Figure 1:** World-wide sampling of albacore tunas for this study. N=number of samples.

# STOMACH ANALYSES: PREY COMMONLY FOUND

As in the previous issue, we introduce you to some common prey species found in tuna stomachs and techniques our laboratory technicians use to identify them.

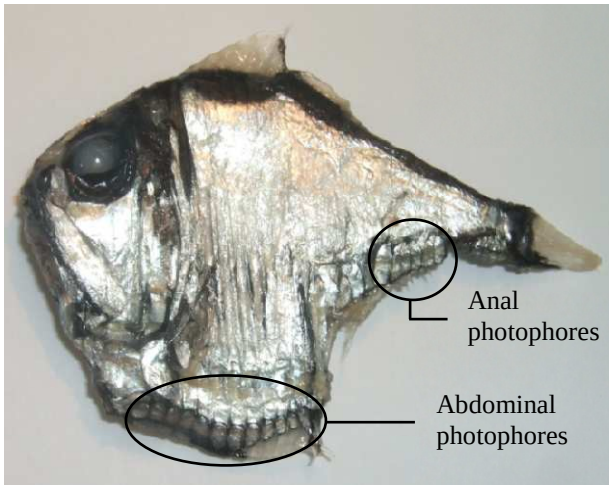
**Sternoptychidae, commonly named hatchetfishes**

The family name Sternoptychidae is derived from the Ancient Greek words 'sternon' and 'ptyx', which loosely translate to 'breast' and 'fold/crease', respectively.

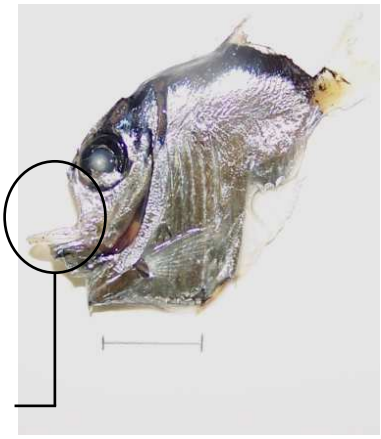
Sternoptychidae are found most often in tropical and subtropical waters of the Atlantic, Pacific and Indian oceans at depths ranging from 50 to 4000 meters.

This family comprises about 74 species grouped in 10 genera and two subfamilies. Sixty species occur in the Pacific area.

In tuna stomachs, we mainly come across larvae, juveniles and adults that range in size from 1.3 mm to 88.9 mm (standard length). The figures below show the morphologic characteristics that we look for to identify Sternoptychidae.




Body resembling the blade of a hatchet




These fish have a deep, short and very compressed body. The mouth is large, bears teeth and is directed upwards. Many photophores (organs containing luminescent chemicals) are present on the flanks. In the dark, these photophores attract small preys to the fish which are easily consumed with its fast gaping mouth movements.

To identify Sternoptychidae, the most useful characteristics are: i) a body resembling the blade of a hatchet, ii) the number of abdominal photophores, and iii) the number of anal photophores. If the digestive process is advanced, these structures disappear. However, the hatchet-like overall shape is characteristic of this type of fish.

Stomach analyses reveal that these fish are common prey for yellowfin, albacore, bigeye and skipjack tunas.

# STAFF NEWS

Ashley Williams has been leading the albacore project since mid-2008. In September, Ashley moved to the Stock Assessment Section of OFP, where he now focuses on providing SPC member countries with national-level information and advice to assist in the management of regional tuna fisheries. This includes developing National Tuna Fisheries Status Reports, which provide summaries of the trends in catch and effort data from the main fisheries, and providing training to national counterparts in interpretation and use of stock assessment information. Ashley is not abandoning the albacore project, however, and will spend a significant amount of time in 2011 analysing the albacore data and writing up the results in scientific papers. Ashley can be contacted at ashleyw@spc.int.

We have the pleasure of welcoming Elodie Vourey, who has joined our team in Noumea in the position of Laboratory Assistant. Elodie obtained a diploma of High Level Technician in Marine Biological Engineering, Fisheries and Aquaculture in 2005 from Intechmer in France. Since then she has worked for different organisations in New Caledonia as a laboratory technician. It is with great pleasure and motivation that she joined the EMA Section in July 2010. Her main work consists of conducting qualitative and quantitative analyses of oceanic predators' stomach contents. Elodie can be contacted at elodiev@spc.int.

Senior Laboratory Assistant Cyndie Dupoux will travel to Australia in October to work with renowned crustacean and cephalopod taxonomist Dr Lu Chung-Cheng at the Victoria Museum in Melbourne. She will be bringing specimens collected during stomach analyses to refine her taxonomic skills for these types of prey as they are common in oceanic predators' diets. Cyndie will be providing an update of her exchange in the next newsletter. Cyndie can be reached at cyndied@spc.int.

# OBSERVER TRAINING – PORT VILA, VANUATU

Earlier this year the Vanuatu Fisheries Department requested that SPC and the Forum Fisheries Agency (FFA) upgrade and train their Cadet Observers. The observer training was held from 23 August to 16 September. The training covered the non-generic part of Pacific Islands Regional Fisheries Observers (PIRFOS), including observer forms, gear and operation, species identification (tunas, billfish, sharks, longline and purse-seine by-catch species, dolphins, large baleen whales, sea turtles, species of special interest and blackfish), field trips (longline vessels and unloading), biological sampling, scenario exercises, quizzes, pre-tests and final assessments. There were 16 trainees. These observers are now regarded as the most highly trained observers, with two weeks of generic training (sea safety and first aid), seven days of cadet training and four weeks of additional retraining and upgrading.

According to SPC Observer Trainer Siosifa Fukofuka, 'Overall, this observer course was rated highly in terms of the quality of trainees… there were also a lot of positive comments from all the trainers and facilitators.' Indeed, Caroline Sanchez, who provided the biological sampling training, was very pleased to see the curiosity observers showed towards the biological aspect of tuna ecology studies. Their enthusiasm and positive attitude regarding practical training and the outstanding results of their work were also commended.

**Top:** Group photo of observers and trainers. **Left and right:** Observers at work – tag seeding and otolith sampling.

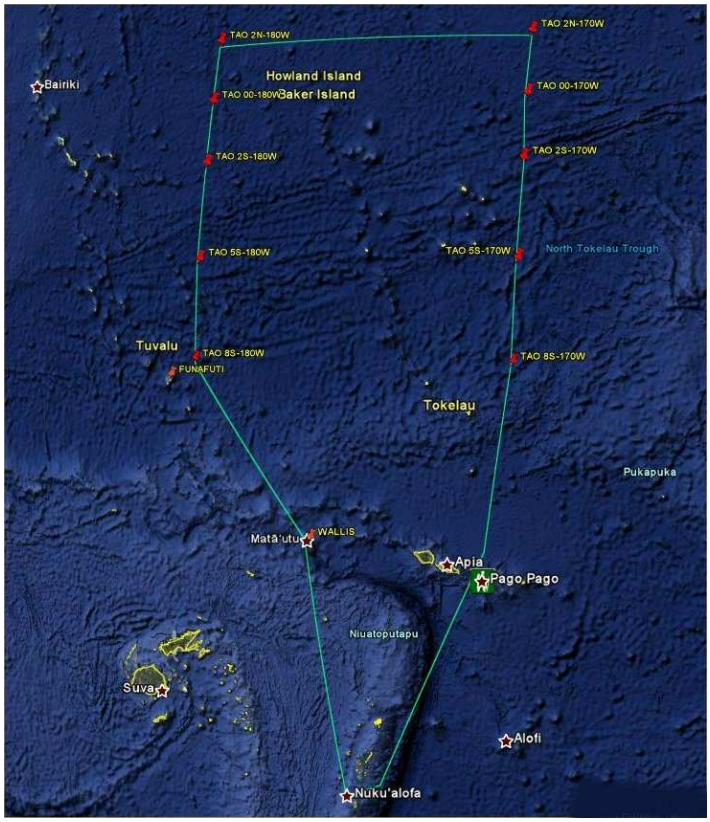
# CENTRAL PACIFIC TAGGING: CRUISE # 5

As an attempt to fill the gap in the geographical coverage of the Pacific Tuna Tagging Programme, a one-month tagging campaign in the middle of 'Ocean World' is scheduled from mid-November to mid-December this year. The 22-meter Tonga-based multi-purpose fishing vessel Pacific Sunrise will be chartered for the occasion. The cruise will start from Nuku'alofa and will target any tuna aggregation associated with one of the Tropical Atmosphere Ocean (TAO) Project oceanographic buoys anchored along the 170° and 180° West meridians between 8° South and 2° North latitudes. The buoys to be visited are located in the exclusive economic zones of Tokelau, Kiribati (Phoenix and Gilbert Island groups) and Tuvalu and also in international waters.

Over 12,000 tuna have already been tagged during the previous four Central Pacific cruises between the 140° and the 170° West meridians. Along with tagging tuna in areas where pole-and-line vessels cannot operate due to the absence of bait fish, these tagging campaigns increase the percentage of tagged bigeye tuna, as this species represents about 92 % of the releases in previous CP cruises.

The fishing gear used will be short surface trolling lines rigged with plastic lures (during the day) and handlines or rods and reels associated with metal jigs (at night).

Luck is a non-negligible factor during these cruises, as success is entirely dependent of the presence of tuna associated with the TAO moorings. During the last cruise (CP4), tuna were found only around one out of 10 buoys…Fingers crossed please!




**CP5 planned cruise track.**


**A TAO buoy.**

**Next newsletter in January 2011**

We welcome your comments on the content of this newsletter – please send them to Valérie Allain (valeriea@spc.int), Caroline Sanchez (carolines@spc.int) or Malo Hosken (maloh@spc.int).