April 23, 2003 F/PIFSC:RWB:FLF
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CRUISE REPORT

VESSEL: *Oscar Elton Sette* Cruise 03-02, Leg II (OES-003)

CRUISE PERIOD: Leg II: 17 March-4 April 2003 (scheduled)
Leg II: 19 March-4 April 2003 (actual)

AREAS OF OPERATION: North Pacific transition zone (≈30°N), northwest of Oahu, Cross Seamount, leeward side of the Island of Hawaii (Kona coast)(Fig. 1, Table 1)

ITINERARY:

19 March — Departed Snug Harbor at approximately 1800. On board were Richard Brill, Erin Burge, Kerstin Fritsches, Susan Haynes, Alex Jestel, Lenore Litherland, Mike Musyl, and Brandi Reed. Began transiting north towards swordfish grounds (North Pacific transition zone).

20 March — Starting 0800, deployed approximately 100 longline hooks (no bait) to test hydraulic systems and allow ship's crew, officers, and scientists to re-familiarize themselves with longline operations. Retrieved gear immediately after setting, then continued transit north.

21 March — Continued transit to swordfish grounds North Pacific transition zone (≈30°N).

22 March — Arrived at approximately 30°N. Found good 18°-17°C temperature break running North-South. Starting at 2000, set approximately 450 hooks, 5 hooks per float, taught mainline, all squid bait, chemical light stick every fourth hook. Gear set at right angle to the temperature break, ending about 3 miles on cold side of the break. (Exact start and end points for all sets are listed in Table 1)

23 March — Began gear retrieval at 0700. Caught six swordfish. (A listing of all fish caught is given in Table 2.) Three were tagged with popup

satellite archival tags (PSATs). (Table 3 lists all PSATs deployed during the cruise.) Starting at 2100, set approximately 450 hooks, 5 hooks per float, taught mainline, all squid, light stick every fourth hook in an area near last night's set.

24 March — Began gear retrieval at 0800. Caught three swordfish; all were dead. Two were retained for tissue specimens; the third was lost alongside the ship. Began running south after haulback to avoid approaching bad weather. Turned back north when weather forecast improved. Starting at 2100, set approximately 450 hooks, 5 hooks per float, taught mainline, all squid, light stick every fourth hook in area east of previous night's set.

25 March — Began gear retrieval at 0700. Caught one swordfish (dead), one mahimahi (released), and 40 blue sharks. All but one shark were alive and were released. Gear was set in approximately 17°C sea surface temperature, but with no obvious thermal structure which may explain high blue shark catch rate. Began running south after haulback to avoid approaching bad weather.

26 March — Continued transit south. The ship had just turned back north as weather was improving when a crewman fell and injured his ankle. Continued transiting to Oahu to drop off injured crewman for the purpose of seeking medical attention.

27 March — Continued transit south.

28 March — Arrived Oahu and dropped off injured crewman. Immediately transited to area northwest of Oahu. Starting at about 1900, set approximately 450 hooks, 6 hooks per float, taught mainline, all squid bait, light stick every third hook. Used nylon leaders on all but last 200 hooks, which had wire leaders, in an attempt to catch sharks for application of PSATs. This pattern of gear deployment was repeated on all subsequent sets.

29 March — Began haulback about 0700. No fish suitable for application of PSATs were captured. Began transit to Cross Seamount immediately after gear retrieval. Starting at about 2100, set approximately 450 hooks.

30 March — Began haulback about 0700. One bigeye tuna (127 cm FL) was tagged with a PSAT and released. Continued transit to Cross Seamount following

haulback. Starting 2000, set about 470 hooks over the summit of Cross Seamount.

31 March — Began haulback about 0900. Caught one yellowfin tuna and 19 bigeye. None of the tunas were large enough for PSATs. Began transit toward leeward coast of the Island of Hawaii after haulback. Starting 2100, set about 470 hooks.

1 April — Began haulback at 0800. Caught one bigeye thresher shark (about 3 m length) which was tagged with PSAT. Continued transiting to leeward coast of the Island of Hawaii after haulback. Starting 2100, set about 470 hooks.

2 April — Began haulback at 0800. Caught one silky shark (about 2 m length) which was tagged with a PSAT. Starting 2100, set about 470 hooks.

3 April — Began haulback at 0800. Caught one oceanic whitetip shark (about 1.5 m length), which was tagged with a PSAT. Departed for Pearl Harbor immediately after haulback.

4 April — Arrived Pearl Harbor approximately 0800. Began fueling. Departed Pearl Harbor at approximately 1500. Returned to Snug Harbor and disembarked scientists; end of cruise.

MISSIONS AND RESULTS:

A. Capture swordfish, tunas, and sharks for attachment of PSATs.

Made 10 successful longline sets (Tables 1 and 2). Deployed seven PSATs on swordfish, sharks or tunas (Table 3).

B. Collect tissue samples for ongoing physiological, biochemical, and anatomical studies of tunas, billfishes, other pelagic teleost species, and sharks.

Took tissue samples from bigeye and yellowfin tunas, swordfish, mahimahi, escolar, lancet fish, snake mackerel, and blue sharks for ongoing physiological, biochemical, and anatomical studies.

C. Conduct experiments on vision acuity in tunas and billfishes using isolated retinas and standard physiological techniques.

Conducted detailed studies on the visual capabilities of swordfish, tunas, striped marlin, mahimahi, escolar, lancet

fish, and snake mackerel using isolated retinas and/or eye lenses.

NARRATIVE SUMMARY:

A total of 10 operational longline sets were conducted during the cruise (Table 1). During these operations, three swordfish, one bigeye tuna, and three sharks were suitable for the attachment of PSATs. Biological samples for ongoing physiological and fish vision studies were obtained from most of the other tuna, billfish, and mahimahi caught.

A narrative report on the results obtained from the blood samples taken from bigeye tuna is given in Appendix 1.

RECORDS:

The following forms, logs, charts, and data records were kept and given to the Honolulu Laboratory upon termination of the cruise. These include all data captured onto computer storage media during the cruise. All the records are filed there unless indicated otherwise in parentheses.

SEAS system data files
Deck Log-Weather Observation Sheet
Marine Operations Log (NOAA)
Project Area and Operations Chartlets
Station Number and Activity Log
Fish catch record

SCIENTIFIC PERSONNEL:

Richard W. Brill, Chief Scientist, National Marine Fisheries Service (NMFS), Northeast Fisheries Science Center (NEFSC), VIMS-Hampton University CMER Program
Erin Bruge, Cooperating Scientist, VIMS
Kerstin Fritshces, Cooperating Scientist, University of Queensland
Susan Haynes, Cooperating Scientist, VIMS
Alex Jestel, Cooperating Scientist, VIMS
Lenore Litherland, Cooperating Scientist, University of Queensland
Michael Musyl, Cooperating Scientist, Joint Institute for Marine and Atmospheric Research, University of Hawaii
Brandi Reed, Cooperating Scientist, University of British Columbia

Submitted by: _____
Richard W. Brill
Chief Scientist

Approved by: _____
Jeffrey J. Polovina
Acting Director, Honolulu Laboratory

Attachments

Table 1, Summary of longline set locations

Date	start latitude (N)	start longitude (W)	end latitude (N)	end longitude (W)
March 20	23° 03.762	158° 18.183	23° 05.152	158° 14.585
March 22	30° 13.569	158° 14.464	30° 06.823	158° 28.406
March 23	30° 20.594	158° 13.950	30° 24.398	158° 26.470
March 24	30° 26.962	157° 46.215	30° 33.881	157° 36.264
March 28	21° 27.845	158° 47.681	21° 30.969	158° 38.917
March 29	19° 51.283	158° 31.502	19° 41.858	158° 29.583
March 30	18° 46.299	158° 17.228	18° 38.161	158° 14.244
March 31	18° 49.945	157° 04.502	18° 40.869	157° 00.046
April 1	19° 13.984	156° 08.319	19° 22.364	156° 08.154
April 2	19° 17.445	156° 08.965	19° 26.226	156° 09.586

Table 2 Summary of fish captured during longline operations

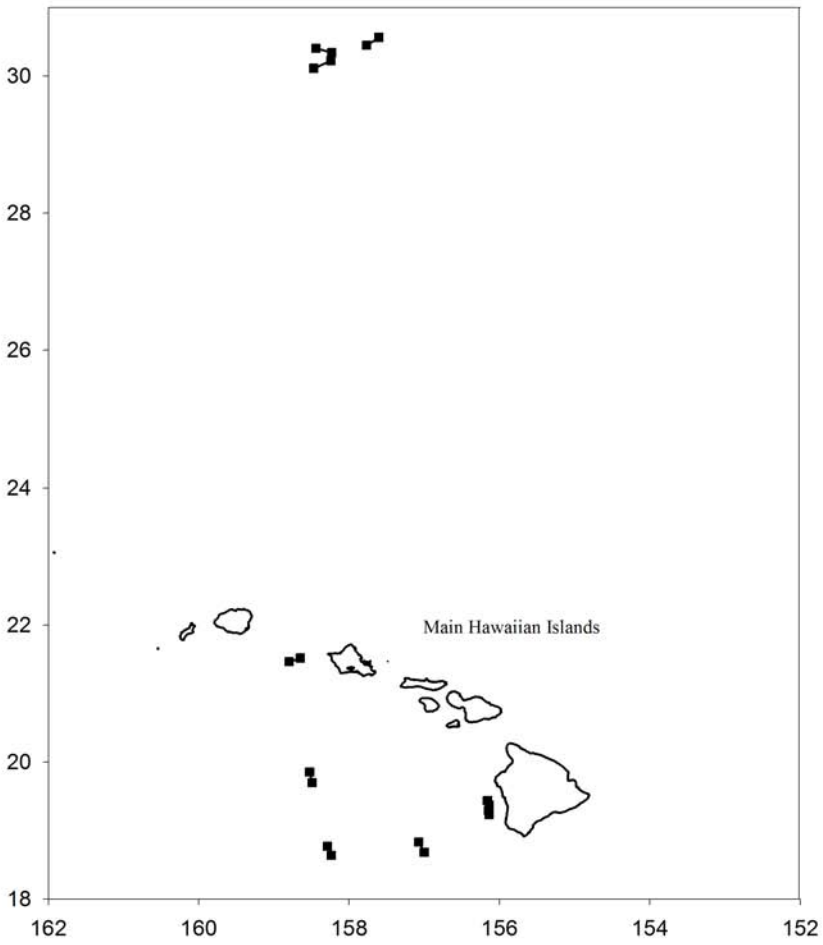
Date	Common Name	*Species*	# Caught
23 March	Blue shark	*Prionace glauca*	15
	Swordfish	*Xiphias gladius*	6
	Mahimahi	*Coryphaena hippurus*	2
	Shortfin mako shark	*Isurus oxyrinchus*	1
	Longsnout lancetfish	*Alepisaurus ferox*	3
	Snake mackerel	*Gempylus serpens*	1
24 March	Swordfish	*Xiphias gladius*	3
	Bigeye tuna	*Thunnus obesus*	5
	Blue shark	*Prionace glauca*	13
25 March	Swordfish	*Xiphias gladius*	1
	Blue shark	*Prionace gluauca*	40
29 March	Escolar	*Lepidocybium flavobrunneum*	8
	Blue shark	*Prionace glauca*	1
30 March	Mahimahi	*Coryphaena hippurus*	15
	Blue shark	*Prionace glauca*	2
	Bigeye tuna	*Thunnus obesus*	1
31 March	Mahimahi	*Coryphaena hippurus*	3
	Barracuda	*Sphyraena barracuda*	1
	Bigeye tuna	*Thunnus obesus*	19
	Yellowfin tuna	*Thunnus albacares*	1
	Oilfish	*Ruvettus pretiosus*	1
	Longsnout lancetfish	*Alepisaurus ferox*	1
1 April	Mahimahi	*Coryphaena hippurus*	4
	Escolar	*Lepidocybium flavobrunneum*	2
	Bigeye Thresher shark	*Alopias superciliosus*	1
2 April	Silky shark	*Carcharhinus falciformis*	1
	Mahimahi	*Coryphaena hippurus*	2
	Swordfish	*Xiphias gladius*	1
	Striped marlin	*Tetrapturus audax*	1
	Shortbill spearfish	*Tetrapturus angustirostris*	1
	Blue shark	*Prionace glauca*	1
3 April	Mahimahi	*Coryphaena hippurus*	1
	Blue shark	*Prionace glauca*	1
	Oceanic whitetip shark	*Carcharhinus longimanus*	1

Table 3. Species tagged with pop-up satellite tags (PSATs).

SPECIES	Length or weight*	Lat. Degrees	Lat. Min	Lat. Dir.	Long. Degrees	Long. Min	Long. Dir.
swordfish	150 lb	30	9.225	N	158	17.634	W
swordfish	90 lb	30	7.85	N	158	19.773	W
swordfish	150 lb	30	8.749	N	158	18.955	W
bigeye tuna	127 cm	19	52.107	N	158	30.736	W
bigeye thresher shark	2 m	18	42.563	N	156	48.843	W
oceanic whitetip shark	2 m	19	12.556	N	156	9.129	W
silky shark	2 m	19	15.142	N	156	17.129	W

*Fork lengths of sharks and tunas were measured when sea conditions and behavior of the animal made it safe to do so, otherwise lengths or weights were estimated. Weights of swordfish were estimated.

Figure 1. Longline set locations.



Appendix 1

Report from Dr. Elisabeth Maurer and Brandi Reed, Canadian Blood Services, Department of Pathology, University of British Columbia

Summary of the project "Blood serotonin in different species"

Human blood platelets are small (3-5 micrometers in diameter), anucleated cells with three different types of storage granules. The dense granules contain calcium, adenosine nucleotides, phosphate and serotonin. Platelets are the only blood cells that take up and transport serotonin. The reason for platelets being the exclusive serotonin storage and transport vehicles in the blood is not known.

We found that platelets are extremely sensitive to reduced temperature and show pronounced morphological changes and the expression of activation markers when cooled from 37°C to 20°C. Since platelets are also the only transporters of serotonin in the mammalian circulation, we hypothesize that platelet serotonin might play a role in body temperature regulation. Further, there might be differences in serotonin levels between warm- and cold-blooded animals. One possible role for the action of serotonin could be via the interaction with endothelial cells of the blood vessels. By opening up the gaps between endothelial cells, serotonin would increase subcutaneous perfusion.

Animals evolutionary older than mammals have instead of platelets so-called thrombocytes, which are large, nucleated cells. Thrombocytes were shown to have a similar role in hemostasis as platelets.

The measurement of serotonin is rather sophisticated. Over the last 3 years we developed an immunocytochemical assay for microscopy and the semi-quantitative analysis with flow cytometry as well as a quantitative HPLC method.

So far, we have investigated thrombocytes from salmon, frogs, turtles, alligators, and platelets from sea lion and humans. Salmon and frog thrombocytes did not contain serotonin. If serotonin is found in blood, it is strictly present in platelets or thrombocytes; there was none in other blood cells of these species. All other species have serotonin exclusively in their thrombocytes or platelets.

Since tuna can regulate their body temperature it was suggested that these fish might also have serotonin in their thrombocytes.

The analysis of frozen whole blood with HPLC, however, did not show any serotonin in tuna or swordfish blood.