

INTERNATIONAL DOLPHIN CONSERVATION PROGRAM

SCIENTIFIC ADVISORY BOARD

2ND MEETING

LANZAROTE (SPAIN)

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DOCUMENT SAB-2-04

DOLPHIN SAMPLING PROGRAM

At the first meeting of the SAB, held in Lima, Peru in June, 2004, it was recommended that the IATTC re-initiate a sampling program of dolphins killed in the fishery and formed a working group to explore the logistics of collecting life history samples by observers. Previously, teeth and reproductive organs have been collected to estimate the age and reproductive status of dolphins and to study their vital rates (*i.e.*, birth rates, age at sexual maturity, age-specific survivorship) that are key indicators of the status of the populations. Stomach contents have been collected to determine the feeding habits of the dolphins and to compare them with tunas. A necropsy program was conducted to determine whether stress-related mortality of dolphins was occurring due to the fishery. Currently, the IATTC, with funding from the University of Hawaii, is collecting stomach samples and muscle and liver samples from a variety of species to compare broad-scale trophic structure patterns in the eastern, central, and western Pacific.

The SAB also asked the working group to examine the logistics of collecting samples from dolphins to answer questions about stress-related mortality. Biological samples taken by observers from dolphins could address some of the important unanswered questions about stress, dolphin biology, and population trends. The pathological samples that were most recently collected under the U.S. necropsy program were used to examine the causes of fishery mortality and the general health of the population. However, the sampling techniques were complex and few samples were collected. A scaled-back program was contemplated by the SAB that would involve simpler collection procedures that would facilitate collecting more samples, and thus having a larger sample size available for analyses.

1. SCOPE OF THE SAMPLING PROGRAM

The scope of the program should be determined on the level of funding available, opportunity costs in terms of observer time, what research questions are to be answered, and what samples and sample sizes are required for these studies. For this initial proposal, we have assumed that the standard set of life history samples collected in previous studies would be collected: teeth (for age estimation), testes or ovaries and uteri (for determining reproductive status), sex, length, and other data currently collected on the observer's *Dolphin Life History Form*. A skin sample would be collected for studying genetic stock structure, and the muscle, heart and lymph node samples would be collected for studying dolphin physiology. Additionally, stomach contents could be collected to provide information about ecosystem-level changes in trophic interactions, population status relative to carrying capacity, and environmental changes.

A preliminary testing phase would be appropriate, in which a sampling program would be initiated in four ports where most of the vessels that set on dolphins unload (Mazatlan and Ensenada (Mexico); Cumana (Venezuela); Panama City (Panama)), using IATTC observers aboard Class-6 vessels with DMLs. After about 20 trips have been sampled, the procedures for collecting at sea, storage at the field offices, and shipping to the laboratories for analysis would be evaluated, and revised if necessary. The program could then be expanded to include more observers from the various programs.

1.1. Potential sample size

In 2003, there were 256 trips with dolphin sets recorded by IATTC observers, and 428 trips recorded by

all observers, based in the four ports mentioned above. With a mortality rate of about 2.7 dolphins per trip, and a carcass recovery rate of about 50% (based on the results of the NMFS necropsy program), a sample size of 345 dolphins per year could be expected from IATTC observers, and 577 from all programs.

1.2. Collection preparations and observer training

Once a sampling program is initiated, observers must be trained in dissection and tissue-preservation techniques as well as in the use and care of equipment, observer manuals must be written, equipment and preservatives purchased, carcasses brought back from sea for observer training sessions, storage facilities on land located and acquired, shipment to a research laboratory must be arranged, national and CITES permits must be acquired, and a full-time Program Coordinator hired. The international fleet must be advised of this new program, as it is vital to obtain cooperation from the fishermen. The fishermen's assistance is needed in getting dead dolphins on deck, providing deck space for sampling, providing freezer or well space for storage, and off-loading any frozen carcasses.

1.3. At-sea collection

The observers will be provided with standard life history sampling supplies: knives and sharpening stones, scalpels and blades, plastic bags and sealed storage buckets, labels, gloves, and formalin. Observers will be instructed to sample all dead dolphins that come up on the deck, but that this task should not interfere with the higher-priority tasks of recording mortality and potential infractions of the AIDCP. Teeth and reproductive tracts will be preserved in formalin and stored in a sealed bucket secured on the well deck. Stomachs, skin and muscle samples, hearts, and lymph nodes will be securely bagged, placed in a bucket, and frozen in the ship's freezer. Complete carcasses will be secured by a line and kept frozen in a ship's well.

During the set, dead dolphins will be stored temporarily on the wet deck in an area that does not interfere with fishing operations. After the set is completed, the observers will process the dolphins, record the data on their Life History forms, store the samples, and clean up the deck and their gear. Processing one dolphin for basic life history data (age and reproductive status) requires approximately 10-15 minutes, food habits and tissue isotope samples an additional 5-10 minutes, and the heart and lymph node sampling for physiology and pathology studies an additional 5-10 minutes.

1.4. Storage at field offices

The observers will transport the specimens to the field office where they are debriefed. Transporting preserved specimens by airplane will require that the formalin be drained from the storage containers, and that the frozen specimens be covered in water that is subsequently frozen, and well-sealed in a bucket. Upon arrival at the field office, the observer will inventory the samples, reconcile the inventory with the Life History forms, ensure the integrity of the labels and storage bags, and place the frozen specimens in the office freezer, and the preserved samples prepared for longer-term storage in formalin. The data on the Life History form will be reconciled with the other trip data. When sufficient quantities of specimens have been collected, they will be shipped to the IATTC headquarters in La Jolla in the most convenient and safe manner. (While other laboratories may be involved, for budget planning purposes it is assumed that all specimens are transported to La Jolla).

1.5. Laboratory processing

Life history specimens will be processed at the NMFS Southwest Fisheries Science Center (SWFSC) in La Jolla. Ages will be estimated from the teeth, and reproductive status will be determined from the testes, ovaries, and uteri. While the specialized facilities are available at the SWFSC to process the samples, additional technical staff will need to be recruited and trained, preferably from the countries cooperating in the research.

Genetic samples, stomach contents and stable isotope analyses can also be processed in La Jolla by IATTC or NMFS staffs.

Heart and lymph node specimens will be processed at an appropriate research facility with suitably qualified staff with the appropriate skills and training reside.

1.6. Data management

The data contained on the Life History forms will be entered by the IATTC staff into a data base. This will not contain confidential information about vessels or flags, but can be linked with other data bases that may required for the analyses that do have such information. A system for providing access to the data bases by scientists from member countries while preserving confidentiality of sensitive data will have to be designed and agreed upon. One option would be to provide the Life History data base to member countries that request it (remembering that all changes or corrections to the data base must be done to the main IATTC data base to avoid conflicts among different versions of the same data base). For analyses that require additional data from data bases containing confidential information, the IATTC staff will conduct such analyses and provide the results to requesting member countries in a form that does not reveal confidential information.

1.7. Analysis of results

The data will be reported by the participating laboratories to the SAB. The SAB will assist in the analyses of the data.

2. PROPOSED PROGRAM STEPS

1. Initiate process in cooperating countries for obtaining the necessary permits. Prepare written sampling protocols and arrange for cooperation from industry groups/vessel managers.
2. Ask observers to bring back dead dolphins in the wells or freezer when they are returning to a port with an IATTC field office so that observers can be trained in sampling techniques.
3. Arrange for freezer and storage space to accommodate specimens in field offices.
4. Buy collection gear and preservatives, and distribute to field offices.
5. Conduct training sessions of observers.
6. Publicize the research to the fishing industry.
7. Include in the observer's debriefing procedures the proper storage and labelling of specimens, review of *Dolphin Life History* forms and reconciling them with other data forms.
8. Arrange for secure shipment of the samples from field offices to laboratories for processing.
9. Conduct laboratory analyses.
10. Report analyses to the SAB for discussion of results and publication.

3. BUDGET

Estimating costs for this project is difficult, because they depend on the scope of the project. In addition to hiring a full-time scientist to coordinate the project, there will be costs associated with setting up the project, including conducting training sessions, buying equipment, and shipping samples. Our estimate for initiating a sampling program of the scope outlined here for the entire fleet and to run it for the first year is approximately US\$265,000. To put this in perspective, the NMFS spent about US\$350,000 over three years to place necropsy technicians on vessels and to process dolphins for its necropsy program, but the expenses were relatively high due to the specialized training and equipment and the contracted

analyses required. In 1992-1993, the IATTC spent about US\$120,000 for observers to collect over 9,300 stomachs of tunas, dolphins, sharks, and other large marine predators during an 18-month period; the sampling procedures were relatively simple, the equipment required relatively inexpensive, and the analyses were conducted by IATTC staff.

3.1. Budget categories

Year 1	US\$
Personnel (coordinator)	60,000
Travel / Training sessions	60,000
Equipment / Logistics / Shipping	145,000
Total	\$265,000
Year 2	
Personnel (coordinator, 2 technicians)	140,000
Travel / Training sessions	25,000
Equipment / Logistics / Shipping	30,000
Laboratory supplies / Analyses	50,000
Total	\$245,000