

## PROGRESS OF THE ICCAT ENHANCED RESEARCH PROGRAM FOR BILLFISH IN THE WESTERN ATLANTIC OCEAN DURING 1994

*Prince, E.D.*

*National Marine Fisheries Service, Southeast Fisheries Center, 75 Virginia Beach Drive, Miami, Florida 33149, U.S.A.*

### SUMMARY

Research activities of the ICCAT Enhanced Research Program for Billfish in the western Atlantic Ocean during 1994 are summarized by location and research objective. At-sea sampling of about 30 Venezuelan industrial longline vessels based at Cumana and which target tuna or swordfish was accomplished in 1994. In addition, at-sea sampling of two Venezuelan flagged, Korean owned large longline vessels ( $\geq 125$  ft.) based at Carupano was also carried out in 1994. Biological sampling of over 900 swordfish for reproductive organs and 300 swordfish for calcified structures (age and growth) was done during the 1994 sampling season. A pilot study tagging cruise was made by the Western Atlantic Coordinator and members of CARICOM on small longline vessels, using live bait, based at St. Vincent. Shore-based sampling of billfish landings for size and sex data (and in some cases sampling of billfish tournaments for catch-per-unit-effort data) was carried out from Venezuela, Grenada, Trinidad and Tobago, St. Maarten, U.S. Virgin Islands and Bermuda. Program participants in Venezuela, Grenada, and Barbados helped obtain information on 60 tag-recaptured billfish in the western Atlantic Ocean. The hardbound copy of the Second ICCAT Billfish Workshop book was finished and distributed during August, 1994.

### RESUME

Les activités de recherche du Programme de Recherche Intensive sur les istiophoridés dans l'Atlantique Ouest au cours de l'année 1994 sont récapitulées par zone et par objectif de recherche. Un échantillonnage a été réalisé en mer en 1994 à bord d'environ 30 palangriers industriels vénézuéliens basés à Cumana et visant l'espadon ou les thonidés. En outre, un échantillonnage a également été effectué en 1994 en mer par deux grands palangriers ( $\geq 125$  pieds de long) coréens battant pavillon vénézuélien et basés à Curupano. Des échantillonnages biologiques ont été réalisés au cours de la saison d'échantillonnage de 1994 sur plus de 900 espadons pour l'étude des organes de reproduction et sur 300 espadons pour recueillir leurs structures calcifiées (étude de l'âge et de la croissance). Une étude pilote a été réalisée lors d'une campagne de marquage par le coordinateur de l'Atlantique Ouest et les membres de la CARICOM sur de petits palangriers basés à Saint-Vincent et pêchant à l'appât vivant. Des échantillonnages à terre des débarquements d'istiophoridés pour l'obtention de données sur la taille et le sexe (dans certains cas, des échantillonnages d'istiophoridés au cours de championnats de pêche pour obtenir des données de capture par unité d'effort) ont été réalisés au Venezuela, à Grenade, à Trinité et Tobago, à Saint Martin, sur les Iles Vierges (Etats-Unis) et aux Bermudes. Au Venezuela, à Grenade et aux Barbades, les participants au programme ont obtenu des informations sur 60 istiophoridés marqués et recapturés dans l'Atlantique Ouest. Le volume relié des Secondes Journées ICCAT sur les Istiophoridés est terminé et a été diffusé en août 1994.

### RESUMEN

Las actividades de investigación del Programa ICCAT de Investigación Intensiva sobre Marlines en el Océano Atlántico Oeste durante 1994 se presentan resumidas por lugar y objetivo de la investigación. Se llevó a cabo en 1994 muestreo a bordo de unos 30 palangreros industriales venezolanos con base en Cumaná, que perseguían túnidos o pez espada. Además, también se llevó a cabo muestreo a bordo de dos grandes palangreros coreanos ( $\geq 125$  pies de eslora) con base en Carúpano. Durante la temporada de muestreo de 1994, se efectuó muestreo biológico de más de 900 ejemplares de pez espada para obtener órganos reproductores, y 300 ejemplares de pez espada para obtener estructuras calcificadas (edad y crecimiento). El Coordinador del Atlántico oeste llevó a cabo un estudio piloto de campaña de marcado, junto con miembros de CARICOM, en pequeños palangreros con base en St. Vincent, que empleaban cebo vivo. Se obtuvieron de Venezuela, Granada, Trinidad y Tobago, St. Maarten, Virgin Islands (EE.UU.) y Bermuda, datos de talla y sexo a partir de muestreo en la orilla de desembarques de marlines (y en algunos casos, muestreo de concursos de pesca de marlines para obtener datos de captura por unidad de esfuerzo). Los participantes en el Programa en Venezuela, Granada y Barbados ayudaron a obtener información sobre 60 marlines marcados-recapturados en el Océano Atlántico oeste. Se terminó y distribuyó durante agosto de 1994 el segundo volumen, encuadernado con tapas rígidas, de las Jornadas de Trabajo ICCAT sobre Marlines.

## INTRODUCTION

Research activities during 1994 began immediately after the first of the year. The objectives presented in the initial program plan in 1986 (Appendix to Annex 12 of Report of Biennial Period, 1986-87 part 1) have not changed, and include: (1) Provide more detailed catch and effort statistics; (2) Expand the ICCAT billfish tagging program; and (3) Assist in collecting data for age and growth studies.

The two locations for intensive scientific study given in the original plan remain the Caribbean Sea and the west coast of Africa. The overall program coordinator during 1994 was Dr. Bradford E. Brown (U.S.A.); Dr. Eric D. Prince (U.S.A.) was coordinator for the western Atlantic Ocean, and Mr. Taib Diouf (Senegal) and Mr. Martin Mensha (Ghana) coordinated activities for the eastern Atlantic Ocean. The following are the coordinating activities realized by this program during 1994 in the western Atlantic Ocean.

### OBJECTIVE 1 -- LANDING STATISTICS

#### Coordination Travel in the Caribbean Sea

Dr. Eric Prince made 2 trips to Caribbean locations in 1994 as part of his coordination responsibilities for program activities in the western Atlantic Ocean. In addition, a trip was also made to west Africa (Senegal, Cote d'Ivoire) in July, 1994, to obtain data, train technicians, and make presentations on the tagging program. The first trip to the Caribbean was in August to St. Vincent and Grenada for the purposes of conducting a pilot study on a longline vessel to evaluate the effectiveness of using live bait to increase tag and release efforts. This trip was made in cooperation with the St. Vincent Ministry of Fisheries and CARICOM staff. A second trip was made by the Western Atlantic Coordinator to San Juan, Puerto Rico in September to give a presentation on progress of the ICCAT Enhanced Research Program for Billfish. Mr. Freddie Arocha (hired by the National Marine Fisheries Service, NMFS, through the University of Miami to work on swordfish biology), made 2 trips to Venezuela in 1994. The first trip in January was to establish and confirm the annual sampling scheme and return biological samples to Miami. The coordination trip in June was made to train new observers, pick up the large volume of frozen biological samples, and collect data.

The Gulf Caribbean Fisheries Institute (GCFI) is holding its 47th annual meeting in Margarita Island, Venezuela, November 13-18, 1994. One of the special sessions at this meeting will be **Billfish Biology, Human Dimensions, and Fisheries**. A less formal roundtable discussion of western Atlantic billfish issues are also planned to follow the technical presentations. The Western Atlantic Coordinator had initially planned to co-chair this session with Dr. Richard Ditton (Texas A & M University) but this years SCRS meeting conflicts with the GCFI meeting. Dr. Mark Farber of the Southeast

Fisheries Center will assume co-chair duties and staff from the SEFC will present recent ICCAT assessment results for western Atlantic sailfish. The Venezuelan Fisheries Agency FONAIAP will host the meeting and plans to present at least four papers related to their ICCAT billfish work in Venezuela.

Staff at the Southeast Fisheries Center spent considerable time during the first part of 1994 assisting the ICCAT Secretariat in finalizing manuscripts for the Second ICCAT Billfish Workshop report. This hardbound report was published and distributed during August, 1994.

Since the majority of field work related to the ICCAT Enhanced Research Program for Billfish is highly seasonal, a questionnaire was included in the July 1994 highlights report to determine whether the recipients would be receptive to a bi-annual instead of a quarterly distribution. All responses received by the Western Atlantic Coordinator were overwhelmingly in favor of a change to a bi-annual distribution of this report.

The following summarizes research progress according to location and/or type of research activity.

Barbados. The shore-base sampling in Barbados for 1994 was not conducted due to the low fishing effort but several recreational billfish tournaments were covered for 1994.

Grenada. The ministry of industrial development and fisheries continued shore-based sampling activities of the artisanal fisheries during the 1994 season. About 700 carcass measurements (mostly sailfish) were submitted to the western Atlantic coordinator in 1994. Sampling of CPUE, size, and sex information for the annual Spice Island Billfish Tournament held in Grenada, was also accomplished in 1994.

Jamaica. Dr. Guy Harvey continues to collect data at recreational tournaments included size and sex information of the landed fish, as well as catch rate data. Shore-based sampling of the artisanal canoe fishery was also conducted for 1994, but on a sporadic basis only. Dr. John Graves (Virginia Institute of Marine Science) intends to collect biological samples from blue marlin landed during the 1994 Port Antonio billfish tournament held in October.

St. Maarten, N.A. The western Atlantic coordinator could not make a trip to St. Maarten in 1994 and no samples were obtained from the Nichirei Carib Corporation. In addition, data was not collected from the annual recreational billfish tournament, although these data may be available from the recreational fishing club that sponsors this tournament.

St. Vincent. The Western Atlantic Coordinator assisted by members of CARICOM and St. Vincent Ministry of Fisheries staff made a successful longline cruise in August to test the feasibility of

using live bait to increase the catch, tag, and release efforts for billfish in this area. Live bait were successfully held aboard the boat and catch rates for sailfish were very high, even though August is the poorest month of the year for sailfish abundance.

Trinidad and Tobago. Shore-base sampling of the industrial longline vessels (mostly Taiwanese vessels) that off-load in the Port of Spain is under the direction of Dr. Christine Chan-A-Shing, Ministry of Food Production & Marine Exploitation. Size frequency measurements opportunistically taken from several hundred dressed billfish carcasses at the National Fisheries Company freezers were submitted to the Western Atlantic Coordinator in 1994. Dr. Chan-A-Shing believes that there is a strong possibility that shore-based sampling could be re-activated at a high level next year.

Venezuela. At-sea sampling activities of FONAIAP continued at the port of Cumana, where the fleet of industrialized longline vessels target yellowfin tuna and swordfish, but also catch billfish. Of the 25 at-sea observer trips accomplished by October 1994, 1 of these trips were made on a Korean type vessel out of the port of Guanta (Pto. La Cruz). These vessels average from 125 feet to 200 feet in length, while the industrialized longline vessels out of Cumana average only about 50 to 60 feet in length. A total of at least 30 observer trips are anticipated by the end of 1994. Biological sampling of swordfish consisting of reproductive organs from over 900 fish and skeletal structures for age and growth assessment from about 300 fish were collected during 1994 at-sea sampling activities. Shore-based sampling in Venezuela continued to expand during 1994, with harbor sampling in Juangriego and Playa Verde, in addition to Cumana and La Guaira. Shore-based sampling resulted in size frequency data from over 4,000 billfish were collected in 1994. Sampling of six recreational tournaments held in Playa Grande Marina as well as Puerto Cabello and Punto Fijo, continued in 1994. A total of 192 tagged billfish were released from charter boats at Caraballeda Marina near La Guaira, Venezuela. A total of 60 tag-recaptured billfish were reported to the western Atlantic Coordinator in 1994. Of these, 30 were white marlin, 14 were sailfish, 11 were blue marlin, and 5 were unknown species. In addition, one sailfish that had been injected with oxytetracycline and tagged in Isla Mujeres, Mexico, was recaptured after about 3 years at large near Margarita Island, Venezuela. In November, 1993. The otolith obtained from this fish is now being analyzed for age validation studies by University of South Carolina scientists. The FONAIAP staff spent considerable time in the fall preparing for the special session on Billfish at the upcoming annual meeting of the GCFI in Margarita Island, Venezuela.

U.S. Virgin Islands. Only limited swordfish longline activity in this location took place during 1992 and thus, at-sea sampling could not be accomplished. Shore-based sampling of several billfish tournaments were conducted during 1994 and a brief report of this activity is expected to be submitted to the Western Atlantic Coordinator prior to the SCRS meeting.

Species Identification Kits. Scott Shepard, candidate for a Masters of Science degree in Biology at Florida Atlantic University, has recently finished his thesis entitled: Rapid immunologic identification of istiophorid fishes from minute tissue samples (84 pages). This work is part of the species identification work conducted at Florida Atlantic University under the guidance of Dr. James Hartmann. Six sailfish species identification kits (bead syringe assay type which yield a highly visible color change) are currently being assembled by the research team for testing of false positive reactions. These are expected to be available for use before the end of the year.

#### OBJECTIVE 2 -- BILLFISH TAGGING PROGRAM

The western Atlantic Coordinator responded to numerous requests for ICCAT tagging kits from several Caribbean locations during 1994, including Venezuela, St. Vincent, and U.S. boats fishing waters adjacent to Trinidad and Tobago. A total of over 60 tag-recaptured billfish were recovered in 1994 from Program participants working in Venezuela, Grenada, and Barbados. These recaptures carried both NMFS and Billfish Foundation tags and represented a substantial increase in recaptures from previous years. Therefore, the ICCAT Enhanced Research Program for Billfish in the western Atlantic continues to contribute to increased tag returns for the NMFS and Billfish Foundation tagging programs. In an effort to expand the ICCAT billfish tagging program to the offshore longline fleet, 5,000 nylon anchor tags were assembled with the Japanese symbols for reward included on the streamer legend. These tags are intended for the Japanese Tuna Federation who have tentatively agreed to initiate billfish tagging activities from their offshore longline fleet in the near future.

#### OBJECTIVE 3 -- AGE AND GROWTH

Calcified structures from one unusually large blue marlin were submitted to the western Atlantic Coordinator during 1994. This fish weighed 1050 pounds and was captured by a recreational angler fishing off Bermuda. In addition, about 1/2 dozen juvenile sailfish and swordfish samples (less than 5 kgs) were obtained from the Florida Keys through an incentive program sponsored by The Billfish Foundation. These juvenile billfish samples are collected by examining the stomachs of larger predators or by night dip netting.