



Dakar, December 2009

Identification, Biology and Conservation of Elasmobranch Fishes in West Africa

Workshop Report

“Identification, Biology and Conservation of Elasmobranch Fishes in West Africa”

Dakar, 7 – 11 December 2009

The workshop on the “Identification, Biology and Conservation of Elasmobranch Fishes in West Africa” took place between the 7 and 11 December at the Université Cheikh Anta Diop in Dakar (UCAD II). Like in previous workshops (IMROP Nouadhibou 2004; UCAD Dakar 2005; UCAD Dakar January 2007 and UCAD Dakar October 2005), this workshop was organized by Mr. Mika Diop (Coordinator of the project PSRA-Requins from CSRP), and counted with the presence of three professors: George Burgess (Florida Museum of Natural History, USA), Rui Coelho (Florida Museum of Natural History, USA), and Enric Cortes (National Marine Fisheries Service, USA).

The workshop had the presence of 28 participants from 7 countries of the CSRP (Figure 1):

- Guinea-Bissau (3 participants)
- Mauritania (5 participants)
- Guinea (3 participants)
- Gambia (2 participants)
- Senegal (9 participants)
- Sierra-Leone (3 participants)
- Cape Verde (3 participants)

The objective of this workshop was to improve species identification, data collection and data analysis of elasmobranch fisheries in the region, and was aimed towards samplers, fishery observers and fishery scientists. The ultimate goal of this and previous workshops carried out in the region is to help promote elasmobranch conservation and management efforts in the region.



Figure 1: Group Photo of the participants in the 2009 workshop for the identification, biology and conservation of elasmobranch fishes.

Monday, 7 December 2009

The morning session started at 9:30 with the official opening of the workshop (Figure 2). Mr. Mika Diop welcomed all the participants and thanked CSRP and FIBA for their efforts in promoting and supporting these workshops.

Mr. Diop's speech was followed by Pr. Omar Thiaw's, who reflected upon the need for a new approach to fisheries management in West Africa, with better technicians and managers. Pr. Thiaw, Director of the Institut Universitaire de Pêche et d'Aquaculture, also noted the importance of international cooperation showcasing this workshop as a good example, with participants from seven countries in the region. The opening remarks were followed by questioning by the local media, including television, radio and newspaper reporters.



Figure 2. Opening session with (left to right) Mika Diop, George Burgess, Rui Coelho, Enric Cortés and Omar Thiaw.

After the opening session, the remaining of the morning was spent by George Burgess giving a talk on the identification of the most common species of sharks and rays found in the region (Figures 3 and 4). G. Burgess also showed pictures and talked about some of the less common species, such as some deep water sharks. Those species are less likely to appear in the artisanal coastal fisheries, but they are probably being caught by expanding industrial deep water fisheries that are currently developing in the region, and therefore it is important to alert the fishery samplers and observers of their presence in deeper waters in the region.

After lunch, the afternoon was spent with Rui Coelho talking on the biology of elasmobranchs, focusing mainly on two different aspects, age & growth and reproduction (Figure 5). This was mainly a theoretical session that had two main objectives: 1) describe the general life history patterns found in elasmobranch fishes and 2) explain and show in detail the methods used for life history (age & growth and reproduction) studies. This session took all afternoon and finished at 17:00.



Figures 3 and 4. George Burgess lecture on the identification of sharks, skates and rays of the CSRFP Region.



Figure 5. Rui Coelho lecture on the biology of elasmobranch fishes.

Tuesday, 8 December 2009

Tuesday was dedicated to a field trip involving visits to a few fishery landing sites in the region. We started at UCAD at around 8:00 and headed south to visit 3 different sites: M'Bour, Joal and Djiffère. The sites of M'Bour and Joal were quite poor in terms of elasmobranch fauna, with only some specimens of only a few species found at each landing site. Both teachers and students noted that there seemed to have been a decrease in abundance of catches in the past several years, with fewer elasmobranchs seen each year at each site. The overexploitation of elasmobranchs in the region appears to be very clear and urgent efforts must be made to reduce fishing mortality if any recovery is to be expected.

The landing site of Djiffère (Figure 6) was more interesting, with larger quantities and higher diversity than at the other sites. It was still poor in terms of abundance and diversity when compared to earlier times at other geographical locations, but there were more elasmobranchs than at the two other sites we visited. A few interesting elasmobranchs were observed there, including *Dasyatis margarita* and *Dasyatis margaritella*, two species that are difficult to distinguish. Specimens of

these two species (and others) were kept and taken back to UCAD II for a closer look during the next day's laboratory session.

The field trip was long, and the participants arrived back in Dakar at 22:00.



Figure 6. Identifying shark, rays and skates in the landing site of Djiffère

Wednesday, 9 December 2009

The morning of Wednesday was spent with Enric Cortés talking about data and analytical needs for fisheries stock assessment and management (Figure 7). E. Cortés presented a “road map” for ultimately reaching successful fisheries management, describing the needs that fishery scientists and managers have in terms of data. He provided the participants specific information on the types of data that must be collected for stock assessment and management purposes. E. Cortés

discussed the fact that different analytical approaches have different data needs, and presented a “road-map” showing what specific data must be collected for each type of analysis. E. Cortés also discussed the fact that, in general, the more complex and elaborate analyses are very demanding in terms of data, but that there are simpler ways to assess the species’ ecological risk in situations where less data are available, such as is the case of West Africa fisheries.



Figure 7. Enric Cortés lecture on the data needs for fisheries stock assessment and management.

The afternoon of Wednesday was spent in the laboratory (Figures 8 and 9), and two tasks were accomplished:

- 1) Identification of West African species, led by G. Burgess
- 2) Dissection and biology of sharks and rays, led by R. Coelho

Between the specimens that had been collected by Mr. Diop in the previous weeks and those collected in the previous day during the field trip, participants were able to identify and analyze specimens from 12 different species (two sharks and ten batoids), specifically:

- *Rhizoprionodon acutus*

- *Sphyrna lewini*
- *Rhinobatos cemiculus*
- *Rhinobatos irvinei*
- *Rhinobatos rhinobatos*
- *Zanobatus schoenleinii*
- *Torpedo torpedo*
- *Raja miraletus*
- *Dasyatis margarita*
- *Dasyatis margaritella*
- *Taeniura grabata*
- *Gymnura micrura*



Figure 8: Laboratory class for the identification and dissection/biology of elasmobranchs.



Figure 9: Dissecting a shark in the laboratory.

Thursday, 10 December 2009

The Thursday morning session started with a practical computer class using Microsoft Excel spreadsheets which demonstrated some of the most common analyses carried out in fisheries biology. A few minutes were spent installing the “Data Analysis Tool Pack” and “Solver” in Excel, as some functions included in those add-ins were needed for the class. A worksheet with the exercises was distributed to the participants. The objectives of the class were to gain an appreciation of:

- Length-Length relationships by using the “Data-Analysis” in Excel to calculate the linear regression parameters, followed by the interpretation of the results and the creation of a graphic,
- Length-Weight relationships by creating a graphic and adding a power trend-line,

- Clasper length-total length relationships by using the “Data-Analysis” in Excel to compare left and right side claspers with a student t-test statistic, followed by the calculation of the mean clasper length and the creation of a graphic,
- Von Bertalanffy Growth Equation by using the “Solver” function in Excel to estimate the Von Bertalanffy Growth parameters (L_{inf} , k and T_0) with the least squares technique, and,
- Maturity Ogive by calculating the proportion of mature individuals in each length class and estimate the L_{50} (size at maturity) with the “Solver” function in Excel.

Due to time constraints, only the 1st and 2nd exercises were carried out in full during this session. At the end of the exercises, a new worksheet with the results was distributed to all participants so that they could use it in the future for their own analysis, with their own data sets. A few participants showed interest to see the execution of the other exercises, particularly those involving the “Solver” , so during the coffee break a special and more personal mini-session was carried out with a few participants showing them how to analyze this type of data.

After the morning coffee break, G. Burgess gave a lecture on the Conservation of Elasmobranchs. This lecture served as the final lecture explaining why all this work that we showed during the week is so important and urgent (Figure 10).



Figure 10: George Burgess lecture on the conservation of elasmobranchs.

After lunch, E. Cortés presented a theoretical lecture on the Productivity – Susceptibility Analysis (PSA, also known by Ecological Risk Assessment - ERA). The PSA is particularly suited for cases where there are still not enough data to complete a full species assessment, and it is therefore entirely appropriate for the West Africa region. This kind of approach provides a first step to assess the vulnerability of species being caught by a fishery in a region, and it is dependent of the species productivity and susceptibility to fishing pressure. At the end of the day, the participants agreed on a list of sharks and batoids that are currently being captured by the artisanal gillnet fisheries in the region and that should be evaluated with this analysis.

Friday, 11 December 2009

The last day of the workshop was dedicated to populate the Excel spreadsheet to carry out the PSA analysis for elasmobranch species being caught in the region by artisanal gillnet fisheries. This spreadsheet is divided into two components:

- 1) Productivity values for each species
- 2) Susceptibility values for each species

Given the lack of time and the fact that the participants' knowledge is particularly valuable in terms of what is being caught by the fisheries, it was decided that only the "susceptibility" component would be completed and that the professors (Coelho, Burgess and Cortés) would later complete the "Productivity" component in their own institutes by consulting published references and by contacting Mr. Diop and/or the participants directly by e-mail.

The students' participation in this analysis was very enthusiastic and we had enough time to cover all shark and batoid species that are being affected by the artisanal gill net fisheries in the CSRP Region. We hope to complete the "productivity" component during the next few months and we hope to produce, for the first time, a ranked list of the most vulnerable elasmobranch species that occur in these fisheries in the region. This will be particularly useful because the ranked list can be interpreted as a priority list, with the top-ranked species being the ones that should be the focus of priority conservation and management efforts.

The workshop ended at 13:00 and a small ending ceremony was carried out, with Mr. Omar Thiaw returning to distribute participation certificates to all students. Each participant was also given a CD-ROM with copies of all presentations and exercises that were carried out during the week. Further, a large number of scientific papers, field guides and some fisheries books in pdf format were also included in the CD-ROM.

Our final thoughts are that we believe that this was a very positive workshop and that the beginning of a PSA Analysis for sharks being caught by artisanal fisheries in the region was an excellent addition to what has been done in previous years. We hope to have, in a few months, an important output with a ranked list of the species that should be prioritized in terms of conservation and management in the region.

RUI COELHO (FLMNH), GEORGE H. BURGESS (FLMNH) & ENRIC CORTÉS (NMFS)

14 DECEMBER 2009