PHILIPPINE SCIENCE HIGH SCHOOL WESTERN VISAYAS
Doña Lawaan H. Lopez Campus
Iloilo City

TAXONOMIC CLASSIFICATION OF FISHES FOUND IN FRIDAY'S ROCK DIVE SITE AT BORACAY ISLAND

A Research Paper Presented to the
Faculty of Philippine Science High School Western Visayas
Iloilo City

In Partial Fulfillment
Of the Requirements in
Science Research II

By
De la Torre, Cherry Ann I.
Padalhin, Pauline P.
Templonuevo, Xyza Jane S.

February 2004

PHILIPPINE SCIENCE HIGH SCHOOL WESTERN VISAYAS
Doña Lawaan H. Lopez Campus
Iloilo City

TAXONOMIC CLASSIFICATION OF FISHES FOUND IN FRIDAY'S ROCK DIVE SITE AT BORACAY ISLAND

APPROVAL SHEET

A Research Paper Requirement

For Science Research II

By

De la Torre, Cherry Ann I.

Padalhin, Pauline P.

Templonuevo, Xyza Jane S.

Approved by the Research Committee

MARVIN L. CADORNIGARA, Research Committee Chair

MARIA CARMELA PAULA BLACER, Member

ROWENA LABRADOR, Member

MYRNA LIBUTAQUE, Member

February 2004

PHILIPPINE SCIENCE HIGH SCHOOL WESTERN VISAYAS
Doña Lawaan H. Lopez Campus
Iloilo City

ACKNOWLEDGMENT

We, the researchers, would like to extend our deepest gratitude to the following for their invaluable contribution to this study:

Sir Marvin Cadornigara, our beloved research adviser, for his help and guidance starting from the writing of our research proposal up to the writing of the final research paper;

The staff of ASU Fisheries for lending us their time and equipments;

Mr. Rinse Remetio and Mrs. Kuhlman for teaching and helping us in identifying the fish species. Thank you for the knowledge you have imparted to us. We could not have finished this study without you;

Mr. Ariel De la Torre, Mr. Ruffil Mission, and Mr. Gilbert Visca, for bringing us into the dive site, hundreds of meters away from the shore and for catching the fish samples for us. Thank you for sharing your expertise with us;

Mr. Fred Delos Reyes of Aqualife Divers Academy for briefing us about the dive sites that surround Boracay Island.

The parents of the researchers, especially to Mrs. Evelyn dela Torre, for the moral, emotional and financial support for the whole duration of the research;

PHILIPPINE SCIENCE HIGH SCHOOL WESTERN VISAYAS
Doña Lawaan H. Lopez Campus
Iloilo City

Those who may not have been acknowledged but have also contributed equally to this undertaking, directly or indirectly;

Most of all, God, for His unceasing love, support, guidance and protection. Without You, this study would never have been completed.

We thank you all for your generosity and kindness.

We thank you all for believing in us.

CHERRY ANN I. DE LA TORRE
PAULINE J. PADALHIN
XYZA JANE S. TEMPLONUEVO
Researchers

February 2004

PHILIPPINE SCIENCE HIGH SCHOOL WESTERN VISAYAS
Doña Lawaan H. Lopez Campus
Iloilo City

De la Torre, Cherry Ann I.; Padalhin, Pauline J.; and Templonuevo, Xyza Jane S. "Taxonomic Classification of Fishes Found in Friday's Rock Dive Site at Boracay Island". Unpublished Research Paper. Philippine Science High School Western Visayas, Iloilo City, February 2004.

Abstract

This descriptive study surveyed the taxonomy of the fishes in Friday's Rock dive site located at Station 1 of Boracay Island. There was one transect identified and then divided into three quadrats. Samples of the fishes in each quadrat were taken and identified. The researchers tested for the parameter values of the water in the area in terms of temperature, salinity, and pH level.

Fish orders Perciformes and Tetraodontiformes were found in Friday's Rock, Boracay Island, Malay, Aklan.

For order Perciformes, genera Amphiprion, Cheilinus, Halichoeres, Scolopsis, Dascyllus, Lethrinus, Abudefduf, Thalassoma, Bodianus, Chromis, Pomacentrus, Cirrhilabrus, Scarus, and Pterocaesio were represented.

For genus Amphiprion, the species Clarkii was represented.

For genus Halichoeres, the species Hortulanus and Zeylonicus were represented.

For genus Scolopsis, the species Affinis was represented.

For genus Dascyllus, the species Trimaculatus and Marginatus were represented.

For genus Lethrinus, the species Rubrioperculatus was represented.

For genus Abudefduf, the species Vaigensis was identified.

For genus Thalassoma, the species Lunare was identified.

For genus Bodianus, the species Mesothorax was identified.

For genus Chromis, the species Atripes was identified.

For genus Pomacentrus, the species Brachialis was identified.

For genus Cirrhilabrus, the species Cyanopleura was identified.

For genus Scarus, the species Prasiognathus was identified.

For genus Pterocaesio, the species Chrysozona was identified.

For order Tetraodontiformes, genera Balistapus and Sufflamen were represented.

For genus Balistapus, the species Undulatus was identified.

For genus Sufflamen, the species Bursa was identified.

The water in the study site showed a mean temperature value of 26.38 °C, a mean salinity value of 35.22 ppt, and a mean pH value of 7.32 during the time the study was conducted.

Table of Contents

LIST OF TABLES

LIST OF PLATES

LIST OF IMAGES

APPENDICES

PHILIPPINE SCIENCE HIGH SCHOOL WESTERN VISAYAS
Doña Lawaan H. Lopez Campus
Iloilo City

TAXONOMIC CLASSIFICATION OF FISHES FOUND IN FRIDAY'S ROCK DIVE SITE AT BORACAY ISLAND

Chapter 1

Introduction to the Study

Background to the Study

Boracay Island is a thousand-hectare island found at the northern tip of Panay, specifically in the province of Aklan. It is seven kilometers long and a kilometer wide at its narrowest point. It is composed of three communities: Yapak at north, Balabag at the middle, and Manoc-Manoc at south (Boracay.Com, 2001).

Considered as one of the major attractions of the Philippines, this tropical island prides itself with more than thirty beaches, all of which are laid with powdered white sand and clear blue waters that give us a glimpse of the rich underwater scene. The most sought of these beaches, however, is the four-kilometer stretch of pure white sand called the White Beach which is also considered one of the world's best beaches (Islands Philippines, 2003).

Aside from the breathtaking streaks of colors seen during a sunset at Boracay, it also offers other ways to enjoy nature at its best such as island-hopping, snorkeling, windsurfing, sailing and scuba diving (www.boracayisland.org, 2002).

For the latter, Boracay has a good variety of dive sites because it offers more than twenty-four diving sites suited for beginners or experienced divers. Three most prominent dive sites in the island are Yapak which is also known as "The Wall", Punta Bunga, Crocodile Island, and Friday's Rock (Boracay Foundation , 2002).

As a vital part of a marine ecosystem, especially of the world-famous Boracay Island, the species of the fishes found here should be identified and classified to serve as the most recent references for government projects and analyses, and other future researches; however, this study is only concerned about the species of fishes found in one of the dive sites, Friday's Rock.

Friday's Rock is a dive site named because of a big rock (boulder) rising from the sand at 60ft, with its top at 23ft, found within it (TravelSmart.Net, 2004). The freestanding rock is surrounded by a number of smaller stone

outcrops and reefs. Between these rocks and reefs lies soft sand (Calypso Diving School and Resort brochure).

This dive site is house to lots of fish and soft corals and has a maximum depth of only 60 feet (TravelSmart.Net, 2004), making it one of Boracay's top 5 dive sites (Bose, 2003) and is the only fish-feeding site in Boracay (Valencia, 1996).

The independent variable of this study was the selected dive site while the dependent variables were the species of fish found in the specified as well as the water parameter values in terms of temperature, salinity and pH at the time the study was conducted.

The relationship between these variables is presented in figure 1.

Statement of the Problem and Hypothesis

The study determined the taxonomic identification of fishes in Friday's Rock dive site, Boracay, Malay, Aklan.

Specifically, it aimed to answer the following questions:

INDEPENDENT VARIABLE

DEPENDENT VARIABLES

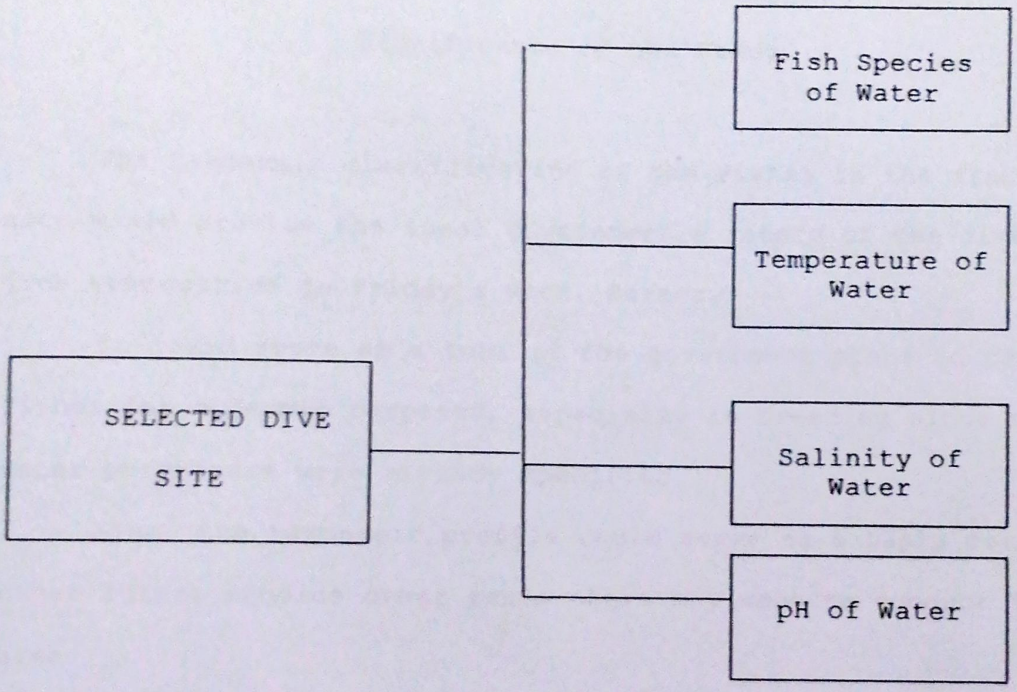

Figure 1. Fish species, temperature, salinity and pH in the Friday's Rock diving site at Boracay Island.

1. What is the taxonomic classification of fishes found in Friday's Rock, Boracay Island in terms of (a) order, (b) genus, and (c) species?

2. What are the (a) temperature, (b) salinity, and (c) pH of the water in Friday's Rock at the time the study was conducted?

Significance of the Study

The taxonomic classification of the fishes in the study site would provide the local government a record of the diverse fish communities in Friday's Rock, Boracay.

It could serve as a tool if the government plans to use the fishes for economic purposes, especially in breeding since the water parameters were already specified.

Also, the taxonomic profile could serve as a basis for other future studies other researchers may want to conduct in the area.

Definition of Terms

The following terms in this study were given their respective conceptual and operational meanings.

Classification - the arrangement of organisms into groups based on mutual similarity or evolutionary relatedness (Hyperdictionary, 2003).

In this study, "classification" referred to the arrangement of fish samples taken from the study site into groups based on mutual similarity or evolutionary relatedness.

Dive Site - the physical location of a diver during a dive (University of Mississippi, 2001).

In this study, "dive site" referred to Friday's Rock dive site, Boracay, Malay, Aklan.

Power of Hydrogen (pH) - is a measure of acidity of an aqueous solution (The Encyclopedia Americana International Edition, 1994).

In this study, "pH" referred to one of the parameters of water characteristics measured using the pH meter.

Quadrat - is a rectangular sampling unit (Hyperdictionary, 2003).

In this study, "quadrat" referred to the rectangular area in Friday's Rock, Boracay used as sampling units.

Salinity - is the concentration of salt dissolved in water (Florida Oceanographic Society , 2003).

In this study, "salinity" referred to one of the parameters of water characteristics measured using a refractometer.

Taxonomy - is the collection of theories and techniques of naming, describing, and classifying organisms. The taxonomic hierarchy is, from the top to bottom; kingdom, phylum (for animals) or division (for plants and fungi), class, order, family, genus and species (Hyperdictionary, 2003).

In this study, "taxonomy" referred to the naming of fish samples taken from the study site according to order, genus and species.

Temperature - is a quantitative value of the degree or intensity of heat (The Encyclopedia Americana International Edition, 1994).

In this study, "temperature" referred to one of the parameters of water characteristics measured using the thermometer.

Scope and Delimitation

This study identified the taxonomic classification of fishes in Friday's Rock dive site in Boracay Island. The water characteristics in terms of temperature, salinity and pH were also determined.

This study did not attempt to measure the relative frequency of the species since the researchers were only concerned in identifying the species of fishes in the study site.

Only fishes that had relatively greater mass were identified since fish lines were used.

This study was conducted at Friday's Rock, Boracay Island. The measurement of water parameters such as salinity and the identification of the fish species were done at the Aklan State University Fisheries (ASU) laboratories.

Chapter 2

Review of Related Literature

This chapter consists of 3 topics, namely, (1) Taxonomic Classification, (2) Water Characteristics and (3) the results of a related study entitled "Taxonomy of Corals at Bulabog, Malay, Aklan" by Lachica, Pan and Rebuelta.

Taxonomic Classification

Classification in biology is the systematic categorization of organisms into a coherent scheme to organize the vast number of known plants and animals into categories that could be named, remembered, and discussed.

Modern classification also attempts to show the evolutionary relationships among organisms which is part of the broader science of taxonomy, the study of the relationships of organisms, which includes collection, preservation, and study of specimens, and analysis of data provided by various areas of biological research.

Nomenclature is the assigning of names to organisms and to the categories in which they are classified.

The present system of binomial nomenclature identifies each species by a scientific name of two words, Latin in form and usually derived from Greek or Latin roots. The first name (capitalized) is the genus of the organism; the second (not capitalized) is its species.

The advantages of scientific over common names are that they are accepted by speakers of all languages, that each name applies only to one species, and that each species has only one name. These avoid the confusion that often arises from the use of a common name to designate different things in different places or from the existence of several common names for a single species (Encyclopedia.Com, 2002).

Water Characteristics

The pH, (water) temperature and salinity are the water characteristics identified in the study.

Many biological, physical, and chemical parameters are dependent on temperature for they can greatly affect the rates of biological and chemical reactions, the solubility of chemical compounds in water, the distribution and abundance of organisms, the rate growth of biological organisms, the amount of dissolved oxygen, and the water density. (Florida Oceanographic Society, 2003)

High water temperatures (more than 35°C) can be harmful to aquatic life (Lower Cape Fear River Program, 2003).

Salinity is the concentration of salt dissolved in water, usually expressed in parts per thousand (ppt) or the grams of salt per 1000 grams of water sample.

Seawater has an average salinity of 35‰. Changes in salinity can affect the well-being and distribution of biological populations (Florida Oceanographic Society, 2003).

The pH of water affects the solubility of minerals in water that affects the organisms' nutrition.

The buffering capacity of water, its ability to resist changes in pH, is critical to aquatic life. Aquatic organisms' survival greatly diminishes as pH falls below 5 or increase above 9.

A pH value less than 7 indicates the water is acidic. A pH greater than 7 means the water has excess alkali (base) dissolved in it (Florida Oceanographic Society, 2003).

Related Study

The taxonomic classification of corals found in Bulabog, Boracay, Malay, Aklan was identified by Lachica, Pan and Rebuelta in their study entitled "Taxonomy of Corals at Bulabog, Boracay Island". Their results were as follows:

There were two representative coral suborders found in the study site namely, Astrocoeniida and Fungiida. Representatives from families Acroporidae, Pocilloporidae, and Fungiida were identified.

Under family Acroporidae, genera Acropora and Montipora were represented.

Under family Pollicoporidae, genera Seriatophora, Stylophora and Pocillopora were represented.

Under Family Fungiida, genera Herpolitha and Fungia were represented.

Summary

In biology, the proper identification of a species belonging to a larger division of organisms, in this case---fish, was made by categorizing and naming organisms in a standardized and hierarchical manner through classification and taxonomy. The water parameters such as temperature, pH, and salinity determine what species of fish thrive in a certain type of water environment.

A research study conducted by Lachica, Pan and Rebuelta identified the coral specimens found in Bulabog also in Boracay, Malay, Aklan.

Chapter 4

Results

This study aimed to determine the (a) species of fishes found in Friday's Rock, Boracay, Malay, Aklan in terms of order, genus, and species. Furthermore, the water parameter values in the study sites in terms of (b) temperature, (c) salinity, and (d) pH were determined.

Taxonomy of fishes found in Friday's Rock, Boracay Island, Malay, Aklan

The fishes in the study site were classified according to their order, genus, and species, respectively. There were two orders found in the study site, namely: (1) Perciformes and (2) Tetraodontiformes.

Under order Perciformes, there were 14 genera identified, namely: Abudefduf, Amphiprion, Bodianus, Cheilinus, Chromis, Cirrhilabrus, Dascyllus, Halichoeres, Lethrinus, Pomacentrus, Pterocaesio, Scarus, Scolopsis, and Thalassoma. Under genus Abudefduf, the species Vaigensis was identified. Under genus Amphiprion, the species Clarkii was identified. Under genus Bodianus, the species Mesothorax was identified. Under genus Cheilinus, the species Chlorurus was identified. Under genus Chromis, the species Atripes was identified. Under genus

The (water) temperature values were taken favorably at the same time as the collection of the samples since a longer period might affect or alter the values.

The values for the rest of the parameters mentioned were determined using water samples taken from the dive site. They were preserved and then tested in designated laboratories.

Materials and Equipment

The materials used in this study were three fish lines, a field thermometer, a pH meter, a refractometer, a graduated cylinder, 10% formalin solution, Biochemical Oxygen Demand (BOD) bottles, glass bottles, and a cooler.

General Procedures

This study involved the following phases:

Selection of Sampling Areas

The whole dive site was considered as one transect. The transect was further divided into three quadrats. The quadrats were 700 meters, 800 meters and 900 meters, respectively, from the shore. These distances were determined by using buoys

already set in the said dive site. The quadrats served as the study sites in gathering the fish species and in measuring the parameter values.

Collection of Fish and Water Samples

A boat was used to reach the specific sampling areas. The fish samples for a specific study site were collected through the use of three fish lines. For each quadrat, the fish samples were collected for 3 consecutive days from 4:15 PM until 5:45 PM of the same day.

Three water samples was taken from each quadrat for each of the 3 consecutive days of fish sample collection, using the BOD bottles. These were preserved at a low temperature in a cooler until the values for the parameters were obtained.

Testing of Water Parameters

The water parameters in terms of temperature, salinity and pH were measured.

The (water) temperature during the whole time interval was determined using a field thermometer by recording the temperature at the start of the collection and every 45 minutes, thereafter and then taking the mean.

These water samples were brought to a laboratory to measure the salinity, and pH of water found in each quadrat.

Identification of Fish Species

The order, genus, and species of the fish samples were determined based on books on taxonomy. These were identified and/or verified by the researchers and some researchers and faculty members from the ASU Fisheries.

Cirrhilabrus, the species Cyanopleura was identified. Under genus Dascyllus, the species Trimasulatus and Marginatus were identified. Under genus Halichoeres, the species Hortulanus and Zeylonicus were identified. Under genus Lethrinus, the species Rubrioperculatus was identified. Under genus Pomacentrus, the species Brachialis was identified. Under genus Pterocaesio, the species Chrysozona was identified. Under genus Scarus, the species Prasiognathus was identified. Under genus Scolopsis, the species Affinis was identified. Under genus Thalassoma, the species Lunare was identified.

Under order Tetraodontiformes, there were 2 genera identified, namely: Balistapus and Sufflamen. Under genus Balistapus, the species Undulatus was identified. Under genus Sufflamen, the species Bursa was identified.

Table 1 shows the data.

Table 2 shows the data per quadrat.

Temperature of water in Friday's Rock, Boracay Island, Malay, Aklan during the time the study was conducted

The water in the study site showed a mean temperature value of 26.38 °C.

Table 3 shows the data.

Salinity of water in Friday's Rock, Boracay Island, Malay, Aklan during the time the study was conducted

The water in the study site showed a mean salinity value of 35.22 ppt.

Table 3 shows the data.

pH of water in Friday's Rock, Boracay Island, Malay, Aklan during the time the study was conducted

The water in the study site showed a mean pH value of 7.32.

Table 3 shows the data.

Table 1: Taxonomy of Fishes in Friday's Rock, Boracay Island, Malay, Aklan

Order	Genus	Species
Tetraodontiformes	Balistapus	Undulatus
	Sufflamen	Bursa
Perciformes	Abudefduf	Vaigensis
	Amphiprion	Clarkii
	Bodianus	Mesothorax
	Cheilinus	Chlorurus
	Chromis	Atripes
	Cirrhilabrus	Cyanopleura
	Dascyllus	Marginatus
		Trimasulatus
	Halichoeres	Hortulanus
		Zeylonicus
	Lethrinus	Rubrioperculatus
	Pomacentrus	Brachialis
	Pterocaesio	Chrysozona
	Scarus	Prasiognathus
	Scolopsis	---unidentified---
		Affinis
	Thalassoma	Lunare

Table 2: Taxonomy of Fishes per Quadrat in Friday's Rock, Boracay Island, Malay, Aklan

Quadrat Number	Order	Genus	Species
1	Tetraodontiformes	Sufflamen	Bursa
	Tetraodontiformes	Balistapus	Undulatus
	Perciformes	Cheilinus	Chlorurus
	Perciformes	Amphiprion	Clarkii
	Perciformes	Halichoeres	Hortulanus
	Perciformes	Scolopsis	--unidentified--
	Perciformes	Dascyllus	Trimaculatus
2	Perciformes	Lethrinus	Rubrioperculatus
	Perciformes	Scolopsis	Affinis
	Tetraodontiformes	Balistapus	Undulatus
3	Perciformes	Abudefduf	Vaigiensis
	Perciformes	Thalassoma	Lunare
	Perciformes	Bodianus	Mesothorax
	Perciformes	Chromis	Atripes
	Perciformes	Pomacentrus	Brachialis
	Perciformes	Cirrhilabrus	Cyanopleura
	Tetraodontiformes	Balistapus	Undulatus
	Perciformes	Dascyllus	Marginatus
	Perciformes	Scolopsis	Affinis
	Perciformes	Halichoeres	Zeylonicus
	Perciformes	Scarus	Prasiognathus
	Perciformes	Pterocaesio	Chrysozona

Table 3: Water Parameter Values in the Study Site During the Time the Study was Conducted

Study Site	Temperature	Salinity	pH
Friday's Rock, Boracay Island, Malay,	26.38 °C	35.22 ppt	7.32

Chapter 5

Summary, Conclusion and Recommendation

The study determined the taxonomic identification of fishes in Friday's Rock dive site, Boracay, Malay, Aklan.

Specifically, it aimed to answer the following questions:

1. What is the taxonomic classification of fishes found in Friday's Rock, Boracay Island in terms of (a) order, (b) genus, and (c) species?

2. What are the (a) temperature, (b) salinity, and (c) pH of the water in Friday's Rock at the time the study was conducted?

Summary and Conclusion

Fish orders Perciformes and Tetraodontiformes were found in Friday's Rock, Boracay Island, Malay, Aklan.

For order Perciformes, genera Amphiprion, Cheilinus, Halichoeres, Scolopsis, Dascyllus, Lethrinus, Abudefduf, Thalassoma, Bodianus, Chromis, Pomacentrus, Cirrhilabrus, Scarus, and Pterocaesio were represented.

For genus Amphiprion, the species Clarkii was represented.

For genus Halichoeres, the species Hortulanus and Zeylonicus were represented.

For genus Scolopsis, the species Affinis was represented.

For genus Dascyllus, the species Trimasulatus and Marginatus were represented.

For genus Lethrinus, the species Rubrioperculatus was represented.

For genus Abudefduf, the species Vaigensis was identified.

For genus Thalassoma, the species Lunare was identified.

For genus Bodianus, the species Mesothorax was identified.

For genus Chromis, the species Atripes was identified.

For genus Pomacentrus, the species Brachialis was identified.

For genus Cirrhilabrus, the species Cyanopleura was identified.

For genus Scarus, the species Prasiognathus was identified.

For genus Pterocaesio, the species Chrysozona was identified.

For order Tetraodontiformes, genera Balistapus and Sufflamen were represented.

For genus Balistapus, the species Undulatus was identified.

For genus Sufflamen, the species Bursa was identified.

The water in the study site showed a mean temperature value of 26.38 °C, a mean salinity value of 35.22 ppt, and a mean pH value of 7.32 during the time the study was conducted.

Recommendation

The researchers recommend that the results be used in determining the tolerable temperature, salinity and pH as water parameters for breeding the fish species.

The researchers as well recommend that fish species already considered as endangered be identified for government protection and reproduction.

The researchers also recommend that researchers who tend to conduct further studies on the taxonomic classification of fishes in the said dive site should design a method of sampling in which relatively small fishes can be obtained as such was one of the delimitations of this study.

The researchers furthermore recommend a study on the taxonomic classification of fishes of the rest of the dive sites of Boracay Island to have a general record of the fish species thriving in the island.

The researchers also recommend that another study would be conducted in another different season to distinguish which fish species just migrated in the study site and which species are common to the study site.

The researchers also recommend to include in the study the frequency count and the diversity and also identify which of then species are already endangered.

REFERENCES

Australian Museum Online. (2003). Available: www.amonline.net.au

Boracay Foundation. (2002). Boracayisland.Org. Available: www.boracayisland.org.

Boracay.Com. (2001). Available: www.boracay.com.

Bose, Lilledeshan. (2003). Location - Boracay: Better Than Blue. Available: www.asiandiver.com.

Calypso Diving School and Resort brochure.

Encyclopedia.Com. (2002). Available: www.Encyclopedia.com.

FishIndex.Com. (2003). Available: www.fishindex.com.

Florida Oceanographic Society. (2003). Common Water Quality Tests and Why They Are Important. Available: www.floridaoceanographic.org.

Hyperdictionary. (2003). Webnox, Corp. Available: www.hyperdictionary.com.

Islands Philippines. (2003). Boracay Island, Aklan Province. Available: www.aklan.islandsphilippines.com.

Lower Cape Fear River Program. (2003). Water Quality Sampling Parameters. Available: www.uncwil.edu.

Reader's Digest Universal Dictionary. (1987). Great Britain: Houghton Miffin Company, and the Reader's Digest Association.

The Encyclopedia Americana International Edition. (1994). Dansbury, Conneticut: Grolier, Incorporated.

TravelSmart.Net. (2004). Diving in the Philippines. Available: www.travelsmart.net.

University of Mississippi. (2001). APPENDIX 7: DEFINITION OF TERMS. Available: www.olemiss.edu.

Valencia, Lynda B. (1996). Environmental News. Available: www.cyberway.com.

Webster Comprehensive International Dictionary of English Language: Deluxe Edition. (1995). USA: Merriam-Webster, Incorporated.

APPENDIX A

Plate 1. Gathering of fish samples

Plate 2. Testing for pH using a portable pH meter

Plate 3. Testing for salinity using a hand refractometer

Plate 4. The researchers with the boatmen/fishermen

PHILIPPINE SCIENCE HIGHSCHOOL WESTERN VISAYAS
Doña Lawaan H. Lopez Campus
Iloilo City

APPENDIX B

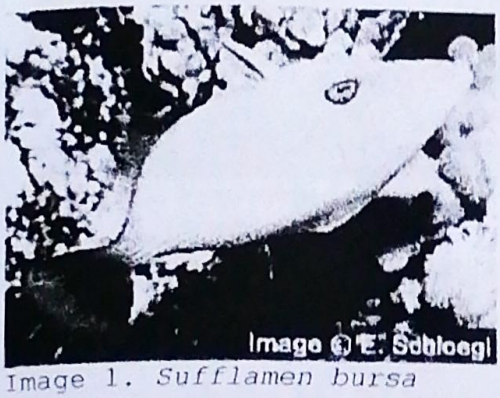

Image 1. *Sufflamen bursa*

Image 2. *Balistapus undulatus*

Image 3. *Amphiprion clarkii*

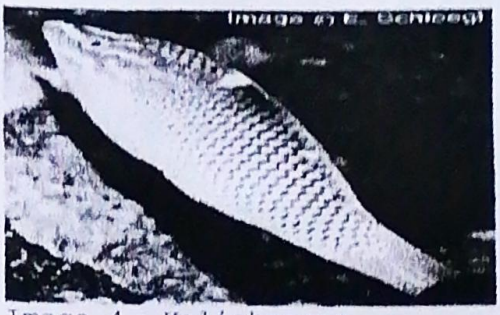

Image 4. *Halichoeres hortulanus*

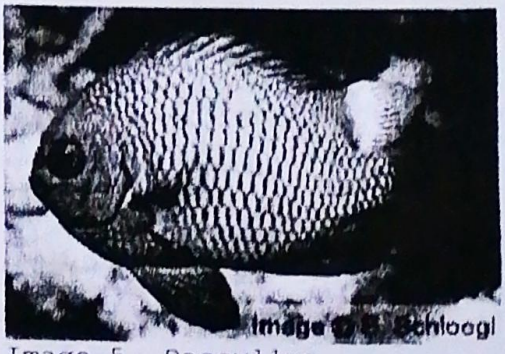

Image 5. *Dascyllus trimaculatus*

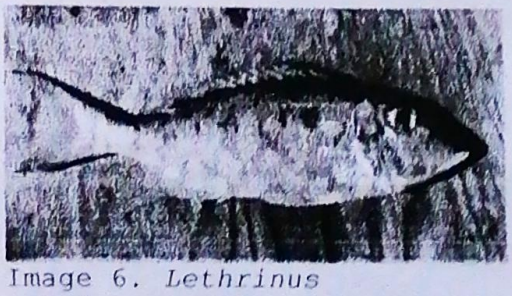

Image 6. *Lethrinus rubrioperculatus*

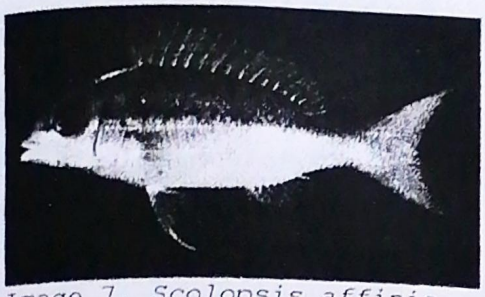

Image 7. *Scolopsis affinis*

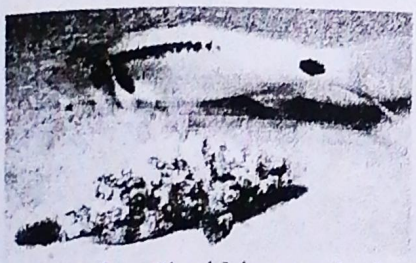

Image 8. *Cheilinus cholorurus*

Image 9. *Abudefduf vaigiensis*

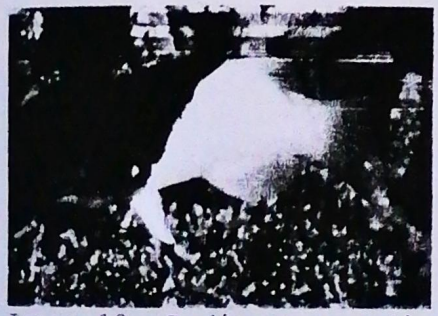

Image 10. *Bodianus mesothorax*

Image 11. *Thalassoma lunare*

Image 12. *Chromis atripes*

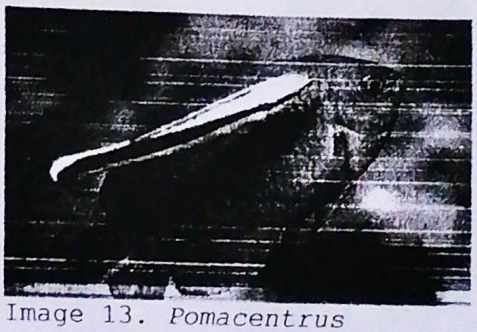

Image 13. *Pomacentrus brachialis*

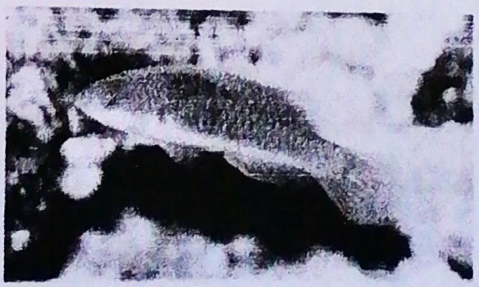

Image 14. *Cirrhilabrus cyanopleura*

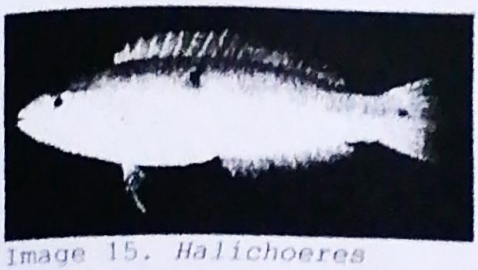

Image 15. *Halichoeres zeylonicus*

Image 16. *Dascyllus marginatus*

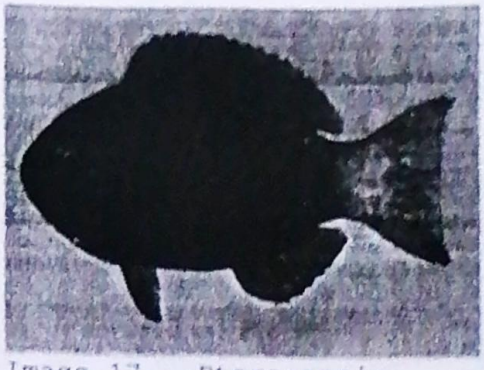

Image 17. *Pterocaesio chrysozona*

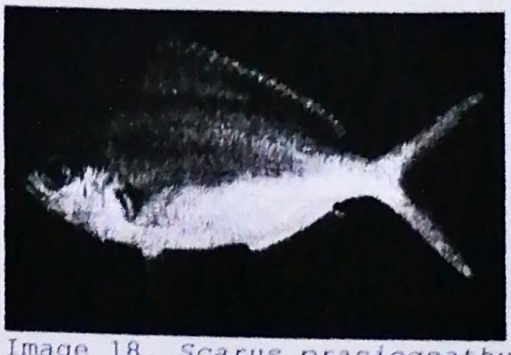

Image 18. *Scarus prasiognathus*