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FLANDERS MARINE INSTITUTE
Oostende - Belgium

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KENYAN-BELGIAN PROJECT IN MARINE SCIENCES

FIRST QUARTERLY REPORT

January - March 1987

ACKNOWLEDGEMENTS

We would like to thank in the first place the Kenyan and Belgian Governments for giving us the opportunity to continue this Kenyan-Belgian Project in Marine Sciences at the Kenya Marine & Fisheries Research Institute (KMFI) in Mombasa, financed by the Belgian Government.

KENYAN-BELGIAN PROJECT IN MARINE SCIENCES

We are also grateful to the Authorities of KMFI who provided us with the necessary room and basic infrastructure to go on with the research project. The work itself is realised thanks to the collaboration with the Belgian experts during their stay in Mombasa, and the technicians of KMFI. All of them are very enthusiastic and conscientious about their work.

FIRST QUARTERLY REPORT

INTRODUCTION

The scientific programs, discussed with the Belgian experts during the two first years of the project are successfully running now. In general terms the research work in the different fields is carried on as last year. Some new programs fitting in the framework of the project, have been started recently.

In order to develop the present project into a Regional Project of Marine Sciences, Prof. Polk - Director of the KBF - established contacts with Universities and International Organizations (UNESCO, UNEP, IUCN, EEC...). Prof. Polk has been appointed expert by UNEP to undertake a mission to visit the Institutes, Universities and Ministries of the East African

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We are also grateful to the Authorities of KMFRI who provided us with the necessary room and basic infrastructure to go on with the research program. However, the research work itself is realised thanks to the Kenyan scientists, in collaboration with the Belgian experts during their stay in Mombasa, and the technicians of KMFRI. All of them are very enthusiastic and conscientious about their work.

1. WORKPLANNING

Concerning the sampling schedules which are included here, the following samplings could not be done:

INTRODUCTION

The scientific programs, discussed with the Belgian experts during the two first years of the project are successfully running now. In general terms the research work in the different fields is carried on as last year. Some new programs fitting in the framework of the project, have been started recently.

In order to develop the present project into a Regional Project of Marine Sciences, Prof. Polk - Director of the KBP - established contacts with Universities and International Organisations (UNESCO, UNEP, IUCN, EEC..). Prof. Polk has been appointed expert by UNEP to undertake a mission to visit the Institutes, Universities and Ministries of the East African

countries and the West Indian Ocean Islands, to discuss the possibilities for an interdisciplinary collaboration on a regional basis. Besides this mission, Mr. Onyango and Mr. Pissierssens of the Computer Section - KMFRI, were asked by UNESCO to elaborate the possibilities of a computer network for a Documentation and Scientific Data Base for the East African Region.

For the organisation of the scientific work a seminar is organised at the end of each month to discuss the sampling schedule for the next month. As there is only one 4-wheel drive Landrover, lent to us by the Cooperation Section - Belgian Embassy Nairobi, and two canoes with outboard engines for a team of about 15 research officers working on different research fields, a co-ordinated planning for transport is needed so that each research topic sampling can be done.

However, the most important hamper for the continuity of the research work is still transport, besides the fact that delivery of equipment ordered from Belgium takes a long time.

During the monthly meetings, the progress of the research work of the different topics is discussed as well as any problem concerning the sampling and research.

* Moi-University - March 24 -25

* International Ocean Institute - March 27-April 2

1. WORKPLANNING

Concerning the sampling schedules which are included here, the following samplings could not be done :

- January 14th upto 20th : canoe outboard engines were not working
- March 18th upto the end of March : Maumba boat and one canoe outboard engine out of order.

A trip to Malindi for 2 to 3 days is planned for the teams of Oceanography and Artemia together. However, this trip had to be cancelled for March as the financial administration of the Institute, for the researchers and technicians could not be settled.

For the oyster pilot culture in Gazi Creek research work is going on concerning :

- settlement of oyster spat
- growth of oyster spat
- study on the competition for space between oysters and other bivalves settled on the different materials used for spat catchment
- abundance of plankton in the Creek water and primary

2. VISITS TO THE PROJECT

2.1. Visiting Experts

- * Dr. Daro, N. Free University of Brussels - Plankton
January 19 - February 23, 1987
- * Dr. Keppens Free University of Brussels - Geology
February 3 - February 7
- * Dr. Somers State University of Ghent - Law of the Sea
February 24 - February 28

2.2. Visit to the Kenya Marine & Fisheries Research Institute and the Kenyan-Belgian Project

- * Moi-University - March 24 -25
- * International Ocean Institute - March 27-April 2
- * Dr. Denny P. - Director Centre for Research in Aquatic Biology
March 24 - 25
- * Mr. Phillips J. - FAO Representative in Kenya - University of London - March 28

3. ONGOING RESEARCH WORK

3.1. Oyster Culture

For the oyster pilot culture in Gazi Creek research work is going on concerning :

- settlement of oyster spat
- growth of oyster spat
- study on the competition for space between oysters and other bivalves settled on the different materials used for spat catchment
- abundance of plankton in the Creek water and, primary

productivity studies

- biochemical and nutritive aspects of oysters

Research Officers : R.K. Ruwa, L. Abubaker, M. De Souza.

Besides the scientific work, the following has been done :

- maintenance of the oyster strings
- cleaning of the hanged oysters to scratch the fouling organisms off
- building of new racks and replacement of the collapsed racks

Responsible : Mr. M. Ngoa for the overall organisation.

In the Institute laboratory tests to culture oysters are done to study the different larval stages upto settlement.

3.2. Plankton Research

* Phytoplankton

Study of primary productivity, chlorophylls, seston and nutrients is done every two weeks as well in Tudor Creek (English Point) as in Gazi Creek.

Besides these samplings, three stations in Tudor Creek were selected at beginning, middle and mouth of the Creek to compare the primary productivity at low and high tide and during different seasons.

R.O. De Souza Marina

* Zooplankton

Weakly sampling in Tudor is going on at English Point at low and high tide to study the composition and abundance of near-surface zooplankton.

Sampling at 5 different stations along Tudor Creek at spring and neap tide are done to study abundance and distribution of the different species in a specific area and season. Samplings with Niskin-bottles have been tested with the Maumba-boat to study the vertical distribution of plankton, fish eggs and larvae.

In the laboratory cultures of copepods are tried out to study larval stages of different species.

R.O. Mr. Okemwa Ezekiel

* Chemical Composition

Chemical analysis of water samples from Tudor Creek at low and high tide are done twice a month on different sampling stations. Besides dissolved oxygen, salinity, pH and temperature, the following nutrients are studied: ammonia, nitrate, nitrite, phosphate, silicium and POC.

The distribution of nutrients, salinity and oxygen in bottom sediments is followed as well.

One monthly sampling is carried out also in Port Reitz and Kilindini estuary.

R.O. Mr. Kazungu Johnson

The study on major Penaeidae shrimps in Tudor Creek is carried on. Similar chemical analysis are carried out on seawater and sediment samples from Gazi, Bamburi and Malindi (Ngomeni, Sabaki River).

R.O. Mr. Juma Booker

* 24h-cycles in Tudor Creek

24h-cycles are carried out at spring and neep tide on station 1 (mouth of Tudor Creek) and station 5 (beginning of the creek).

During these 24h-cycles, sampling is done every 2 hours for zoo- and phytoplankton, fish eggs and -larvae, chemical composition, chlorophylls, temperature and turbidity measurements. Respiration experiments on copepods are done to study their activity, and primary productivity experiments are done as well in both stations.

These data of 24h-cycles during the dry season will be compared with the surveys during the next rainy season in order to study the effects of Monsoon rains on the input of nutrients and organic matter in the Creekwater, and of the change of salinity and temperatures.

R.O. Mr. Okemwa, Ms. De Souza, Mr. Kazungu, Mrs. Kimaro and a team of technicians of the Biology and Chemistry Lab.

The study on Marine Algae is continued at McKenzie Point (near Gazi Beach, Tiwi Beach, Bamburi Beach and Malindi). The algae are identified and their abundance recorded. The algae species with commercial possibilities (e.g. agar, cosmetics), the study of biomass and

3.3 Coral Reef Study

The coral reef study has been focussed on the influence of sea urchins on the coral reef.

An investigation on competition and predation of sea urchins is tested in different ways in several areas at the coast south from

Mombasa. These studies are only part of the coral reef study which will give scientific aspects to prepare a management of the reefs.

R.O. Mrs. Muthiga Nyawira and Mr. Mc Clanahan

3.4 Prawns Research

The study on major Penaeidae shrimps in Tudor Creek is carried on to follow their relative abundance, recruitment, growth rates and reproduction. Sampling is done by trawling or beach seine twice a month at spring tide.

R.O. Mr. Wakwabi

3.5. Mangrove Ecology

Macrofaunal distribution in Mangrove areas is carried out in Gazi and Malindi. Besides the macrofauna, biological and chemical aspects of the sea- and creekwater are studied as well. These studies are carried out to compare mangrove systems which are not influenced by sewage and other human activities (Gazi) with some where this influence is remarkable as in Ngomeni Bay (FAO prawns cultured, by cutting mangroves and building ponds).

R.O. Mr. Ruwa, Mr. Juma Booker, Mr. Kazungu, Ms. De Souza

3.5 Algae Research

Studies on Marine Algae is continued at McKenzie Point (near KMFRI), Kanamai Beach, Tiwi Beach, Bamburi Beach and Malindi. The algae are identified and their abundance recorded. Especially the algae species with commercial possibilities (e.g. extraction of agar agar, cosmetics), the study of biomass and regeneration time is carried out.

R.O. Mrs. Oyieke, Mr. Wamukoya and Mr. Mwaura

3.8 Pollution

Study of concentration levels of residues of chlorinated hydrocarbons and of heavy metals in water and sediment samples are undertaken on different sites along the coast.

Similar investigations are started on cultured and natural organisms as known to take up and may be utilized

3.6 Computer Section and Documentation Centre

The activities of the Computer Section are going on for the administration (salaries, personnel, stores, equipment inventory, accounts..), word-processing (correspondence and reports) and the scientific work (input of scientific data, graphics and statistical analysis). For each field several employees have been trained to use the computer.

A regional documentation centre and data-bank will hopefully be set up for the West-Indian Ocean Region. The development of such a computer network linked to a centralised data base is intended to facilitate the access to scientific publications for all researchers in the Region.

A feasibility study for the development of a computerised network in the East African countries will shortly be done by Mr. H. Onyango and Mr. P. Pissierssens during a mission they will be carrying out for UNESCO.

Besides the ongoing research work in the different fields, some new surveys started since the beginning of the year. The data from these surveys will also be introduced in the scientific data base to make an ecological model, important for management of the East African coast.

3.7 Study of the currents in Tudor Creek

Drift measurements are taken during spring-neap flood and ebb tides. The data show that the area is significantly influenced by tidal currents, long shore current systems and specific eddies. A further objective of this study is to assess the significance of the different currents on the distribution of plankton in the creek.

R.O. Mr. Mutua

WORK PLAN
SAMPLING SCHEDULE FOR JANUARY 1987

3.8 Pollution

Study of concentration levels of residues of chlorinated hydrocarbons and of heavy metals in water and sediment samples are undertaken on different sites along the coast. Similar investigations are started on cultured and natural growing oysters. The tendency of oysters to take up and concentrate contaminants as known for mussels, may be utilized also for indicating marine pollution.

R.O. Mr. Munga

Thanks to contacts with the Government Chemist Laboratory in Mombasa it has been allowed to use their equipment for specific biochemical analysis as this is not available at the Institute.

In the next report the scientific progress reports will be included as well.

Mombasa, April 1987

Dr. E. Martens
Assistant-Director KBP

Prof. Dr. Polk
Director KBP

WORK PLAN
SAMPLING SCHEDULE FOR JANUARY 1987

Day & Date	Low Tide	Area	Res. Officer	Transport	Activities
ri 2/1/87	11.53	SP English Pt.	Okemwa	driver - B11	Plankton
on 5/1/87	13.57	English Pt.	Okemwa	canoe -	Plankton
ue 6/1/87	14.42	Tudor Creek	Kazungu	canoe	Chem. analysis
ed 7/1/87	15.31	Gazi	Ruwa	car	Oyster research
		Gazi	DeSouza	car	Prim. product.
		Tudor Creek	Okemwa	canoe	Plankton 5 st.
on 12/1/87	9.18	English Pt.	Okemwa	canoe -	Plankton
ue 13/1/87	9.53	Kilindini	Kazungu	car	Chem. analysis
ed 14/1/87	10.26	Tudor Creek	DeSouza	Maumba	Prim. prod. 5 st
		English Pt.	DeSouza	canoe	Prim. product.
hu 15/1/87	10.55	Gazi	Ruwa	car	Oyster research
		Tudor Creek	Wakwabi	canoe	Prawns research
		Kanamai	Ruwa/Muthiga	car	Mangr. eco/Coral
ri 16/1/87	11.25	SP Tudor Creek	Okemwa	2 canoes	Plankton 5 st.
		Malindi	Ruwa/Juma	car	Mangr./Artemia
at 17 - Sun 18		Malindi	Ruwa/Juma	car	Mangr./Artemia
on 19/1/87	12.48	English Pt.	Okemwa	2 canoes	Plankton
ue 20/1/87	13.19	Tudor Creek	Kazungu	canoe	Chem. analysis
		Gazi	Ruwa/DeSouza	car	Oyst. res/Pr. proc
ed 21/1/87	13.51	Bamburi	Ruwa	car	Mangrove res.
ri 23/1/87	15.08	Bamburi	Ruwa	car	Mangrove res.
		Tudor Creek	DeSouza	canoe	Prim. prod 3 st.
on 26/1/87	7.42	NP English Pt.	Okemwa	canoe -	Plankton
ue 27/1/87	8.50	Kanamai	Ruwa	car	Mangrove res.
ed 28/1/87	9.42	Tudor Creek	DeSouza	canoe	Prim. product.
		Gazi	Ruwa	car	Oyster research
hu 29/1/87	10.26	Tudor Creek	Wakwabi	canoe	Prawns research
		Gazi	Ruwa	car	Oyster research
		Kanamai	Muthiga	canoe	Corals research
ri 30/1/87	11.05	SP English Pt.	Okemwa	canoe	Plankton
		Library	All research Officers		Seminar

WORKPLAN

SAMPLING SCHEDULE FOR FEBRUARY 1987

E	LOW TIDE	AREA	RESEARCH OFFICER	TRANSPORT driver Bii	ACTIVITY
2	12.46	English Pt.	Okemwa	canoe	Plankton LT 12.46 HT 19.12
		Bamburi	Juma	car	Chemical analysis
		Tiwi	Ruwa/Dr.Daro Wamukoya	car	Mangrove Ecology
3	13.20	Tudor	Mutua/Dr.Daro	canoe	Flowmeter calibr.
		Tudor	Kazungu	canoe	Chem. analysis
		Gazi	Ruwa/De Souza	car	Oysters/Prim.Prod.
		McKenzie Pt.	Wamukoya		Algae research
4	13.54	Gazi	Ruwa/Juma Wamukoya	car	Oysters/Chem.anal. Algae research
		Bamburi	Dr. Daro	car	Mangrove Ecology
5	14.29	Tudor	Dr. Daro	2 canoes	24h-cycle, station 1 & 5
		Old Nyali Br.	Wamukoya	car	Algae culture
6	15.11	Tudor	Dr. Daro	2 canoes	24h-cycle
	NP	Kanamai	Ruwa	car	Mangrove Ecology
9	8.27	Tudor	Okemwa	canoe	Plankton 5 station series
		Kibarani	Wamukoya	car	Algae research
10	9.15	Kilindini	Kazungu	car-Maumba	Chemical analysis
		Gazi	Ruwa/Juma	car	Oysters/Chem.anal.
		KMFRI	Wamukoya		Algae research
		English Pt.	De Souza	canoe	Prim.Production 3 stations LT
11	9.48	Tudor	Dr. Daro	car-Maumba	Depth profile HT 15.56 - 3.52
		Bamburi	Ruwa/Juma	car	Mangrove Ecology
12	10.16	English Pt.	Okemwa	canoe	Plankton LT 10.16 HT 16.32
13	10.42	Tudor	Wakwabi	canoe	Prawns research
		Kanamai	Muthiga/Wamu- koya	car	Coral reef & Algae research

WORKPLAN

SP

16	11.54	Tudor	Dr. Daro	2 canoes	24h-cycle St. 1&5
17	12.21	"	"	"	" "
18	12.48	Tudor	Kazungu	car-canoe	Chem.anal.LT 12.48
		Malindi	Artemia/Ruwa Juma/Daro/ Wamukoya	car	HT 19.06 Mangrove Ecology
19	13.16	English Pt.	De Souza	canoe	Prim.Prod.
		Malindi	Artemia/Ocean.	car	3 stations HT 7.13 Mangrove Ecology
20	13.47	"	"	"	" "

NP

23	5.36-17.06	English Pt.	Okemwa	canoe	Plankton LT 17.08 HT 11.40
24	7.42	Tudor	Okemwa	canoe	Plankton 5 station series
		Gazi	Ruwa/Juma/ De Souza	car	Oysters/Chem.anal. Prim. production
25	8.51	meeting about Nyali	research work Wamukoya	(Library 10 a.m.) car	Algae research
26	9.36	Bamburi Reef Hotel	Juma Wamukoya	car car	Chemical analysis Algae research
27	10.13	Tudor Gazi	Wakwabi Ruwa/Wamukoya	canoe car	Prawns research Oysters/Algae
28	10.47	Kanamai Port Reitz	Muthiga Wamukoya	car	Coral reef Algae research

WORKPLAN

SAMPLING SCHEDULE FOR MARCH 1987

DATE	TIDE	AREA	RESEARCH OFFICERS	TRANSPORT Driver Bii	ACTIVITY
on 2	LT 11.46 HT 18.10	English Pt. Mkomani	Okemwa Ruwa	canoe -	Plankton LT-HT Oysters
ue 3	LT 12.15 HT 18.41	Gazi Tudor	Ruwa/Juma Kazungu	car canoe	Oysters/Sediment Analysis Chemical Analysis
ed 4	LT 12.43 HT 19.09	Tudor McKenzie Pt. Mkomani	Mutua/Turi Wamukoya Ruwa	canoe - -	Current studies LT-HT Algae Research Oysters
hu 5	LT 13.13	Tiwi English Pt.	Wamukoya De Souza	car canoe	Algae Research Prim. Prod.
ri 6	LT 13.41 HT 7.47	English Pt. Diani/Gazi	Okemwa Wamukoya/Juma Ruwa	canoe car	Plankton LT-HT Algae Res./Sedim. Anal./Oysters
on 9	NP LT 17.16	Tudor Mkomani Tudor Malindi	Okemwa Ruwa Mutua/Turi Artemia/Ocean	canoe - canoe car	Plankton 5 Station Series Oysters Current studies LT-HT Artemia/Mangrove Ecology
ue 10	LT 8.11	Mkomani Kilindini Malindi	Ruwa Kazungu Artemia/Ocean	- car/canoe Maumba car	Oysters Chem. Anal. LT-HT Current studies LT-HT
ed 11	LT 8.57 HT 15.11	Tudor Mkomani Tudor Malindi	Okemwa Ruwa De Souza Artemia/Ocean	car/Maumba - canoe car	Vertical Plankton Collection Oysters Prim. Prod. LT 3 station series Plankton LT-HT
hu 12	LT 9.29	Gazi	Wamukoya/Ruwa De Souza	car	Algae Res./Oysters Prim. Prod.

i 13	LT 9.52 HT 15.59	English Pt. Old Nyali Br. Gazi	Okemwa Wamukoya Ruwa	canoe car car	Plankton LT-HT Algae Research Oysters
n 15	LT 10.37	Kanamai	Muthiga	car	Coralreef
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n 16	LT 10.59 HT 17.18	Tudor English Pt. Kanamai Mkomani	Wakwabi Okemwa Wamukoya Ruwa	canoe canoe car -	Prawns Research Plankton LT-HT Algae Research Oysters
e 17	SP LT 11.23 HT 17.43	Tudor Tudor Mkomani Gazi	Okemwa Kazungu Wamukoya Ruwa/De Souza Juma	canoe canoe - car	Plankton 5 Station series Chem. Anal. LT-HT Algae Research Oysters/Prim. Prod. Sediment Anal.
d 18	LT 11.50 HT 18.10	Tudor Fort Jesus English Pt. Gazi	Mutua/Turi Wamukoya De Souza Ruwa	canoe car canoe car	Current studies LT-HT Algae Research Prim. Prod. Oysters
u 19	LT 12.18	Port Reitz Gazi	Wamukoya Ruwa	car car	Algae Research Oysters
i 20	LT 12.49	KMFRI	Wamukoya	-	Algae Research
<hr/>					
n 23	LT 14.54 HT 9.12	English Pt.	Okemwa	canoe	Plankton LT-HT
24	NP LT 17.34 HT 11.56	Tudor Tudor	De Souza Mutua/Turi	canoe canoe	Prim. Prod. HT 3 station series Current studies LT-HT
25	LT 7.37	Gazi	De Souza/Juma	car	Prim. Prod./Sedim. Analysis
26	LT 8.34	Meeting about research work (Library)			
27	LT 9.14 HT 15.29	English Pt.	Okemwa	canoe	Plankton LT-HT
29	LT 10.19	Kanamai	Muthiga	car	Coralreef