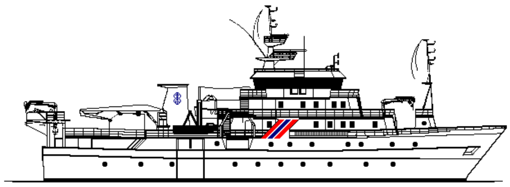
EAF NANSEN PROJECT



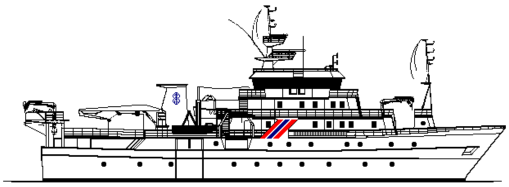
Country: Mauritius				
Research vessel: R/V DR. FRIDTJOF NANSEN				
Survey number: 2010407				
Number of days: 10				
General objectives: Survey of the demersal resources on the western slope of St. Brandon and Nazareth Bank, Mauritius**.**				
	Port	**Date**	**Coverage**	**Specific objectives**
Departure	Port Luis	16 September	Mauritius	• Describe the distribution, composition and estimate the abundance of the main demersal fish species on the shelf and slope by acoustic surveying and fish identification from fish traps and trawls • Map the general hydrographic regime by using a CTD to monitor the temperature, salinity and oxygen at bottom trawl stations and on hydrographical transects along the shelf • On-the-job training covering main survey routines
Arrival	Port Luis	25 September		
Cruise leader: Jens-Otto Krakstad				

Participants:
Ministry of Fisheries and Rodrigues, Mauritius:
Vishnu Soondron (Local cruise leader), Parmanand Daby, Vishaal Geeane, Vibz Senedhun, Vik Dabychurun, Satish Khadun, Vikash Munbodhe, Moganah Cunnee and Cindy Lutchmanen,
Institute of Marine Research, Bergen, Norway:
Jens-Otto Krakstad (cruise leader), Diana Zaera, Asbjørn Aasen, Tore Mørk and Kåre Tveit

Summary of the results:

Results from the acoustic survey

This survey had as one of its purposes to look for demersal resources in depths between 100 and 350 m. The shelf edge was surveyed systematically with zig-zag transects during the day, between 50- > 1000 m depth, in order to cover the area of interest. The distribution area and relative abundance of the main fish groups in the area surveyed, i.e. PEL 2 (mainly carangids), shallow water demersal species (<60 m depth) and deep water demersals (slope demersals) at depth deeper than 60 m, were recorded with the Simrad ER 60 echosounder. Only average sA values are reported and not biomass estimates due to the fact that the target strength of the surveyed demersal species is unknown and that the surveyed shelf area forms part of a much larger fishing bank, therefore reported values would not be representative for areas outside the one covered by the present survey and would thus, give little meaning. All considerations reported here are made only from acoustic values recorded during the day. During the night plankton lifted from the bottom and dispersed in the water column and made any separation of fish in the echogram difficult.
There were consistent acoustic recordings of demersal fish over the whole shelf area surveyed; deeper water demersal species were however scarce and patchily distributed, particularly on the shelf edge and other untrawlable grounds. Only two distribution areas were identified as indicated on the maps. This is mainly considered to be attributed to the very steep slope found over most of



the surveyed area with depths increasing abruptly to >1000 m beyond the shelf edge (typically at 60 m depth). This is largely different from the eastern side of the two banks where the slope is gentler and the habitat for deep water demersal fish is therefore, larger and where new resources also have been found during the previous surveys.

The fish densities were highest on the banks except for the far northern end of Nazareth bank. Very little fish were recorded in the depression between the banks. SA values attributed to plankton were high on the Cargados-Carajos bank and on the southern end of the Nazareth Banks.

Fish trap experiments

One of the goals during this survey was to test a prototype of commercial fish trap aimed especially for use in tropical waters. The prototype is based on a commercial trap currently used in Mauritian waters, but improved to be collapsible, giving fishermen the opportunity to bring more traps at sea, and as a consequence, reducing the number of days at sea before landing their catch, which in turns reduces fuel costs and improves the quality of the landed fish. Steel fencing around the trap removes problems with predator attacking the fish caught.

Some traps had attached a video recording camera, and the video observations show that the trap works well: it falls nicely to the bottom, sits stable and fishes well. Undersized fish may pass through the mesh in the fish trap unhindered, and the fish retained look relaxed.

The traps were usually deployed during the day and retrieved during the night. Soaking time varied between 8 to 16 hours. On the shelf (<100 m) traps were deployed in groups of three linked together, while in deeper waters (>100 m) they were deployed individually to reduce the risk of losing them due to the steepness of the slope. To compare the performance between the traditional traps and the prototype, the traps were mixed when deployed in groups. Although some traps fished up to 40 kg, when standardized by soaking time, the values look moderate to low (<2 kg/h). When compared individually, the prototype traps generally performed better, yielding higher catches. The traditional traps came up empty more often than the prototype, this could be just a random effect and more trials need to be performed before reaching any firm conclusion. When comparing the traps within a group it was observed that there was a great variability, probably due to the fact that the traps were not spaced far enough apart creating interference between individual traps on a line. It would be of interest to repeat the experiment increasing the distance between the traps for comparison.

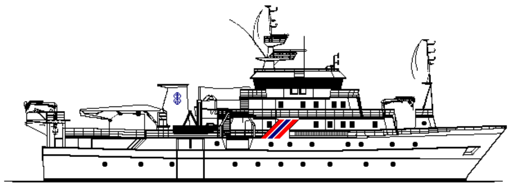
When compared by depth it was observed that the prototype traps performed better than the traditional ones, but again the results just point to an indication of the trap's performance, and more trials are needed in order to be able to draw definite conclusions.

Trap performance by depth comparing traditional vs. prototype

All traps performed better on the shelf (average CPUE of 0.82 Kg/h) than on the slope (max CPUE of 0.15 kg/h between 100 and 150 m depth). This could be attributed to the steepness of the slope and a lower availability of the resources.

It is important to note that not all traps had the same mesh shape. The prototypes had diamond shape mesh, while all the traditional ones had square mesh type. The mesh at the trap's entrance had three different mesh shape in the prototype traps: square (trap 1), diagonal (trap 3) and diamond (trap 4). In the traditional traps the doors had square mesh. From these preliminary results, it seems that the non-square-mesh-type performed better than those having a square mesh. One of the prototype traps (#7) in addition to an entrance with square mesh type, it had a smaller mesh size (25 mm) than the rest of the traps (50 mm).

We wanted to see if soaking time had any effect, but we didn't have enough data as to compare. It was not possible to test the influence of diel fishing periods, since traps were deployed during day



time and retrieve at night. This is important since depending on the target species and their behavior, traps should be deployed either during day or night time. At shallower depths (<200 m) some of the commercial target species are nocturnal (e.g. snappers) and night catch rates can be expected to be higher than day catches. On the contrary, emperors are diurnal and day catches might be dominated by this family. This was confirmed in our trials, where the dominant species belonged to the Lethrinidae (emperors), which not only dominated in numbers of individuals caught (160) but in number of different species (5, Figure 13). On the other hand, in deeper waters, there is little difference between day and night, therefore one can expect no big differences during the two diels.

When comparing average fish size caught in the traps deployed on the slope (traps 1 to 6), we found that it was about the same in most traps (ranging between 54 and 56 cm TL), except in two traps where fish were considerably bigger (61 and 64 cm TL in traps 4 and 5 respectively).

Two cameras were mounted in two of the prototype traps (#1 and #4) and in a couple of occasions sharks were observed circling around the trap. Once the shark started circling the trap, all fish activity outside the trap ceased and it can be assumed that the trap stopped fishing.

Observations regarding the trap design

The current trap design has proven to be very successful, and a number of modifications have been proposed after the present survey. These are generally minor, and aimed at improving the ease of use of the traps. The findings during the survey indicate that future traps should have:

- An even easier way to be collapsed.
- A biodegradable panel so that traps lost at sea stop fishing and become artificial reefs for fish until they eventually are broken down.
- A new design of the bait bags to reduce the amount of bait used per set
- Openings in the top panel so that baiting of the traps becomes faster and easier
- A smaller inner chamber for fish in the trap to escape from predators in the trap

There is also a need to study further the best suitable fish entrance to the trap and to determine the best suited mesh size, and shape to be used. Investigations into the optimal soaking time in various situations should also be determined to maximize the catch / effort from the traps.

For scientific purposes, the traps can be fitted with an acoustic release, cameras, fish counters and a variety of sensors like temperature, salinity current speed and direction.

Results from the trawl survey

The composition of the fish fauna on the bank and slope of the western side of St. Brandon and Nazareth changes with depth. However no trawlable areas were found on the slope and all trawl catches were made in waters <60 m deep. The Demersal group consists of valuable demersal species groups (groupers, snappers and emperors). For the different analysis the “other” group includes all species not accounted for in the main groups. Therefore, the content of “other” will change from table to table.

Report: status: final References:

FAO Project: CCP/INT/003/NOR. CRUISE REPORTS “DR. FRIDTJOF NANSEN » EAF – N2010/7. **Survey of the fish resources of Mauritius. Survey of the demersal resources on the western slope of St. Brandon and Nazareth Bank, Mauritius. 16 – 25 September 2012.** Bergen, November 2010

Constraints/Comments: