Relation between coral reef degradation and the Overexploitation of coral reef fishes in El-Tur region, Egyptian Red Sea Coast

By

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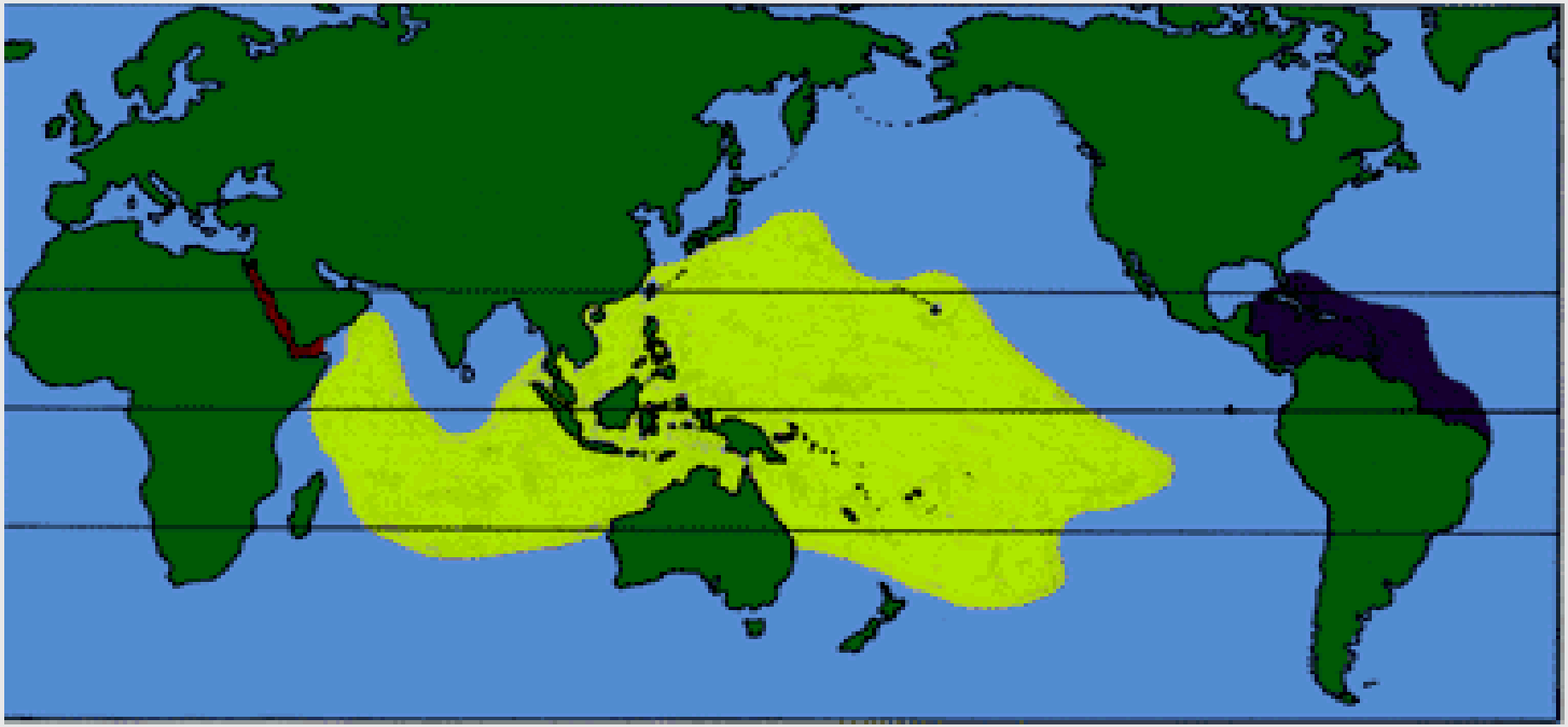
Coral Reefs Distribution Around the World



Coral Reef Regions of the World

- Indo-Pacific
- Red Sea
- Western Atlantic

Introduction

- **The Egyptian Red Sea coast extends approximately 1800 km along the Gulfs of Suez and Aqaba and the Red Sea, and is bordered by fringing reefs for most of this length.**
- **Red Sea is characterized by the presence of the most beautiful coral reef tourism attraction and the unique diversity of fishes and invertebrates.**
- **The most commercially species of the coral reef fishery (artisanal fishery) are: emperors (*Lethrinus nebulosus*); groupers (*Epinephelus areolatus*) and parrot fish (*Scarus sp.*).**

Map of the fishery area

Coral reef community

Fishes

Invertebrates

Mollusks

Echinoderms

Coral reef importance

- **Tourism:** coral reef areas are giving a high economic income. Most of the coastal populations are depending on income derived from tourism.

- **Fisheries:** Reefs used as a fish shelter, feeding area, spawning and nursery grounds.

- **Medicine:** Many pharmaceuticals are extracted from the coral reef ecosystems.

- **Ecological Indicators:** Coral reefs have a high vulnerability to any ecological stress due to climatic changes, as the global warming.

Environmental changes impacts coral reef fisheries

Direct impact

I. Pollution

II. Humane activity

III. Shores development

Indirect impact

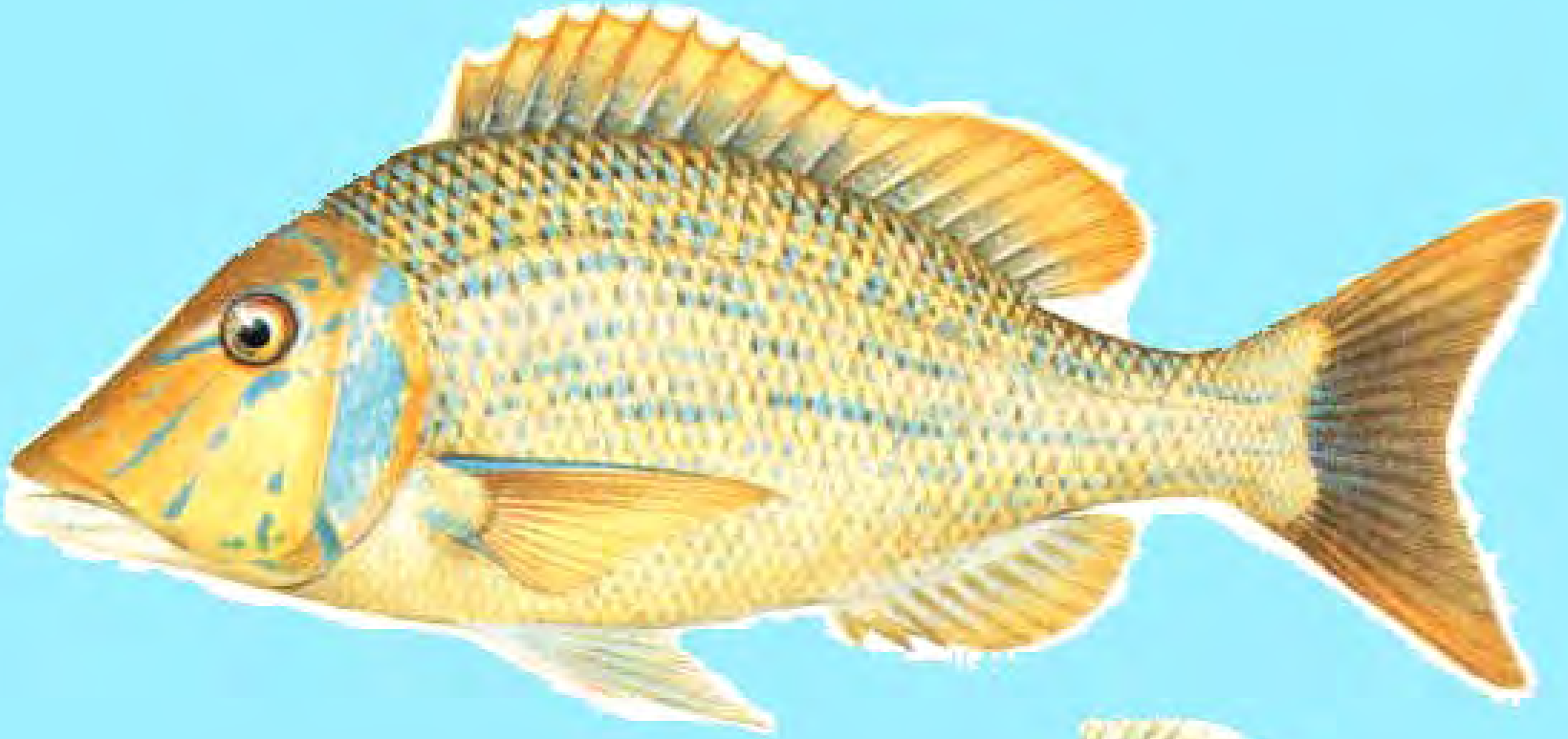
I. Overfishing

II. Destructive fishing

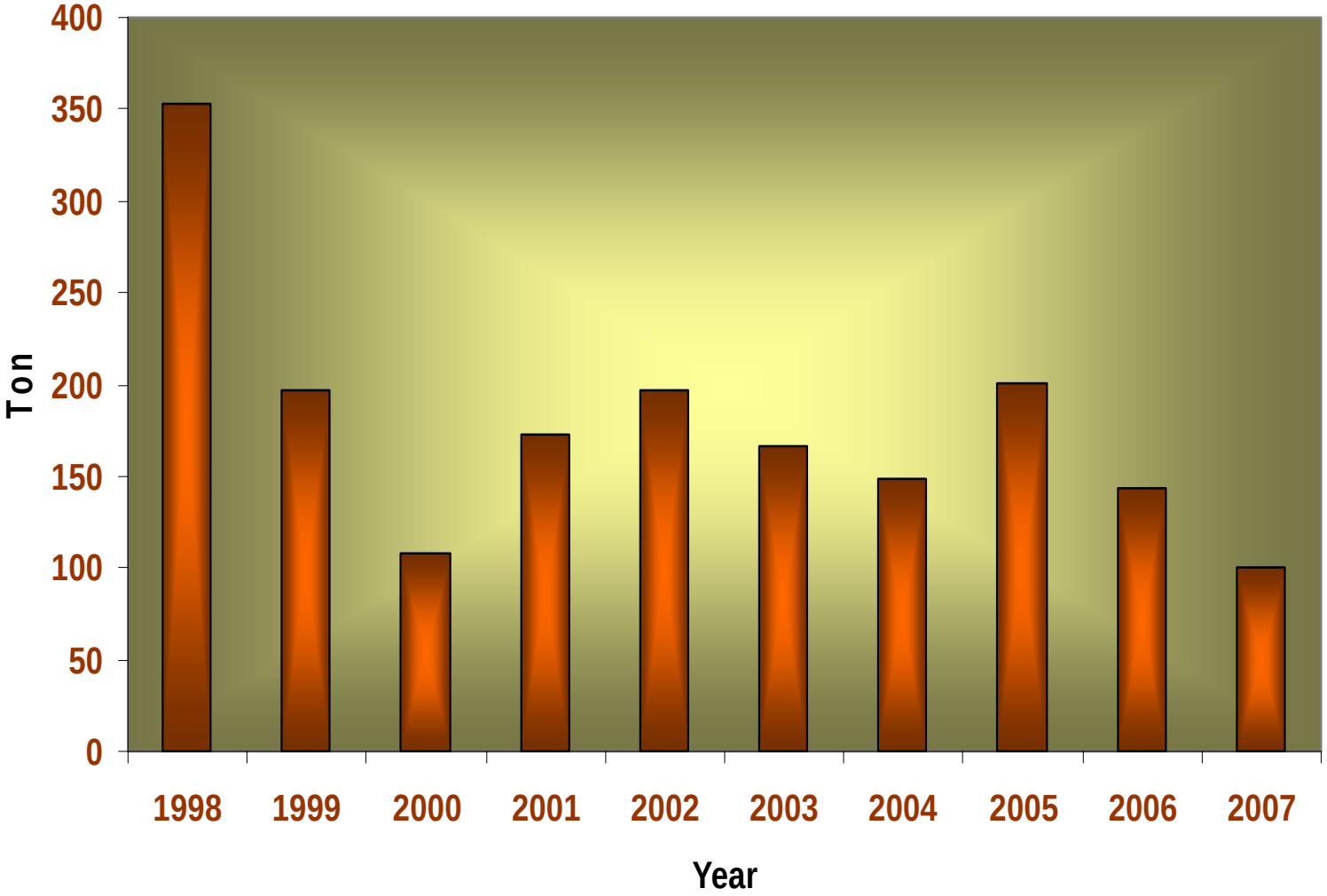
Overfishing impact coral reef fisheries

- Unsustainable exploitation of fish has an impact on stocks globally, resulting in the collapse of fisheries and changes the composition of fish communities. Fishing typically targets large individuals resulting declines in target species size, density and abundance

- ***Large carnivores such as emperors and groupers are among the most heavily exploited reef fishes, as their behavior in forming aggregation targeted by fishers render them vulnerable to overfishing.***
- ***It has recently showed a decreasing in the total catch and the Lethrinus catch as a result of improper fisheries management and illegal fishing practices.***

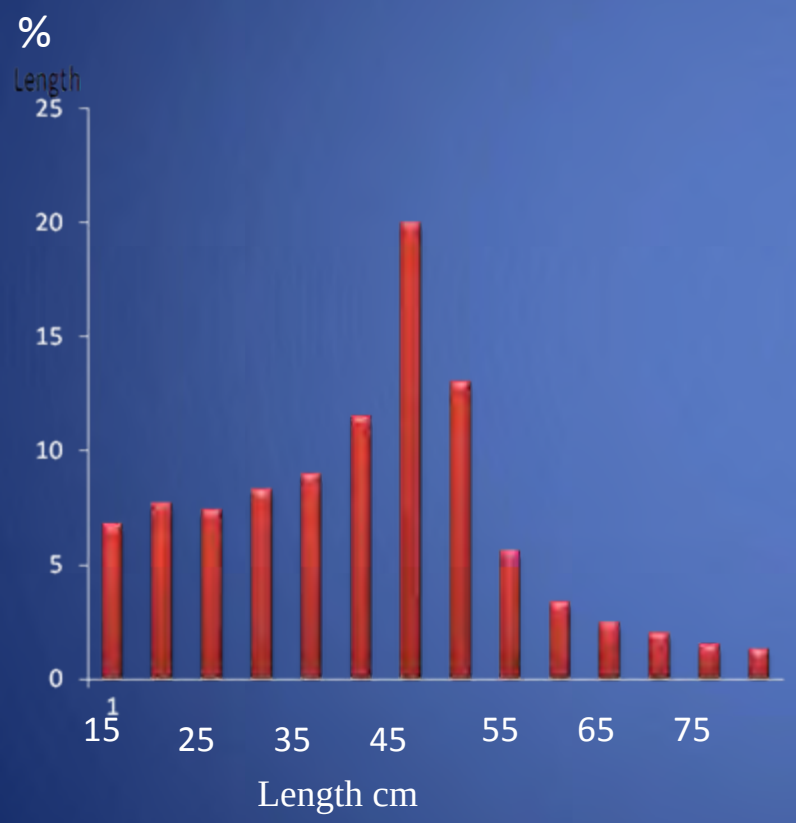


Lethinus nebulosus



Annual total catch of coral reef fishes in the Gulf of Suez

Length frequency distribution of L. nebulosus Through 1998 and 2008



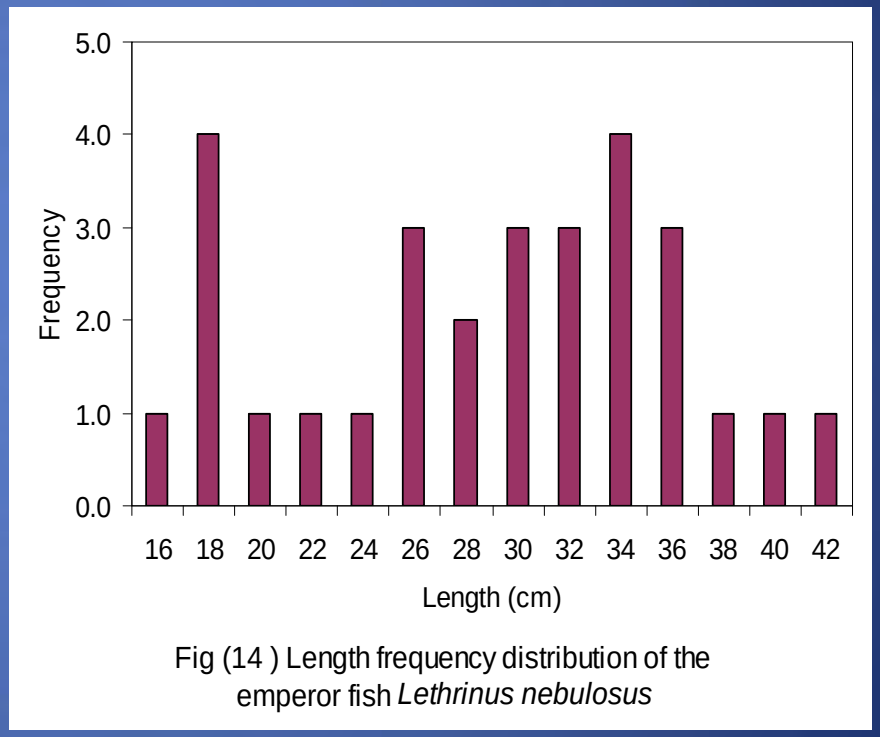


Fig (14) Length frequency distribution of the emperor fish *Lethrinus nebulosus*

During 1998

During 2008

Problem

1. the large individuals of L. nebulosus feed mainly on Echinoderms species specially, acanthasters as (A. planci) and the sea urchins.
2. As a result of the over-fishing the sea stars predators are declined, these leads to the over spreading of acanthasters species which has a feeding behavior ability to attack coral polyps affecting the coral reefs healthy.

Results

I- Age and growth

1. *Sample length range was from 15.0 cm to 66.0 cm. during 2004 with 10 age groups*
2. *Statically there was no significant differences between males and females in length or age and growth or in feeding habits (P> 0.05).*
3. *The growth parameters of L. nebulosus was estimated as : $L\infty$= 81.65 cm, K= 0.161 yr-1 and t_o= -0.472 yr-1*
4. *Mortality rates : Z= 0.722, M= 0.237 and F= 0.485 yrs-1*
5. *Exploitation rate E = 0.67*
6. *Longevity in the sample = 18.9 yr*

II- Survey through three sites in El-Tour region revealed that

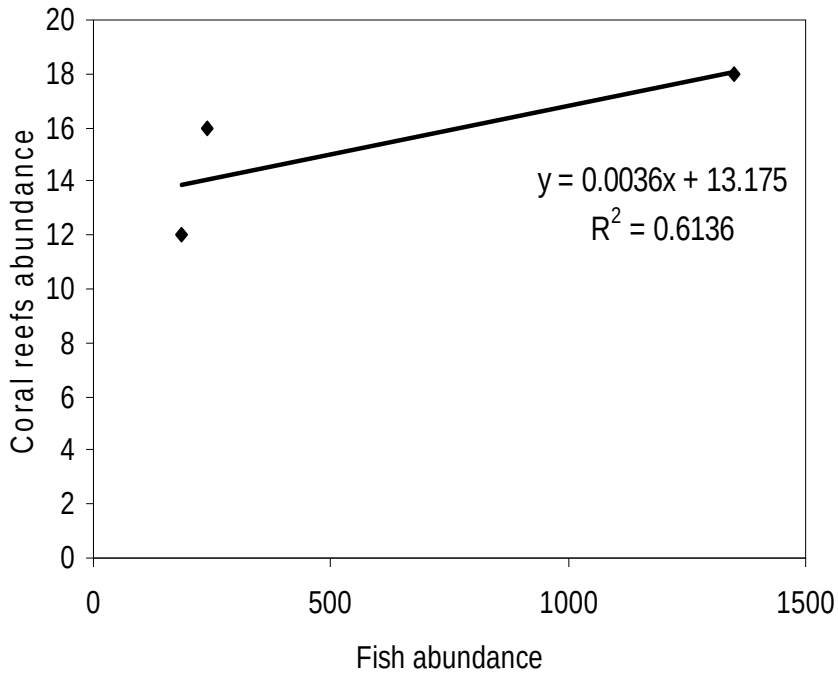


Fig (5) relationship between fish abundance and coral reefs abundance in three surveyed sites.

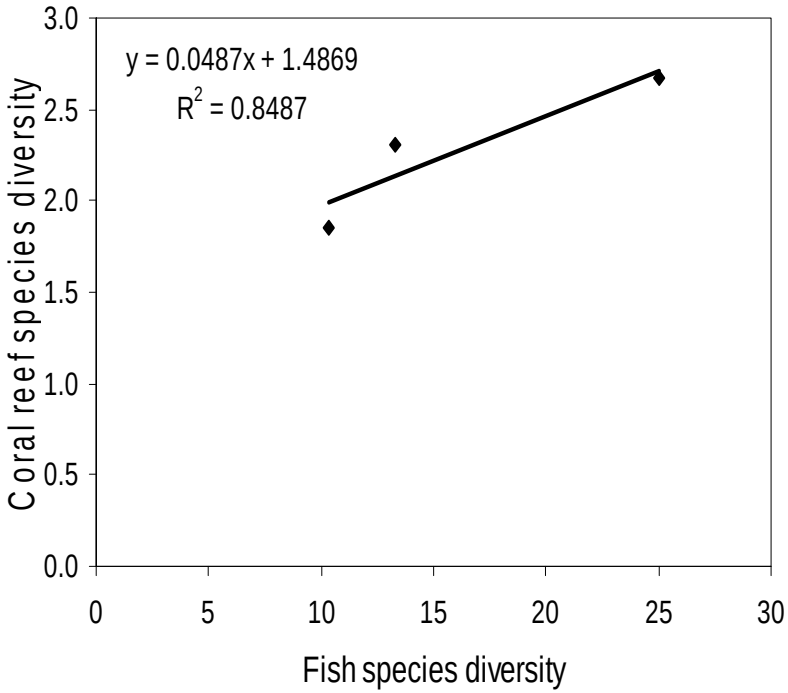
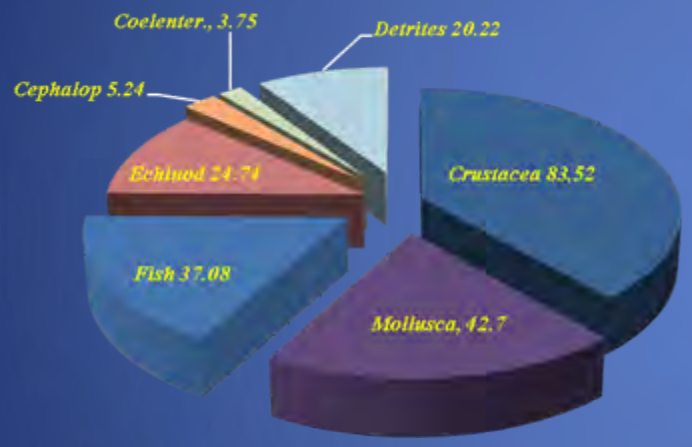


Fig (6) Relationship between fish species diversity and coral reef species diversity in three surveyed sites.

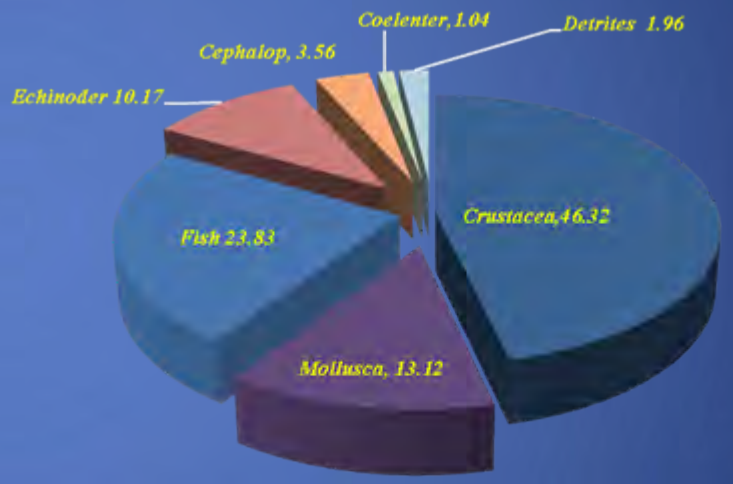
Dead corals and rocks with spreading of the sea urchins

Healthy corals with different fish species

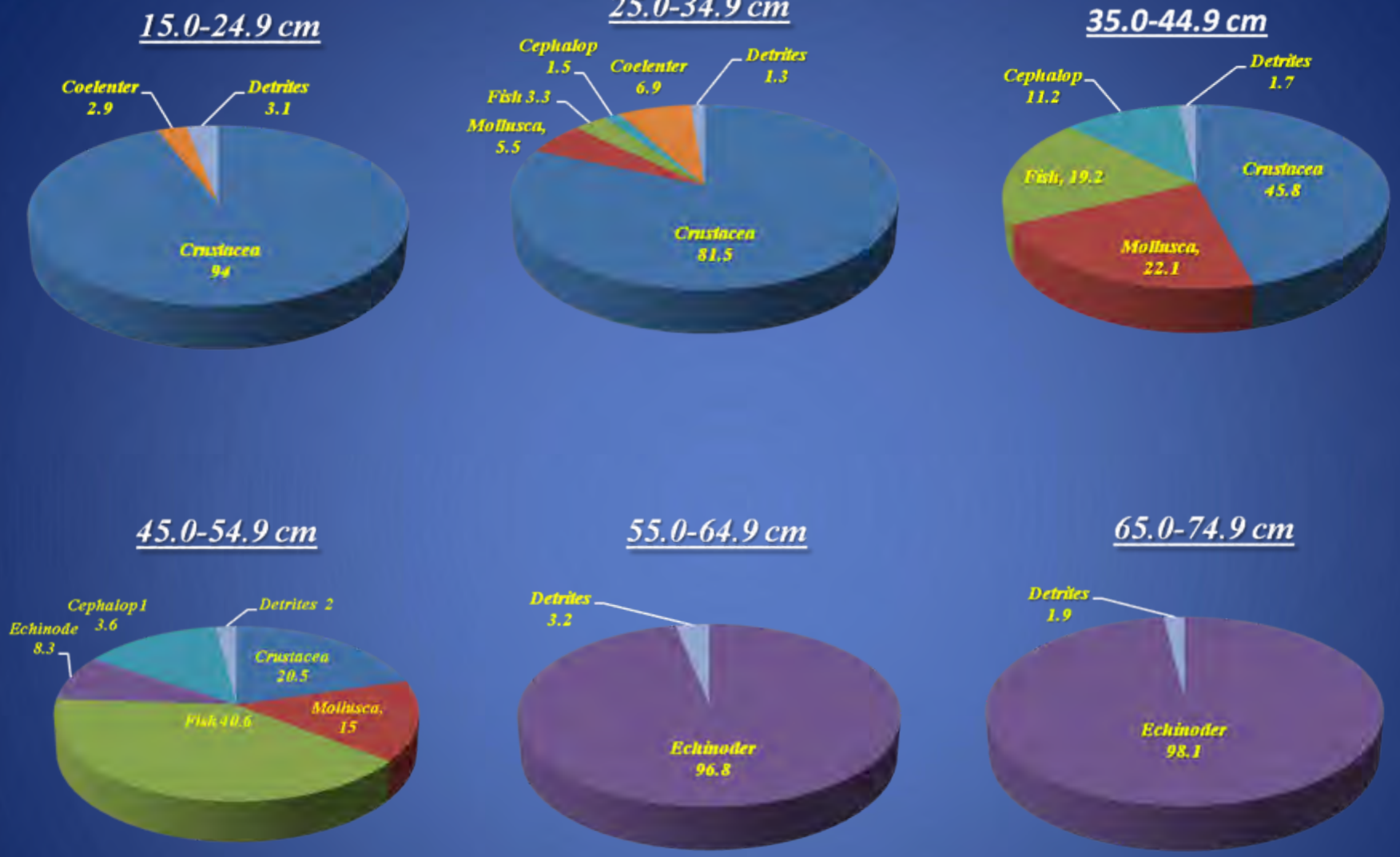
III- Feeding behavior



Percentage occurrence of the different Food items in L. nebulosus



Percentage composition of the different Food items in L. nebulosus



Pervious data coated from 1998

Percentage of diet composition of L. nebulosus in relation to length groups

Conclusion

Data revealed that:

1. *The spangled emperors L. nebulosus is a slow-growing and long-lived species, with longevity up to 18 years.*
2. *Fishing mortality F > natural mortality M by about 48.9% indicating that there is currently a risk to the sustainability of that stock.*
3. *The exploitation rate E > 0.5 by about 34%, (optimum level = 0.5) indicating that this stock is exposed to heavily over-exploitation.*
4. *Spangled emperor is one of the main predators and heavily feeding on acanthester sp. , specially the large individuals, which are declined as a result of the over exploitation.*

***5**- The crown-of-thorns starfish, Acanthaster planci and sea urchins are the major coral predator widely distributed in the Indo-Pacific region, where population outbreaks have caused dramatic impacts on coral reefs (compiled by IUCN).*

***6**- Corals predation and storm damage by A. planci were recorded in Red Sea, Egypt (Ormond et al. 1990, Abou-Zaid, 2000; PERSGA/GEF 2003 and Ammar, 2005), in Farasan Islands Saudi Arab and the Gulf of Oman (Glynn 1993 and PERSGA/GEF 2003), on the Great Barrier Reef Spain, Fiji, Indonesia, Japan, Costa Rica, USA and Australia (Cameron et al., 1991; Lourey et al. 2000 ; Pierre Madl, 2002;WWF,2003; Quinn &Kojis 2003; Devantier et al. 2006 and Narváez1 & Zapata, 2010)*

Recommendation

Proper fisheries management policy must be under taken

1- Reduction in fishing efforts.

2- Individual fishing quotas must be applied

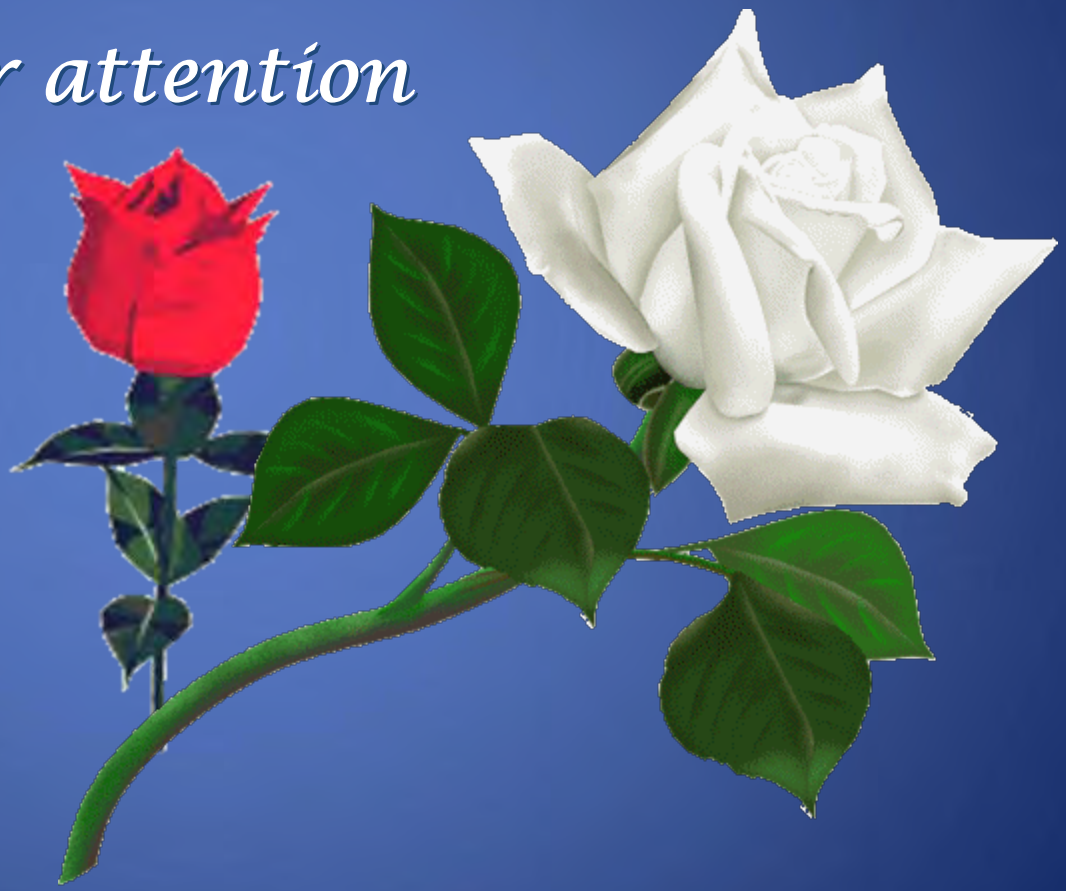
3- Gears must be monitored and enforced by lows.

4- Experimental fishing must be apply to study gear selectivity and to plain a map detecting spawning and nursery grounds.

5- Closed of the nursery ground area for protecting the spawning stock biomass.

6- Increasing public awareness among fishermen society.

7- Treatment of sewage and chemical wastes before dumped in the sea and enforced the oil tankers that dump petroleum wastes .

Save The Ocean, Please....!!

Thanks for your attention