

An ecosystem approach to fisheries: the seabob shrimp in Surinam

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Marine fisheries are often known to cause collateral damage to the ecosystem through bycatch and habitat destruction. As traditional fisheries management only considers the target species population, an ecosystem approach to fisheries is needed, and gains interest. Ecosystem-based fisheries management strives for an ecologically sound resource conservation responding to the reality of ecosystem processes, but implementation remains difficult. Studying the coastal zone of Surinam (South-America) the current PhD research aims to build ecological knowledge supporting ecosystem-based management for the exploitation of seabob shrimp.

The Atlantic seabob *Xiphopenaeus kroyeri* (Crustacea: Penaeoidea) (Heller, 1862) is a shrimp species with a broad distribution in the western Atlantic ocean. In line with a widely observed growth and mechanisation of tropical shrimp fleets in recent decades, industrial exploitation of seabob of the Surinam coast began developing in 1996 with the introduction of shrimp trawlers. The mobile fishing gear used by these vessels is low-selective and produces lots of non-target bycatch, mostly discarded back to the sea. Under international pressure, the use of turtle excluder devices became mandatory, drastically reducing marine turtle bycatch. Further improvements in this fishery were made in recent years by introducing a harvest control rule, a restricted fishing area, a vessel monitoring system and applying the FAO code of conduct. Despite this progress, knowledge on the marine coastal ecosystem in Surinam is lacking and the ecological impact of shrimp trawling is largely unknown.

In this study, occurrence and migration of the seabob shrimp will be studied in relation to environmental factors, mainly freshwater river outflow which is known to profoundly alter the coastal waters. Next, a food web study will be done to assess the trophic role of seabob in the ecosystem and hence the possible consequences of its large-scale removal by fisheries. A third goal is to quantify the impact of bottom trawling on the benthic ecosystem by comparing trawled and untrawled seabed areas. Finally, research results will be integrated into practical, though ecologically sound management advices for the fishery sector. As the research is from the start supported by both the fishing industry and the government authorities in Surinam, adaptation of an ecosystem approach is likely in the future. This should allow for a sustainable exploitation of the seabob, assuring both the continuation of an important socio-economic activity and the supply of a considerable domestic protein source in Surinam.

References

- Castro R.H., R.C. Costa *et al.* 2005. Population structure of the seabob shrimp *Xiphopenaeus kroyeri* (Heller, 1862) (Crustacea:Penaeoidea) in the littoral of São Paulo, Brazil. *Scientia Marina* 69(1):105-112.
- García C.B., D. Perez *et al.* 2008. Experimental results with a reducing device for juvenile fishes in a tropical shrimp fishery: impact on the invertebrate bycatch. *Pan-American Journal of Aquatic Sciences* 3(3):275-281.
- LVV. 2010. Visserij management plan voor Suriname: de seabobgarnalen (*Xiphopenaeus kroyeri*) visserij. Ministerie van Landbouw, Veeteelt en Visserij (LVV) Suriname, Onderdirectoraat Visserij. Februari 2010.
- Pauly D. 2008. Global fisheries: a brief review. *Journal of Biological Research-Thessaloniki* 9:3-9.
- Pikitch E.K., C. Santora, *et al.* 2004. Ecosystem-based fishery management. *Science* 7:305-346.