ICES 2000 Annual Science Conference, Brugge 27-30 September 2000 - Session Code: Mini 14

Faunistics as an impetus for conservation of sea cucumbers (Echinodermata: Holothuroidea) in the littoral waters of Kenya

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Introduction

Aspidichorotid sea cucumbers (Echinodermata: Holothuroidea) are heavily fished in the littoral waters of Kenya, which results in plummeting stocks. In order to conserve and manage these natural resources appropriate conservation and management plans have to be developed. This can only be done if high quality research on different levels broadens our understanding of the stocks in question. This poster discusses the importance of faunistics (based on correct nomenclature, taxonomy & systematics) in the fine tuning of conservation efforts.

Level one - *Nomenclature & Taxonomy*

Conserving biodiversity involves in a first stage that we know what to conserve. For that we need to correctly name the players in a unequivocal and universally understood way. Consider f.i. the large, commercially important holothurian, *Stichopus herrmanni* Semper, 1868. In a large part of the literature prior to 1995 this species is cited as *Stichopus variegatus* Semper, 1868. This name cannot be valid since, in 1995, Rowe (in Rowe & Gates, 1995) stated that *Stichopus horrens* Selenka, 1867 is the senior synonym of *S. variegatus*. Morphological examination of the *S. variegatus* specimens (a.o. Massin, 1999) shows that these need to be divided among at least two different species: *S. monotuberculatus* (Quoy & Gaimard, 1833) and *S. herrmanni* Semper, 1868.

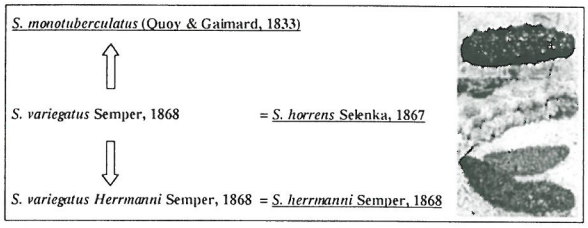


Fig. 1 - The *Stichopus variegatus* problem. Valid names are underlined. a. *S. monotuberculatus*; b. *S. horrens*; c. *S. herrmanni*. *Photo's (a) & (c) Y. Samyn; (b): from Guille et al., 1986.*

Level two - *Systematics*

Correct systematics can influence the conservation effort towards the target taxon. Consider f.i. the reef-dwelling species *Pearsonothuria graeffei* (Semper, 1868), originally described as *Holothuria graeffei* Semper, 1868. Spicule morphology however shows that *P. graeffei* has little affinity to the genus *Holothuria*. Systematicists transferred it to the genus *Bohadschia*. The taxonomic status of *Bohadschia graeffei* (Semper, 1868) was later critically examined by Levin, Kalinin & Stonik (1984), who found that the nature of the chemical characters of this species needed the erection of a new genus name: *Pearsonothuria* Levin, Kalinin & Stonik, 1984.

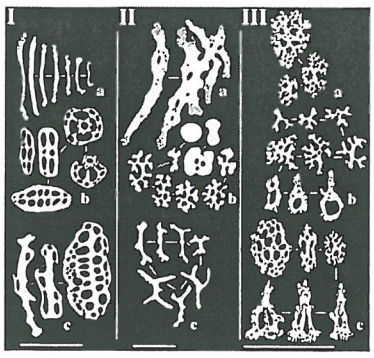
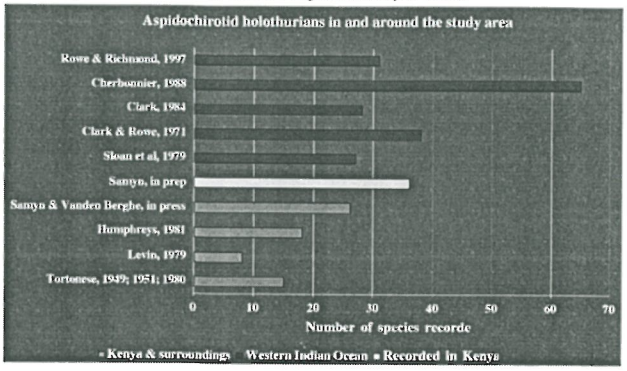


Fig. 2 - *P. graeffei as can be seen in Kenya's coral gardens (photo Y. Samyn)*

Fig. 3 - *Comparative spicule morphology of Holothuria (Thymiosycia) hilla (I), Bohadschia argus (II) and Pearsonothuria graeffei (III) (II after Cherbonnier, 1988; III after Massin, 1996; a. tentacles; b. body wall; c. tube feet). Scale bars represent 100 µm.*

Level three - *Faunistics*

Assessing holothurian biodiversity of a narrow geographical entity like the Kenyan Coast is not a simple endeavour, since *primo* only few recent studies have been devoted to this region (see Samyn, 2000) and *secundo* the existing faunistical lists are often hindered by incorrect decisions on taxonomy and systematics. Our published (Massin et al, 1999; Samyn, 2000; Samyn & Vanden Berghe, in press) and unpublished data show that the biodiversity aspidochirotid holothurian biodiversity in Kenya is currently underestimated (Vanden Berghe & Samyn, 2000).



Level four - *Awareness & Education*

Conservation of holothurians depends on the participation of local communities, a fact that the Kenyan Government catched by creating the Community Wildlife Program, a program that allows the local communities to benefit from conservation effort, for instance through sustainable use of the natural resources (Muthiga, pers. comm.).

Education at all levels (from local resource users to local biology students to policy makers) can both trigger awareness of the problems and remediate the loss of traditional management strategies. Therefore our team makes it the highest priority to inform local people on the purposes and consequences of our research.

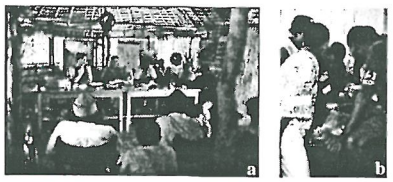


Fig. 4 - *Creating awareness through education of local seacucumber fishermen in the Kiunga Marine Reserve, Kenya; (b) Education of postgraduate marine biologists during a postgraduate course in tropical marine biology. (photo (a). B. Van Bogaert; (b). Y. Samyn)*

Discussion

Local fishermen and traders, are not always concious of the richness and vulnerability of their natural resources. For them ultimate (the fished species *per* se) and proximate (the role of the taxon in the ecosystem) economic considerations are understandable, so towards them comprehension of the living world should be put in that perspective. For instance if fishermen could understand that certain species of seacucumber contain bioactive substances that could be used to fabric novel medicines, or that depletion of the seacucumber stock immediately influences the total ecosystem, awareness for conservation among them would be far greater. Additionally, community based conservation incentives (Western & Wright, 1994), e.g. aquaculture and stock enhancement, provides local communities with an alternative to the fast pursuit of gain, which uncontrolled sea cucumber collectioning ultimately is.

Acknowledgments

This research on the holothurian fauna of Kenya is made possible throught the Fund for Scientific Research Flanders (F.W.O.) and the Research Council of the Free University of Brussels (V.U.B.). Kenya Wildlife Services and WWF Kenya provided field support.

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