

Sea cucumber identification cards: An analysis of their utility in the Pacific

Aymeric Desurmont¹ and Steven Purcell²

Abstract

Fisheries management personnel and other stakeholders need a means of ensuring consistency when identifying the various species exploited within a fishery. We conducted a questionnaire-based survey to evaluate the usefulness of SPC's "Pacific Island sea cucumber and beche-de-mer identification cards". Quality photographs of live animals were the most valuable information. The usefulness of other information depended on the user group, and whether users were from large, developed countries or small Pacific Island nations. A key finding is that the content and format in which the information is presented should largely be dictated by the intended user group. In this case, waterproof identification cards were considered by users as important tools in aiding in the identification of sea cucumber species, which can lead to improved data collection and fisheries management.

Introduction

The ability to correctly identify the species being exploited is fundamental to fisheries management. In the case of sea cucumbers, identification can be more difficult after the animal is boiled and dried (beche-de-mer), because its original colour and form changes during processing. Aids used to help identify marine resources include guidebooks, posters and field identification cards. To determine which of these tools to invest in, it is important to know whether they assist in the identification of species, and what aspect of the information they contain is most useful.

In 2004, the Secretariat of the Pacific Community (SPC) produced a series of bound waterproof identification (ID) cards for common commercial species of sea cucumbers in the Pacific. These Pacific Island sea cucumber and beche-de-mer ID cards were produced in collaboration with the WorldFish Center, with financial support from the Australian Centre for International Agricultural Research (ACIAR). These cards were similar to ID cards produced in 2003 by SPC and the Papua New Guinea National Fisheries Authority, which were developed for identifying PNG's commercial sea cucumbers.

The ID cards illustrate 20 of the most common commercially valuable sea cucumber species in the Pacific (Fig. 1). One card is produced for each species, with each card showing a photo of the live animal in its natural habitat, photos of the processed (dried) specimens, a brief description of the key habitat and physical characteristics, and a description of the dried animals' appearance. The final cards in the series explain different processing methods applicable for each species, and give a narrative of basic sea cucumber biology and management. The intended users for these ID cards include fisheries officers from Pacific Island nations, customs officials that deal with product exports and reporting, processors, and fishers.

Almost 3000 ID card sets have been distributed, primarily in the Pacific. Recently, we contacted people to whom the cards were sent and asked them to complete a questionnaire about the usefulness of the cards. Below, we present a summary of the findings from the user survey, with a comparison of average ranked responses among user groups and regions. This survey contains useful lessons for the future design of identification aids for sea cucumbers and other marine resources.



Figure 1.

Cover page and example of a waterproof ID card, showing the live animal on the front and the dried product (beche-de-mer) on the back.

1. Secretariat of the Pacific Community, BP D5, Noumea Cedex 98848, New Caledonia. Email: aymericd@spc.int

2. WorldFish Center, Pacific Office, c/o SPC, BP D5, Noumea Cedex 98848, New Caledonia. Email: s.purcell@cgiar.org

Methods

We prepared a questionnaire (see Table 1) with nine closed questions and asked for ranked responses of: very much (4), mostly (3), somewhat (2), not much (1), or not at all (0). In brief, questions asked whether the photographs and information were accurate and useful for identifying sea cucumbers, and whether respondents felt the cards had improved the processing and management of sea cucumbers in their fishery. Two open-ended questions asked about other species that could have been included, and the general usefulness of the ID cards. Respondents were categorised by location and agency type.

In total, 74 questionnaires were sent and 27 responses were received; 12 from Pacific Island countries, 10 from Australia, and 5 from outside the Pacific region. Of the 27 respondents, 10 were from research or extension agencies, 8 from fisheries departments, 5 from beche-de-mer trading companies, and 4 from non-governmental organisations (NGOs).

Results and discussion

Respondents found the information on the cards to be mostly accurate (average rank 3.6). Photographs of the live animals were found to be the most useful tool for identification (mean rank 3.8), indicating that they are the key tool used to properly identify the different species. This is not surprising because identification is usually based on outer appearance. This finding indicates that priority should be given to obtaining the best and clearest photographs of live animals for use in identification materials.

Pictures of beche-de-mer (dried product) were on average viewed as “mostly useful”. As could be expected, researchers were the least interested by these pictures (mean rank 2.8). The relatively mild interest expressed by fisheries staff (mean rank 3.0) was less expected; one reason may be that some fisheries officers are not involved in monitoring the trade part of the fishery. Respondents from trade agencies and NGOs all gave the highest rank of “4”. The simple lesson from this result is that the importance placed on photographs depends on the intended user group(s).

Respondents from the Pacific region (Australia and Pacific Island countries) agreed that most local commercial species were shown on the cards (mean rank 3.7). As expected, respondents outside the Pacific did not find the majority of their local species in the card set (mean rank 2.6). Field identification tools thus need to be developed separately for each region, to ensure adequate representation of local species and to avoid redundancy from species present in other regions. In this context, larger reference tools (e.g. guidebooks) should include species distribution ranges.

Overall, the cards “mostly” helped respondents to improve their identification of sea cucumbers (mean 3.1). Excluding low rankings from sea cucumber “experts”, the result is even more positive (mean 3.6). There were no clear differences between respondent categories.

Overall, information on habitat and biology on each card “mostly” helped users in identifying species (mean rank 2.9). The most positive responses came from traders (mean rank 3.8) and respondents from

Table 1. Survey questions for sea cucumber ID cards

Please place one number after each question, which best reflects your response, where:
4 = very much; 3 = mostly; 2 = somewhat; 1 = not much; 0 = not at all.

1. Did you find the information on the cards accurate?
2. Were the photos of live sea cucumbers the most useful information to you?
3. Were the photos and descriptions of dried beche-de-mer useful to you?
4. Did the cards show the majority of commercial species in your locality?
5. Have the ID cards improved your identification of sea cucumbers?
6. Were the habitat characteristics and biological information useful to you in your identifications of sea cucumbers?
7. To your knowledge, have the cards helped fishers to better identify sea cucumbers?
8. To your knowledge, were the descriptions of processing methods (towards the back of the cards) useful for improving the quality of beche-de-mer processed in your locality?
9. Did the information (last page of the cards) on biology and management improve your understanding of sea cucumbers?
10. What other commercially important species would you have wanted to see represented in the cards? (list species)
11. Do you have any other comments about the underwater ID cards?

Pacific Island nations (mean rank 3.4). This finding indicates that such information is supplemental, and secondary, to quality photographs.

As to whether respondents felt the ID cards helped fishers to identify sea cucumber species correctly, the average rank response was only 3.0. Three respondents from Queensland, Australia noted that their fishery was exploited by a few knowledgeable fishers who were familiar with species identification; hence their low rank responses. A poignant comment from one trader was that the few ID card sets distributed by their fisheries department could not help the “thousands” of sea cucumber fishers in that country. Hence, the massive number of fishers in many small-scale fisheries must be taken into account in education strategies for fisheries management. Extension and training agencies must provide sufficient numbers of identification guides and devise means for disseminating them broadly if fishers are really the target user group.

Responses varied greatly about the utility of information on processing methods (at the end of the card sets). In Australia, where processing is mostly done by specialised companies, this information was viewed as less useful (mean rank 1.3). In Pacific Island nations, this information was considered to be “mostly” useful in improving the quality of sea cucumber processing (mean rank 3.2). A couple of respondents suggested developing a more comprehensive guide to processing methods, perhaps in the form of a specific booklet and/or video.

Regarding the biology and management information at the end of the card set, responses varied greatly according to regions and professional sectors. This information mostly helped respondents from the Pacific Islands (mean rank 3.2), but only “somewhat” improved the understanding of sea cucumbers from Australia (mean rank 1.9) or non-Pacific regions (mean rank 1.8). Likewise, researchers responded with low ranks (mean 1.4), while fisheries personnel and traders found the information important (mean ranks 3.1 and 3.4, respectively). The lesson here is that Pacific Islanders benefit more from additional information on biology and management, which they may not otherwise have.

Additional species that respondents suggested should be included in future guides or ID cards were *Actinopyga palauensis*, *A. spinea*, *Stichopus ocellatus*, *S. pseudohorrens*, *S. noctivagus* and *Thelenota rubralineata*. Also recommended was an updated card set to show new species names that have been taxonomically revised (e.g. *Holothuria nobilis*, now *Holothuria whitmaei*). Particular attention should be given to the taxonomy of the genera *Actinopyga*, *Bohadschia* and *Stichopus*. Some respondents also asked that new commercial species, sub-species and morphotypes should be shown.

One respondent noted that fishers are mostly illiterate in his locality. Educational programmes with actual demonstrations of improved processing methods and their advantages would be needed. One respondent stated it would be better to arrange the cards by scientific name, while another argued that cards would be better arranged by commercial value. In fact, the plastic pin binding in each card set can be removed, the cards reorganised as desired (since there is one card per species), and replaced with a split ring. For other cards or posters, we infer that the content and organisation of the cards depends on the key user group envisaged. One respondent suggested including recommended minimum size limits for each species; although this would vary among localities due to spatially variable life history traits of each species, we believe this does have merit. Some respondents wanted to see local names for species, but this would be cumbersome for cards intended for use in multiple countries. One fishery worker from Australia noted that the “cards have been the most useful technical publication we have ever used” and have “helped in training survey divers in the identification of species and helped our fishermen in accurate identification of species, which has in turn improved the accuracy of logbook information”. In this respect, species identification guides can play a powerful role in improving fisheries management.

Conclusion

Identification cards and other information materials can help improve identification of species for fishery workers and fishers, thus improving fishery data used for management. Having multiple target user groups can diminish the utility of identification guides, since users from different sectors need different information. If fishers are the intended user group, thousands of copies may need to be produced and actively disseminated. ID cards or guides intended for remote communities or island nations should include additional information on management, biology, and processing. It was suggested that a poster, with biological information and photographs, would also be beneficial as it could be displayed at centres frequented by fishermen and/or producers. SPC, the WorldFish Center, ACIAR and FAO are preparing such a poster for commercial Pacific sea cucumbers, which should be available in 2008. The results of this study are helping us design the poster, and we thank respondents for their comments.

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