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Traditional Knowledge of Ectoparasites of Reef Fishes

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1. Introduction

Fishermen often have substantial knowledge of the environment, acquired not by formal education but by direct experience of the natural world (Johannes 1981). Such information is not usually documented, but is potentially important, especially in developing countries, because scientists may have incomplete or flawed data on which to base strategies for the rational management of fish stocks. The provision of information by fishermen could have an additional benefit because there is growing awareness that communities should be more involved in local environmental planning processes (e.g., Lopez 1985). The interaction of scientists and fishermen would be one way of ensuring that this occurs.

It might be expected that fishermen would mostly acquire knowledge that would help them to exploit and manage resources effectively, such as on the times of spawning or migration of fish. There appears to be little available data on this point, but Lobel (1978) suggested that the numbers of local names given to fish species by Pacific Island fishermen reflected the importance of fish stocks to them. Invertebrates were less well-named, presumably because many of them are of little or no economic importance. Indonesian fishermen also use a wide range of names for fish (Schuster 1952). However, it became clear during an ecological survey of ectoparasites of reef fishes in coastal waters of Ambon Island (Pattipeiluhu & Gill 1998) that local fishermen could recognize ectoparasites from photographs, even though the organisms were small and of no economic importance. The present study quantifies this knowledge.

2. Methods

The study consisted of two parts. First, a survey was carried out of the isopod ectoparasites of seven fish species that are common in the Ambon region: *Abudefduf saxatilis, Epinephelus* sp., *Lutjanus* sp., *Pempheris ovalensis, Pterocaesio tile, Rastrelliger* sp., and *Selaroides* sp. They were obtained by scuba divers (spear-fishing), from local fish markets, or from fish traps. Two of the fish species, *A. saxatilis* and *P. tile,* are known hosts of the parasites, *Anilocra koolanae* Bruce 1987 and *Renocila* sp. Williams and Williams 1992, respectively (Pattipeiluhu & Gill 1998). Both parasites are fish "lice" that attach themselves to the body surface of the host. They differ from some other members of the group that attach themselves to the gills or inhabit the mouth cavity of the host. However, the two parasites, *A. koolanae* and *Renicola* sp., are different from one another in external appearance, especially their color. *A. koolanae* is white; *Renocila* sp. is grey.

Interviews in Bahasa Indonesia were carried out with 58 fishermen from 15 villages (3–5 per village) on the north and south coasts of Ambon and within Ambon Bay (see Table 2). Each was shown the following photographs.

(a) The parasite *A. koolanae.*

(b) The parasite *Renocila* sp.

(c) Separate photographs of each of the seven fish species included in the survey.

The procedure and questions asked were as follows: (i) Each fishermen was separately shown photographs of *A. koolanae* and *Renicola* sp. In each case, he was asked: Do you recognize this animal? If so, what do you call it? (ii) Each fisherman was separately shown photographs of the seven fish species. In each case, he was asked: Does *A. koolanae* occur in this fish? If so, on which part of the fish is it found (head, gill, or body)? The procedure was then repeated for *Renicola* sp.

3. Results

The survey of ectoparasites confirmed that *A. koolanae* was a parasite of *P. tile,* and that *Renocila* sp. was a parasite of *A. saxatilis* (Table 1). However, *A. koolanae* was not host-specific. It was also recorded on *Selaroides* sp. No isopod parasites were recorded on four of the fish species: *Epinephelus* sp., *Lutjanus* sp., *Pempheris ovalensis,* and *Rastrilliger* sp.

Table 1. The numbers of fishermen using different names to describe isopod ectoparasites of fish.

REGION	VILLAGE	*kutu*	*ian inali*	*mai mai*
North coast:	Hitu	1	1	2
	Seith		2	2
	Asilulu	1		4
	Mamala		2	2
South coast:	Tengah-tengah	1		2
	Tulehu	4		1
	Suli	3		
	Batu Gong	4		
	Toisapu	1		2
	Waai	4		
	Tial			4
Ambon Bay:	Rumah Tigah	3		
	Poka	3		
	Hatiwe Besar	2		2
	Lateri	4		

Table 2. The occurrence of ectoparasites *A. koolanae* and *Renocila* sp. on seven species of reef fishes.

FISH SPECIES	NUMBER EXAMINED	WITHOUT PARASITES	PARASITIZED BY: *A. koolanae*	PARASITIZED BY: *Renocila* sp.
Pterocaesio tile	12	10	2	0
Selaroides sp.	19	17	2	0
Abudefduf saxatilis	27	22	0	5
Epinephelus sp.	17	17	0	0
Lutjanus sp.	25	25	0	0
Pempheris ovalensis	16	16	0	0
Rastrilliger sp.	15	15	0	0

Each of the fishermen interviewed recognized both *A. koolanae* and *Renocila* sp. from photographs. Three names were used for them: *kutu*, *ian inali*, and *mai mai* (Table 2). However, each fisherman used the same name for both parasites; they did not distinguish between them. More than one name was often used in the same village, but there was

nevertheless some evidence of regional trends in the use of names. The most commonly used name in villages on the north of the island was *mai mai. Ian inali* was also used in some of these villages, but less often than *mai mai. Kutu* was most frequently used by villagers from the south coast and Ambon Bay.

The majority of fishermen recognized *P. tile* and *Selaroides* sp. as hosts of *A. koolanae* (Table 3). Substantial numbers of them suggested that the parasite also occurred on *A. saxatilis, Epinephelus* sp., *Lutjanus* sp., *Pempheris ovalensis*, and *Rastrelliger* sp. However, the numbers who identified either *P. tile* or *Selaroides* sp. as hosts of *A. koolanae* were significantly larger than the mean numbers, indicating that it was a parasite of other species (Table 3). Significantly more fishermen suggested that *Renocila* sp. occurred on *A. saxatalis* than that it parasitized other fish species. Fishermen were less clear about the usual locations of these parasites on their hosts. Most thought (correctly) that they occurred on the bodies of the fish, but substantial numbers believed that they were found on the gills or in the mouths of the hosts.

4. Discussion

Many Ambonese fishermen were able to recognize isopod ectoparasites of coral reef fishes, and often accurately to ascribe particular parasites to their fish hosts. They did so for *A. koolanae*, which is a parasite of *P. tile*, and *Renocila* sp., which occurs on *A. saxatilis*. This knowledge is presumably acquired when they sort their fish catches. The study also illustrated the potential value of traditional knowledge as a source of information that has not been documented by science. *P. tile* and one unknown species were the sole hosts of *A. koolanae* that were known to science before this study (Pattipeiluhu & Gill, 1998). However, the large majority of fishermen interviewed (56 out of 58; 97%) knew that the parasite also occurred on *Selaroides* sp. The fish-parasite surveys carried out here confirm that they were correct. It follows that fishermen who suggested that *A. koolanae* and *Renocila* sp. occurred on additional hosts were not necessarily wrong. So far, the parasites have not been recorded on these hosts, but more detailed surveys could possibly establish that they do occur on them.

Knowledge of the ectoparasites of fish is not in itself economically useful to fishermen. It may nevertheless have some applied value. Evans et al. (1995) have shown that the occurrence of *Renocila* sp. on *A. saxa-*

tilis can be used as a biological indicator of organic pollution in coastal areas. This and similar relationships could therefore provide a simple indirect measure of water quality in pollution-monitoring programs. Information about the knowledge and interests of people who live in coastal villages could also be useful in the design of school curricula in biology and related subjects. Syllabi that are based on the knowledge and experience of local people are more likely to be effective than the more academic approach that is used in much of the developed world (World Conservation Strategy 1980, Baskaran 1988).

Table 3. Responses of 58 fishermen to the presence or absence, and believed location (mouth, gills, or body), of the parasites of *A. koolanae* and *Renocila* sp. on their fish hosts. The Chi-square test was used to compare responses, indicating that each of the known hosts carried the parasite (*A. koolanae* on *P. tile* and *Selaroides* sp., and *Renocila* sp. on *A. saxatilis*) with the mean scores for fish that are not hosts (see Table 2); † P<0.01; ‡ P<0.001.

	A. koolanae				*Renocila* sp.			
		POSITION				POSITION		
HOST SPECIES	PRES.	MOUTH	GILLS	BODY	PRES.	MOUTH	GILLS	BODY
Pterocaesio tile	30†	6	9	15	1	0	0	1
Selaroides sp.	56‡	15	16	25	0	0	0	0
Abudefduf saxatilis	17	5	4	8	32†	6	9	17
Epinephelus sp.	21	6	8	7	6	2	3	1
Lutjanus sp.	17	6	5	6	3	1	2	0
Pempheris ovalensis	4	1	1	2	0	0	0	0
Rastrilliger sp.	7	3	2	3	2	1	1	0
Mean of nonhost fish	13.2				2.0			

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