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**ON THE BIOLOGICAL INFORMATION
CONTENT OF COMMON NAMES:
A QUANTITATIVE CASE STUDY OF PHILIPPINE FISHES**

by

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ABSTRACT. - An analysis was performed on the common names of fishes in the Philippines, based on the COMMON NAMES table of FishBase, a large biological database with key information on fishes. The existence of common names for fish species in 10 Philippine languages was found to depend on the commercial importance, depth range and habitat of these species in the Philippines. Also, the prior hypothesis that certain sounds indicate relative size (i.e., small vs. large) was verified for common names of Philippine fishes ($P < 0.01$). The potential utility of a large and widely available database such as FishBase for storage and analysis of that part of indigenous knowledge that is embedded in common names, and for testing hypotheses that bridge the social and natural sciences, is discussed.

RÉSUMÉ. - Sur l'information biologique contenue dans les noms vernaculaires: une étude quantitative sur les poissons des Philippines.

Une analyse des noms vernaculaires des poissons des Philippines a été effectuée à partir de la table des NOMS COMMUNS de Fishbase, qui est une vaste banque de données de noms vernaculaires accompagnés d'informations fondamentales sur les poissons. Ainsi, les noms vernaculaires des poissons dans dix langues des Philippines sont en relation avec leur importance commerciale, leur distribution spatiale et leur habitat. De même, l'hypothèse selon laquelle certains phonèmes indiquent la taille relative des poissons (i.e., petite vs. grande) a été vérifiée pour les noms vernaculaires des poissons des Philippines ($P < 0,01$). On montre l'intérêt potentiel d'une base de données telle que FishBase pour conserver et analyser cette partie de la connaissance autochtone enfouie dans les noms vernaculaires. Cette base de connaissances est également utile pour tester des hypothèses liant sciences naturelles et sciences humaines.

Key-words. - Fish, Philippines, Common names, Database, Linguistics, Sound symbolism.

When Linnaeus established his binomial system for naming biological species, he claimed that all generic names « should be apt in meaning, easy to say and remember, and pleasant to hear » (Stern, 1959). The review of Berlin (1992), on the other hand, suggests that people who have close links with their natural habitat follow, when naming species, a system of nomenclature « that can be best explained in terms of human beings' similar perceptual and largely unconscious appreciation of the natural affinities among groupings of plants and animals in their environments » (p. xi). Further, from the body

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of this work, organized « in the spirit of hypotheses to be tested » (Berlin (1992, p. xiii), the following attributes can be identified as making organisms likely to be named: 1) commonness; 2) striking appearance; 3) ease of observation; 4) large size relative to humans. The last of these attributes also affects the phonetic value of the names that are given (Berlin 1992, p. 234 and following, and see below).

A test of (1) may be performed given information on the relative abundance of a species within its local habitat. Hypotheses related to the second of these attributes can be tested whenever a taxonomy is complete, as species of striking appearance are often the only members of monotypic families. Thus, a test of (2) may involve plotting the frequency of occurrence of common names of species in monotypic families vs. their frequency in similar species. Testing (3) can be done, in fishes, using information on the vertical distribution of a species within the water column. Testing attribute (4) requires standardized measures of size, e.g., the maximum length reported from a given species of fish.

Berlin (1992, p. 234 ff) also analyzed size-sound symbolism in common names of birds named by the Huambisa people of the Peruvian rain forest. The results of his study suggested a preponderance of high frequency sounds (i.e., syllables with "i") in the Huambisa common names for small birds, and conversely for low frequency sounds ("a") in large birds. Berlin (1992, p. 247 ff) suggested that this sound-size symbolism also applied to animals which do not (usually) emit sounds audible to human ears (e.g., to fishes), and that it is widespread through the world's indigenous languages.

In this study, we test hypotheses related to the four above attributes, using over 1200 common names of fish in 10 Austronesian languages of the Philippines (Ruhlen, 1991), after accounting for borrowings from Indo-European languages (i.e., Spanish and English).

MATERIALS AND METHODS

Over 1,200 fish common names used in 10 Philippine languages ("local names") were obtained from the Common Names Table of FishBase (Palomares and Pauly, 1997), an electronic encyclopedia on key information on fish (Froese and Pauly, 1997). Associated information on monotypy, maximum size, depth range and habitats were obtained from the Species Table (Froese *et al.*, 1997). Information on the commercial importance of various species was obtained from the Countries Table of FishBase (Froese and Garilao, 1997).

The origin of these local names was determined from dictionaries (Kaufmann, n.d.; McKaughan and Macaraya, 1967; Panganiban, 1972; Wolff, 1972; Santos, 1978; Makabenta, 1979; English, 1986; Williams, 1987; Geladé, 1993; Hassan *et al.*, 1994). To exclude names that were brought to the Philippines during the 300 years of Spanish occupation, all names were matched against the Spanish common names in FishBase, and attributions verified by the authors. English names were similarly deleted. Names whose origin could not be determined were excluded from the analyses.

Over 600 unique, non-composite local names were identified, in 10 languages. These names were arranged in ascending order of the maximum length reported for each fish species, then grouped in tiers, i.e., total sample/3. The first and last thirds were identified as "small" and "large" fish, respectively. This approach differs from that used in Berlin (1992, p. 248) who defines small fish as those below a fixed cutoff length of 10

inches, and above for large fish. Once the size groups had been established, first syllabic vowels were counted and recorded for each size group, as were first syllabic occurrences of “i” and “a”, identified as typical high and low frequency sounds, respectively.

RESULTS AND DISCUSSION

Table I lists the Philippine languages from which 1286 names were obtained, by language (family) of origin. Table II summarizes the data for our test of Berlin’s first attribute. As might be seen, a large proportion of fish used in artisanal fisheries (41%) in the Philippines do not have local names assigned to them whereas only 10% of commercially very important fish species lack such names. From this, we conclude that indeed, common species, supporting large fisheries, tend to be named more often than the scarcer species contributing to the multispecies artisanal catches.

Table I. - Origin of fish names in 10 Philippine languages. Data from FishBase (Palomares and Pauly, 1997); the names in Kapampangan and Mapun were not used in tests of sound-size hypotheses.

Language	Total	Austronesian origin	Spanish or other Indo-European origin	Undetermined origin
Tagalog	336	283	39	14
Cebuano	335	322	4	9
Bicolano	216	204	9	3
Maranao/Sama/Tausug	115	113	1	1
Kuyunon/Tagbanwa	83	73	6	4
Ilokano	62	56	3	3
Banton	59	53	2	4
Pangasinan	43	38	4	1
Kapampangan	35	31	4	0
Mapun	2	2	0	0

Table II. - Distribution of 2218 named and unnamed fish species and of 74 monotypic species according to their importance in Philippine fisheries. Data from FishBase (Froese and Pauly, 1997). “Importance” is a multiple choice field in FishBase; local names included from Tagalog (41% of all local names), Cebuano (25), Bicolano (8), Maranao/Sama/Tausug (6), Kapampangan (6), Kuyunon/Tagbanwa (3), Ilokano (2), Banton (2) and Pangasinan (2). The remaining 5% are English names used in the Philippines.

Importance	All Philippine species	Species with local names (%)	Monotypic species	Monotypic spp. with local names (%)
Highly commercial	20	90.0	2	50.0
Commercial	493	88.6	25	88.0
Minor commercial	209	74.0	11	82.0
Artisanal fisheries	1496	41.0	36	22.0

Concerning the second of Berlin's attributes, pertaining to striking characters in named species, we found that 74 monotypic species occur in the Philippines, of which 40 have local names assigned to them in the various Philippine languages. Overall, a smaller percentage of monotypic species has names than would be expected given their role in the fisheries (Table II). Thus, we can not confirm Berlin's attribute (2), at least not in the form we have tested it.

FishBase presently lists 936 shallow water (0-99 m) species occurring in the Philippines. Of these, 55% have local names. Of the 105 deep water (100 m and deeper) species, only 24% have local names. Generally, species inhabiting bathydemersal, bathypelagic and benthopelagic habitats lack local names, which confirms Berlin's third attribute (Table III).

Table IV shows that large fish tend to be named more frequently than small fish, thus confirming Berlin's 4th attribute.

The distribution, in Philippine languages, of first syllabic "a" and "i" was not significantly related to fish size (data not shown). On the other hand, small and large fishes differ significantly, in Philippine languages, in terms of the occurrence of first syllabic "ti" and "ta" (Table V).

This confirms Ohola (1984) who hypothesized that « words denoting or connoting SMALL or SMALLNESS [...] tend to exhibit a disproportionate incidence of vowels and/or consonants characterized by high acoustic frequency [,while] words denoting LARGE use segments with low acoustic frequency ». The results in table V also extend to the Austronesian language family the validity of a sound-meaning hypothesis (Berlin, 1992) previously verified for languages of the unrelated Amerindian family (Ruhlen, 1991).

Habitat	Number of species	Spp. with local names (%)
Reef-associated	1164	56.9
Pelagic	175	70.3
Demersal	673	51.4
Bathypelagic	17	5.9
Bathydemersal	39	33.3
Benthopelagic	134	28.4

Table III. - Habitat of named and unnamed species in the Philippines. Data from FishBase (Froese and Pauly, 1997). "Habitat" is a multiple choice field in FishBase.

Size group (cm)	Species named (%)
Small (1-13)	286 (40.8)
Medium (13-31)	415 (59.2)
Large (31-1370)	476 (67.9)

Table IV. - Philippine species (n = 2103, in tiers of 701 spp. each) with local names, by maximum length. Data from FishBase (Froese and Pauly, 1997).

Size group (cm)	Count of 'ti'	Count of 'ta'
Small (< 30)	8	17
Large (> 100)	0	21

Table V. - First syllabic use of the letters "ti" and "ta" in the first and last thirds of 688 local names of fish in Philippine languages (from FishBase; Froese and Pauly, 1997). The size-specific counts of "ti" and "ta" are significantly different (Fisher's exact test of independence; $P < 0.01$).

Biological information content of common names of Philippine fishes

The results presented here indicate that a large database in which local names are linked with scientific nomenclature and biological attributes (such as FishBase) can be used to great advantage to test, in quantitative terms, hypotheses relevant to linguistics and/or cultural anthropology. This is perhaps surprising given the very different purposes for which FishBase was originally developed, and given the widely held perception among social scientists that culture- or language- related hypotheses are not amenable to quantitative testing. On the other hand, our results are consistent with the suggestion of Wilson (1998) that, because of evolutionary constraints, research on humans and the world they live in should lead to results that show consilience, i.e., that “jump together”.

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