

Review

**RECENT COLLECTING EFFORTS OF PHILIPPINE
FLORA AND FAUNA BASED ON A CRITICAL
ASSESSMENT OF THE PUBLISHED LITERATURE
(2002-2005): SOME RECOMMENDATIONS FOR POLICY
RE-EVALUATION AND REFORMS**

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INTRODUCTION

The collection of natural history materials such as exotic flora and fauna has a long history in the Philippines. Records show that early collectors consist of foreign individuals or groups who started to come to the islands beginning from the early years of the Spanish period. Collections were made both for scientific and aesthetic purposes as many of the natural history materials from this part of the world are considered objects of immense scientific value and often prized for their novelty by Western society. This trend would continue until the latter part of the 20th century which also witnessed the slowly increasing participation of Filipino scientists and collectors.

Concomitant to the growing nationalism among the Filipinos is the increasing awareness of the concept of national patrimony, or national heritage, or even intellectual property rights. In the case of objects representing natural history like plants and animals, the concept of living natural heritage came forth amidst the growing awareness of the rich biological diversity in the Philippines. Thus, the Philippine Constitution of 1987 proudly proclaims in Article XII, Section 2, that “all lands of the public domain, waters, minerals, coal, petroleum, and other mineral oils, all forms of potential energy, fisheries, forests or timber, wildlife, flora and fauna, and

other natural resources are owned by the State.” This assertion in the fundamental law of the land is an unequivocal statement that drew upon the indisputable claim of ownership, and in more modern terms, inherent intellectual proprietary rights of the State.

Numerous laws have been passed to uphold and support such constitutional authority. Among the most recent of which is Republic Act 9147 or the Wildlife Resources Conservation and Protection Act which was enacted on July 30, 2001. Notwithstanding the many laws passed to conserve and protect wildlife resources in the Philippines, the perennial and all too common problem of poor implementation and misinterpretation and/or ignorance of these laws remains. The noble intentions of these laws have often been circumvented as a result, leading to many disadvantages accruing to the State, and indeed, to the national patrimony. This dilemma is exacerbated by the growing international trend of rampant and often unfair resource exploitation that cuts across national boundaries fueled primarily by the acute shortage of raw materials in many developed countries. Thus, the imbalance of resource supply and utilization among the world’s industrialized and developing countries has brought about unjust and lopsided practices commonly categorized under the broad label of biopiracy (Fenwick, 1998). Recently, the concerns for biopiracy have been extended to include complementary and alternative medicine (CAM) practices among indigenous peoples (Tedlock, 2006) in what has evolved lately into the field of ethnomedicine. In the Philippines, health practices in indigenous communities that have been proven effective in modern medical societies have been documented recently in a digital library project implemented by the Philippine Council for Health Research and Development.

Consistent with the goals of preserving and documenting the natural and cultural heritage of the Philippines, Republic Act 8492 was enacted to establish the National Museum system in 1998. One of the most important accomplishments of this law is the designation of the National Museum Complex in Rizal Park as its permanent home, after years of constant relocations resulting to untold damages to museum materials. In Section 7.1, the repository and educational mission of the National Museum is explicitly stated therein -- “acquire documents, collect, preserve, maintain, administer and exhibit to the public, cultural materials, objects of arts, archaeological artifacts, ecofacts, relics and other materials embodying the cultural and

natural heritage of the Filipino nation...” Section 7.2 further states that among its mission is to “collect, preserve, identify and exhibit to the public systematically all types of plants and animals found in the Philippines (and) maintain a reference collection on such subjects.”

METHODOLOGY

This review attempts to examine the recent trends in the utilization of Philippine natural history materials, specifically the collection and disposition of floral and faunal materials intended for scientific research as gleaned from the published literature produced from 2002 to 2005. This effort arose from a simple bibliographic listing of published scientific literature containing at least one taxon collected from the Philippines. The variety of papers included in the survey consists mainly of scholarly outputs of taxonomic nature dealing either with a single species description or a large compendium or monographic work, and everything in between. Papers were searched and retrieved from library collections, from electronic journal databases and from the Internet. For every paper included, the following information were noted, tabulated and used for the analysis: author nationality (Filipino or foreign, usually determined by authors' geographical affiliation), author composition according to nationality (either purely Filipino authorship, purely foreign authorship, or mixed), and journal profile (either published in the Philippines or elsewhere).

RESULTS AND DISCUSSION

The search yielded 175 titles of periodical or journal articles and three books (or CDs) as having been published between 2002 and 2005. The complete annotated bibliographic list is found at the end of this review as Appendix 1. These titles published a total of 222 new species of plants, animals, fungi and microorganisms and six new subspecies as well as 12 new genera. For added perspective, these figures are compared to similar surveys in other countries. The numbers represent a very small percentage when compared to a set of data obtained from a 4-year (1994-1997) accounting of the world's angiosperm flora alone (Prance et al., 2000) which yielded 9,718 new species described worldwide, or about 6.65 new species of angiosperms

each day! Based on the information obtained in this present survey, only 0.15 new species of plants, animals, fungi or microorganisms were described each day from the Philippines for the 4-year period surveyed. Sobral and Stehmann (2009) have shown that during a 17-year period from 1990 to 2006, some 2,875 new angiosperm species were described from Brazil at an average of 169 new species per year, or approximately one new species described every two days.

Of the 175 taxonomic papers included in this survey, 112 (62.9%) were published either singly or jointly and exclusively by foreigners (non-Filipinos) who are mainly from developed countries in Europe and North America, while 35 (19.6%) were published entirely by Filipinos. Both foreigners and Filipinos have published jointly 31 (17.4%) taxonomic papers within the four-year period. Joint authorship by authors from two or more countries has been interpreted as an indicator for international cooperation, and this trend has seen a linear increase in recent years (Georghiou, 1998; Wagner and Leydesdorff, 2005). The growth rate of internationally co-authored papers surpassed that of traditionally considered as nationally co-authored papers (Leydesdorff and Wagner, 2008), with the former more frequently cited than the latter (Persson et al., 2004). This trend will likely be seen, if not already, among publications involving Philippine biota although there are no available data to support this hypothesis.

Taxonomists have published about Philippine flora and fauna mainly in foreign journals. A total of 141 papers (79.2%) on Philippine flora and fauna have been published in 78 journals worldwide, with only 37 papers (20.7%) seeing print in journals published out of the Philippines. The leading publication venues for taxonomic papers in the Philippines and abroad included in this survey are listed in Table 1. From the foregoing data, it is obvious that publication venues are generally skewed to favor foreign journals which are mostly peer-reviewed and included in international abstracting and indexing services (the so-called ISI and SCI journals, for example), and which often show high impact factors. However, journal impact factors have been criticized as a tool for measuring the quality of scientific research (Gallagher and Barnaby, 1998), and may not necessarily be a true depiction of the quality of articles published in a journal (Falagas et al., 2006). Research is also geographically biased favoring industrialized countries. In a survey of environmental science journals, Karlsson et al. (2007) found an obvious

knowledge divide between developed and developing countries in terms of authorship and publication rates among other things, with a disproportionate emphasis on temperate and cold-ecoclimatic zones.

While Republic Act 8492 cited above has defined the National Museum as the repository and showcase of natural history objects such as flora and fauna, there has been no explicit provision therein that requires the deposition of voucher specimens particularly type materials in Philippine institutions such as the National Museum. However, Executive Order 247 (“Prescribing a Regulatory Framework for the Prospecting of Biological and Genetic Resources, their By-Products and Derivatives, for Scientific and Commercial Purposes, and for Other Purposes”) issued in 1995 is the basis for such a depository clause as contained in the Implementing Rules and Regulations (IRR) issued by the Department of Environment and Natural Resources. As part of research agreements issued under E.O. 247 and for securing a Prior Informed Consent (PIC) particularly when collecting in localities where indigenous people reside, collectors of biological samples are required to deposit representative materials specially type specimens of newly described Philippine taxa in the National Museum. This requirement is hardly followed by most collectors who have collected materials outside the sphere of the legal permit system in the first place. Many Filipino as well as foreign collectors found the permit system cumbersome, complicated and riddled with much bureaucracy (Swiderska et al., 2001). A quick survey of the papers included in the present review tends to confirm this dilemma. This is particular true in papers that are written by exclusively foreign authors, but lesser so in those written by exclusively Filipino collectors and mixed nationality authors. This may constitute a form of biopiracy although quite different from the traditionally utilitarian definition involving biodiversity for bioprospection purposes (Fenwick, 1998).

Lately, the deposition of voucher specimens collected from Philippine territory and used in published studies has become a matter of tacit protocol grounded mainly on ethical considerations. These often involved collections obtained under the permit system for which collectors are bound by trust and law to deposit these with the National Museum or any similar Philippine institutions. Those who collect without permits frequently do not abide by any rules. While bound by ethical rules to return collections to the countries of origin, they sometimes justify their actions by citing the poor state of most

museum facilities in the Philippines which are deemed unsuitable for long-term preservation of valuable specimens, especially type materials. The upgrading of museum and systematics collection facilities in the country should therefore be addressed by the authorities in the immediate future.

In the light of the above scenario, the following recommendations are made to address the problem of rampant illegal collecting, specimen smuggling and material repatriation.

- More vigilant monitoring by law enforcement agencies of collecting efforts particularly those involving foreign scientists and institutions, tourists and ‘pseudo-tourists’—agencies including local police, wildlife monitoring offices, customs and quarantine offices should be familiar with relevant provisions of various laws
- Implement stringent sanctions for habitual offenders, and possibly offer amnesty to first-time offenders, while keeping the doors open for law-abiding and above-board entities
- Less tedious collecting permit system for projects involving Filipino scientists and institutions or foreign-initiated projects involving Filipino collaborators in order to encourage the research efforts of home-grown scientists which oftentimes are undermined by unscrupulous, competing foreign entities who collect in the country anonymously; this will necessarily promote the scientific study of the country’s rich biodiversity primarily by Filipinos and their collaborators
- Instill a real, unequivocal collaborative scheme between Filipino and foreign scientists by requiring joint authorships of research results as dictated by ethical, practical and IPR considerations
- Implement editorial control measures to ensure publication of manuscripts using only specimens which are obtained through lawful channels
- Improve the overall quality and services of local repositories accompanied by the upgrading of professional and curatorial skills among the staff
- Repatriation of relevant Philippine materials, especially those obtained illegally, invoking Philippine and international biodiversity laws

While the last suggestion above may be considered drastic, this has obviously limited applications and only to materials which are unambiguously established as having been obtained through illegal means based on available collection circumstances (e.g., information supplied in the publication where materials were cited). This suggestion is meant to exclude historical materials deposited in foreign institutions which by virtue of their antiquity have been associated with such institutions and recognized within the international scientific community as such. However, for recently and irregularly acquired materials, repatriation of such may be done following some suggested steps which are grounded on diplomacy and civility without disregard for existing international laws. As the main local entities entrusted with the enforcement of biodiversity laws, particularly the disposition of Philippine specimens, the National Museum and agencies under the Department of Environment and Natural Resources should take the lead in any repatriation efforts. The steps outlined below represent a sequential approach characterized by increasing complexity.

- Formal communication of repatriation request to concerned scientist(s) and agency head citing Philippine and international laws
- Communicate with editors of journal requesting for possible withdrawal of published paper involving questionable specimens and subsequent reprimand on erring individuals
- Dissemination of information and publicity (~peer pressure) within professional societies and the international scientific community
- Filing of inter-governmental or diplomatic protest based on properly documented evidence
- Blacklisting or watch listing of target foreign scientists/collectors with the Philippine Bureau of Immigration and Deportation, and the Department of Foreign Affairs using biopiracy as possible reasons for deportation and denial of entry

The rich natural heritage of the Philippines has been threatened by wanton destruction over the years. Based on current estimates of forest and habitat degradation, the notion that many species are driven into extinction even before they can be discovered, studied and described by taxonomists is

becoming less and less of an exaggeration. The task of systematists becomes more urgent by the minute. However, the pool of taxonomic manpower in the Philippines as well as in many other countries is dwindling while infrastructure is often wanting in many respects. The last thing we need is the loss of taxonomic resources that form part of the national patrimony. But the situation is not totally hopeless when immediate action could be carried out to correct the situation.

LITERATURE CITED

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Table 1. Top domestic and international journal sources of published information used in the survey.

Local titles*

Philippine Scientist	11 papers
Asia Life Sciences	7 papers
Philippine Agricultural Scientist	7 papers
Silliman Journal	7 papers
Acta Manilana	3 papers
National Museum Papers	2 papers
Philippine Journal of Science?	
Other local journals?	

*based on incomplete information

Foreign titles (out of 78 titles)

Annals of the Natural History Museum, Vienna (Austria)	12 papers
Raffles Bulletin of Zoology (Singapore)	11 papers
Zoologische Mededelingen Leiden (Netherlands)	8 papers
Journal of Natural History (UK)	5 papers
Blumea (Netherlands)	3 papers
Copeia (USA)	3 papers
Harvard Papers in Botany (USA)	3 papers
Journal of Mammalogy (USA)	3 papers
Medical and Veterinary Entomology (UK)	3 papers
Proc of the Entomological Society of Washington (USA)	3 papers
Systematics and Biodiversity (UK)	3 papers

APPENDIX 1. Taxonomic literature (2002-2005) included in the survey

- van Achterberg, C. 2002. Revision of the genus *Canalicephalus* Gibson and the recognition of the Acampsohelcaninae (Hymenoptera: Braconidae) as extant. *Zool. Med. Leiden* **76**: 347-370. [Two species from Mindanao are reported: *Canalicephalus bakeri* Gibson and *C. mindanao* Gibson]
- Agoo, E.M.G., A. Schuiteman and E.F. de Vogel. 2003. Orchids of the Philippines, volume I: Illustrated checklist and genera. Nationaal Herbarium Nederland, Universiteit Leiden branch, CD-ROM.
- Ahmad, M. and M.S. Akhtar. 2002. Catalogue of the termites (Isoptera) of the Oriental Region. *Pakistan J. Zool. Suppl. Ser.* **2**: 1-86. [Includes numerous citations of Philippine materials]
- Ahyong, S.T. 2004. New species and new records of stomatopod Crustacea from the Philippines. *Zootaxa* **793**: 1-28. [Five species and one genus described as new to science from the Philippines: *Gonodactyloideus rubrus*, n.sp., *Lysiosquilla isos*, n.sp., *Carinosquilla balicasag*, n.sp., *Cloridina albatrossae*, n.sp., and *Visaya lira*, n.gen. et sp.]
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- Alejandro, G.D., S.G. Razafimandimbison and S. Liede-Schumann. 2005. Polyphyly of *Mussaenda* inferred from ITS and *trnT-F* data and its implication for generic limits in Mussaendeae (Rubiaceae). *Am. J. Bot.* **92**: 544-557.
- Alfaro, M.E., D.R. Karns, H.K. Voris, E. Abernathy and S.L. Sellins. 2004. Phylogeny of *Cerberus* (Serpentes: Homalopsinae) and phylogeography of *Cerberus rynchops*: Diversification of a coastal marine snake in Southeast Asia. *J. Biogeogr.* **31**: 1277-1292. [The study includes populations of *Cerberus rynchops* (Schneider) from the Philippines and *C. microlepis* Boulenger, an endemic species found only in Lake Buhi in Camarines Sur]
- Alviola, P.L., E.A. Cosico and E.G. Eres. 2003. Determination of relative age, sex and sex ratio of the Malayan box turtle (*Coura amboinensis* Daudin) in Pinaglubayan River, Polillo Island, Quezon, Philippines. *Asia Life Sci.* **12**: 111-121.
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- Apurado, J.L. and D.A. Valles. 2004. Notes on pipefishes (Syngnathidae) from two rivers in Panay and Mindanao, Philippines. *Philipp. Scient.* **41**: 268-276.

- Archituv, Y. and B.W. Hoeksema. 2003. *Cantellius cardenae* spec. nov. (Cirripedia: Pyrgomatinae) from *Acropora (Isopora) brueggemanni* (Brook, 1893) (Anthozoa: Acroporidae), a case of host specificity in a generalist genus. *Zool. Med. Leiden* **77**: 1-8. [Includes materials collected from the waters off Bolinao, Pangasinan]
- Banaticla, M.C.E. and I.E. Buot, Jr. 2004. Leaf architecture of ten Philippine *Psychotria* species (Rubiaceae). *Philipp. Scient.* **41**: 74-90.
- Barcelona, J.F. 2004. Collection and conservation status of ferns and fern allies (pteridophytes) on Panay Island, Philippines. *Philipp. Scient.* **41**: 57-73.
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- Zettel, H. 2003. The Helotrephidae (Insecta: Heteroptera) of the Philippine Islands. *Ann. Naturhist. Mus. Wien* **104B**: 45-97. [Fourteen new taxa are described for the first time: *Hydrotrepes palawanensis* from Narra, *H. busuanganus* from Coron, *H. minutus* from Busuanga, *H. vulcanus* from Albay, *H. philippinus* from Sagada, *H. samarensis* from Northern Samar, *H. visayasensis* from Negros Occidental, *H. masbatensis* from Tugbo, *H. milanae* from Leyte, *H. stereoides* from Subic, *H. stereoides montanus* from Sagada, *H. stereoides mindorensis* from Calapan, *H. bicolanus* from Camarines Sur and *H. bicolanus seyferti* from Catanduanes]
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- Zettel, H. 2004. Neue Wasserläufer (Insecta: Heteroptera: Gerridae) von den Philippinen. *Ann. Naturhist. Mus. Wien* **105B**: 361-387 [A total of seven new species and three new subspecies from the Philippines are described for the first time]
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- Zhang Jun-Xia, Ming-Sheng Zhu and Da-Xiang Song. 2004. A review of the Chinese nursery-web spiders (Araneae, Pisauridae). *J. Arachnol.* **32**: 353-417. [Two Philippine species are transferred to the genus *Hygropoda*, namely *Thalassius bottrelli* Barrion & Litsinger and *T. balingkinitanus* Barrion & Litsinger]