

Biodiversity in Asia: global importance & threats from international trade

SBS Ecology & Biodiversity Research Area

Aims:

1. review and comparative analysis of Asian biodiversity (species richness and endemism) and assessment of threats, compared to global patterns.
2. review and profile of wildlife trade into and through Hong Kong, with a special case study on ivory.

Aim 1:

Perform a literature review on selected major taxa to assess the ecological significance of Asian biodiversity within the global context, using published data and unpublished reports on terrestrial, freshwater and marine ecosystems.

The following questions will be addressed: (a) the pattern of biodiversity across and within major taxa within Asia compared to globally for the same taxa; (b) comparisons within and across major ecosystems; (c) key threats to biodiversity within Asia and in relation to other tropical or subtropical regions; (d) hypothesis development for any patterns identified (why and how, etc.?). As a further outcome of the review and associated workshop, key data gaps in knowledge on biodiversity will be identified (from taxonomic to phylogeographic) and the need of taxonomy/biodiversity centers in support of conservation and enhancement of taxonomic knowledge discussed.

Work Plan: *First semester of 2016:* organization of a small workshop of SBS/E&B participants to identify relevant literature and a format for the comparative analysis (preliminary preparation of literature to precede workshop). The workshop would also identify 4 expert speakers for a second international workshop (potentially: Mark Costello, Richard Corlett, Peter Ng Kee Lin, Holger Kreft, Clinton Jenkins, Nancy Knowlton, others?)

Late 2016- Early 2017: organization of an international workshop inviting four (selected) collaborators. During this workshop the structure of the review/opinion paper should be written. Smaller groups of experts would discuss specific issues (e.g. plant diversity, freshwater diversity; taxonomic challenges) and identify key questions/hypotheses for the paper.

Requested Budget: 125,000HK\$ [*Workshop organization: 10,000 HK\$; travelling & lodging expenses per external participant (x4): 25,000 HK\$; publication costs: 15,000HK\$*]

Aim 2:

Describe and examine the role of Hong Kong as a trade hub for internationally traded species into and through Hong Kong. Data on the trade of threatened species to be gathered from the literature, Census and Statistics trade records, CITES reports/database, consultation with experts and expert organizations (such as TRAFFIC) and from information on confiscated shipments. Trade volumes for selected countries and taxa in relation to wild population estimates of these targeted species would be assessed to determine the biological significance of trade volumes. Taxa for consideration to include a range of taxa; elephants; pangolins; cage birds; sharks; fish; lizards; snakes; turtles; orchids.

As a specific case study designed to highlight the challenges of monitoring and managing international wildlife trade into and through Hong Kong, a laboratory investigation will be conducted to trace the origin of ivory sold in Hong Kong using molecular analyses. One hundred samples from small ivory trinkets will be obtained to identify species involved (assisted by Professor Sam Wasser, University of Washington) and determine what proportion is from elephants (and possibly which elephant population(s)) and from mammoth (as often claimed). Radiocarbon and other radioisotope analyses will be used to determine the age of ivory – and thereby its legality (only pre-CITES listed ivory is legal) for elephant samples (N=10 bangles), and species identity(ies) determined.

Work Plan:

Research assistant to compile information/literature/data. Manuscript to be finished and submitted for publication by December 2016.

Requested Budget: 125,000HK\$. [*One RA for 2 months (2 x 15,000 HKD = 30,000 HK\$; trinkets 10,000 HKD (100 x 100 HKD/trinket); genetic analyses 20,000 HKD (100 x 200 HKD/sample; ivory samples 60,000 HKD (10 x 6,000 HKD/bangle; radiocarbon dating 5,000 HKD (10 x 500 HKD/sample).*]

Aim 1 Lead authors: S. Cannicci, B. Guénard, M. Yasuhara); **team;** D. Baker, T. Bonebrake, C. Dingle, B. Hau, L. Karczmariski, T. NG, B. Russell, R. Saunders, V. ThiyagaRajan, G. Williams.

Aim 2 Lead author: L. Gibson; **team;** D. Baker, T. Bonebrake, C. Dingle, Y. Sadovy, D. Dudgeon.

At a meeting of the E&B Research Area members, the above funding allocations were recommended for Aims 1 and 2. In addition, the members recommended that HK\$50,000 also be considered for a collaborative project between Research Areas led by D. Baker on microbiomes, as summarized below.

Microbiome research is an emerging frontier at the forefront of interdisciplinary scientific discovery. However, at its core is fundamental Ecology & Biodiversity. At HKU, microbiome research provides a unifying framework for the Biological Sciences encompassing Ecology, Plant and Cell Biology, Food and Nutritional Science with profound implications for Medicine. Funds are requested to contribute to a **cross-RA** collaboration within SBS. The Cell RA and the Faculty of Architecture have agreed to match this contribution with \$150K and \$200K, respectively. The funds will be administered to Dr. G. Panagiotou for use in developing ongoing microbiome research that links the human-natural-built environments. Specifically, funding will be used to support stipend and analytical costs for a RPg student who will execute a project under the supervision of Drs. Panagiotou and Baker to test the hypothesis that pathogens and antimicrobial resistance genes that accumulate in the natural environment feedback into the built and human environment, and that there is a positive relationship between biodiversity of the natural environment and human health and well-being.

The microbiome collaboration includes contributions from Baker, Bonebrake, Dingle, El-Nezami, Gibson, Panagiotou, and Yan.