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Authors: Estrada, Alejandro, and Butler, Rhett

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Editorial

Ecological and social context driven conservation

Alejandro Estrada[1] and Rhett Butler[2]
[1]Estación de Biología Tropical Los Tuxtlas, Instituto de Biología, Universidad Nacional Autónoma de México
[2]Mongabay.com

The third issue of the second volume of *Tropical Conservation Science* contains a set of papers reporting on seed dispersal by primates in the Atlantic forests of Brazil, earthworm diversity and agriculture in central Vietnam, attitudes and perceptions towards conservation among coffee farmers in Mexico and exploitation and trade of freshwater turtles in India. Two additional papers assess species distribution modeling in the tropics and an apparent global mismatch of research effort and avian conservation.

The fate of seeds dispersed by Golden Lion Tamarins (*Leontopithecus rosalia*) in an Atlantic forest fragment, Brazil

Nonhuman primates, which account for about 25-40% of the animal biomass represented by frugivores in tropical forests, disperse, via their feces, a great number of seeds of a broad spectrum of plant species, thus playing an important role as primary seed dispersers in the natural process of forest regeneration [1,2]. In their paper, **Lapenta and Procópio-de-Oliveira** report on Golden Lion Tamarins (*Leontopithecus rosalia*) as seed dispersal agents in an Atlantic Forest fragment in Brazil. Golden Lion Tamarins disperse the seeds of 43 plants species. Those species dispersed via their feces show a high percentage of germination success and while field experiments also showed high seed predation and high seedling mortality, many seedlings were able to survive to the end of the study period. The investigation by Lapenta and Procópio-de-Oliveira illustrates the complexity of some of the events surrounding the survival of seeds dispersed by GLT and directs our attention to two important issues: firstly, that habitat destruction and fragmentation by human activities alter the interactions between fruit-eating primates and the plants that are their source of fruit, with important consequences for seed dispersal and habitat regeneration [3] and, secondly, that the reintroduction of locally extinct primates to habitat fragments can buffer some of these consequences and may favor forest regeneration.

Earthworm diversity and soil characteristics in Thua Thien Hue, central Vietnam

As noted by Charles Darwin in his 1882 classic, *The Formation of Vegetable Mould Through the Action of Earthworms with Observations on Their Habits,* earthworms process huge quantities of plant litter and help convert it into rich topsoil, liberating nutrients for renewed plant growth.. Since earthworms constitute the highest biomass among tropical soil macrofauna, they represent an important component of diversity in tropical soils and greatly impact soil processes affecting plant growth [4]. Their role as ecosystem engineers is also important for biodiversity conservation and restoration of degraded lands [5] and because a high level of organic matter mixing is associated with soil fertility, an abundance of earthworms is beneficial to sustainable agricultural activities [6]. There are about 151 earthworm species in the humid tropics, but there are still many gaps in our knowledge of inventories for specific localities and of the most basic aspects of earthworm ecology and biology, much less of their influence on ecosystem properties and their interactions with other soil organisms and plants [5]. In their paper, **Zirbes** *et al*., report on the diversity of earthworms **in** sandy soils of Thua Thien Hue, in Central Vietnam, an important region for rice production and other crops, and where earthworms represent about 70% of total soil biomass. Their study reports the presence of seven species of earthworms in the sandy soils investigated, some of which were more common in in orchards and fallows than in rice fields. The authors argue about the importance of management of the soil macrofauna in central Vietnam to sustain and intensify agricultural practices without expanding the cultivated land-surface.

Attitudes and knowledge of shade-coffee farmers towards vertebrates and their ecological functions

In tropical America the multi-layered vegetation of shade-grown coffee plantations enhances the quality of the coffee farm as a conservation matrix and provides food and cover for birds, bats, non-flying mammals, reptiles, and amphibians, among others. In areas where farming has replaced natural habitat with pastureland and row crops, coffee farms are sometimes the only quality habitat available [7]. Understanding the attitudes of farmers towards the wildlife found in their shade-coffee plantation and how they perceive their ecological functions may provide insights to increase their motivation for conservation. **Lopez del Toro** *et al*., studied the attitudes and knowledge of shade-coffee farmers towards vertebrates and their ecological functions in 12 farming communities in east-central Mexico. The authors found that while birds and snakes were perceived as useful, bats were considered of no use and even damaging. They also discovered that very few farmers were aware of the important role bats and non-flying mammals may play in sustaining a healthy coffee plantation. Their study also showed a significant improvement in attitudes towards conservation in farmers who had participated in environmental education workshops compared with those farmers who had not participated.

Species distribution modeling in the tropics: problems, potentialities, and the role of biological data for effective species conservation

Tropical forests are the most biodiversity rich ecosystems on the planet, they have a restricted geographic distribution (*ca* 6% of the Earth's terrestrial surface), and they are disappearing rapidly as a result of human activity. In spite of long-term efforts at documenting the biological richness of tropical forests, it is estimated that only about 30% of plants and animals have been inventoried and that the number of species for which we have adequate information on their basic biology and ecology is significantly smaller [8,9]. In their study of species distribution modelling in the tropics, **Cayuela** *et al.,* point out that **i**n order to conserve the world's tropical biodiversity we need to know where species are found and we need to predict where they might be found if the climate

changes or human activity alters habitats. Because of the paucity of data on the distribution of tropical organisms, the authors point to the value of computer models that aim to predict where species might occur based on current knowledge. The authors stress that species distribution modelling can be a useful tool to support biodiversity conservation in the tropics, by supporting the development of conservation strategies and plans, identifying knowledge gaps, and providing a tool to examine the potential impacts of environmental change.

Mismatch of research effort and threat in avian conservation biology

Despite extremely high species diversity and endemism of existing tropical forests, 16 million ha are lost annually [8], an unprecedented process in evolutionary history [9]. According to BirdLife International [10](BLI,2000) globally, one in eight bird species may become extinct over the next 100 years, with 99% of the extinctions resulting from human activities such as deforestation and hunting [11]. The study by **Brito and Oprea,** based on a review of the available scientific literature (2000-20006), considers avian declines and extinctions as a worldwide concern and argues that the Nearctic and Palearctic are the biogeographic realms that receive most attention by avian conservationists, while the Neotropical, Afrotropical, and Indomalayan are the regions with higher avian species diversity. They further point out that the majority of bird conservation research is conducted by North American and western European researchers and that there is urgent need for capacity building in tropical developing nations. The authors warn that avian conservation science is misplacing its focus in lower-biodiversity regions in general and in non-threatened species for some orders, and that if such trends are not changed the persistence of several bird species worldwide may be seriously compromised.

Protected on paper, hunted in wetlands: exploitation and trade of freshwater turtles (*Melanochelys trijuga coronata* and *Lissemys punctata punctata*) in Punnamada, Kerala, India

Tortoises and freshwater turtles are among the most endangered orders of animals. There are about 320 species of tortoises and freshwater turtles in the world, Although the exact number is still debated [12]. About 250 of the total of 320 species recognized are freshwater turtles; most of these inhabit tropical and subtropical zones in the world. The majority of genus- and species-level taxa are regional or even local endemics [13]. While marine turtles have received significant attention for nearly half a century, their freshwater counterparts have not been as fortunate. Freshwater turtles around the world are threatened by increasing collection for food, perceived medical purposes, and the pet trade, with 159 species, or ca. 60%, of the group being more or less threatened [13]. The study by **Krishnakumar et al** published in this issue is a case in point. The study examines the exploitation and trade, to meet the demand from local restaurants and toddy shops, of the Indian black turtle or Indian pond terrapin and the Indian flap-shelled turtle in the Vembanad Lake and associated wetlands in Punnamada, India. The authors report that trade of these two turtles is intense and law enforcement aimed at limiting trade is lax. Since, the use of these turtles for medicinal purposes and as food is particularly ingrained in the local culture, the authors make a series of conservation recommendations aimed at gathering basic data on the turtle populations in the area and at developing local community involvement in conservation approaches, together with breeding and farming projects.

References

[1] Stevenson, P. R. and Aldana, A. M. 2008. Potential Effects of Ateline Extinction and Forest Fragmentation on Plant Diversity and Composition in the Western Orinoco Basin, Colombia. *International Journal of Primatology* 29:1017-1037.

[2] Link, A. and Di Fiore, A. 2006 Seed dispersal by spider monkeys and its importance in the maintenance of neotropical rain-forest diversity. *Journal of Tropical Ecology* 22:235–246.

[3] Chapman, C.A. and Onderdonk, D.A.1998. Forests without primates: primate/plant codependency. *American Journal of Primatology* 45:127-141.

[4] Fragoso, C., and P. Lavelle. 1992. Earthworm communities of tropical rain forests. *Soil Biology and Bio-chemistry* 24:1397-1408.

[5] Sarlo, M. 2006. Individual Tree Species Effects on Earthworm Biomass in a Tropical Plantation in Panama**.** *Caribbean Journal of Science* 42: 419-427.

[6] Fragoso, C., et al. 1997. Agricultural intensification, soil biodiversity and agroecosystem function in the tropics: the role of earthworms. *Applied Soil Ecology* 6:17-35

[7] Jha, S. and Dick, C. W. 2008. Shade coffee farms promote genetic diversity of native Trees. Current Biology 18: doi:10.1016/j.cub.2008.11.017

[8] Achard, F., Eva, H,D., Stibig, H.J., Mayaux, P., Gallego, J., et al. 2002. Determination of deforestation rates of the world's humid tropical forests. *Science* 297:999–1002

[9] Bierregaard, R.O. Jr., Lovejoy, T.E., Kapos, V., dos Santos, A. A., Hutchings, R. W. 1992. The biological dynamics of tropical rainforest fragments. *BioScience* 42:859–866

[10] BirdLife International 2004. *State of the World's Birds*. www.birdlife.org/action/science/sowb

[11] Sodhi, N. S., Liow, L. H. and Bazzaz, F. A. 2004. Avian extinctions from tropical and subtropical forests. *Annual Review of Ecology, Evolution and Systematic* 35:323–45

[12] Conservation International. 2009. Tortoise and Freshwater Turtle Conservation Program http://science.conservation.org/portal/server.pt?open=512&objID=624&mode=2&in_hi_userid=124186&cached=true – consulted 1 august 2009.

[13] Bour, R. 2008. Global diversity of turtles (Chelonii; Reptilia) in freshwater. *Hydrobiologia* 595:593–598 DOI 10.1007/s10750-007-9244-5

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