

SOCIO-ENVIRONMENTAL CHANGES IN THE STATE OF SÃO PAULO: PERSPECTIVES FOR CONSERVATION

Luciano Martins Verdade

Center of Nuclear Energy in Agriculture / University of São Paulo (USP)

Main research: Antonio R. Almeida Jr.

FAPESP Grant 2006/60954-4 | Term: Aug 2008 to Jul 2012

The state of São Paulo has suffered dramatic environmental changes since 1850 with a consistent destruction of most of the original ecosystems. As consequences, progressive loss of water and soil qualities, as well as crescent contamination of wildlife by pesticides have been promoted. Hopefully, there are no documented case of local extinction of wildlife and plants in São Paulo State, what stresses possible adaption processes to anthropogenic environments. This suggests the inclusion of agro ecosystems in the context of conservational biology. The present study proposes to evaluate the socio economical and cultural aspects causing the changes in the land use in São Paulo during the 20th Century, and also how such changes have affected the ecosystems capacity to produce environmental services essential to life maintenance.



Mixed footsteps of a puma (Puma concolor) and a human on an agricultural landscape in the state of São Paulo (Source: Lisboa MAM & Prado BH. Fazenda das Areias e Fazenda da Conquista: história, memória e cultura. Instituto Florestal. São Paulo – in press)



Puma crossing an eucalyptus plantation in the state of São Paulo (Source: Lisboa MAM & Prado BH. Fazenda das Areias e Fazenda da Conquista: história, memória e cultura. Instituto Florestal. São Paulo – in press)

SUMMARY OF RESULTS TO DATE AND PERSPECTIVES

The preliminary results of the projects can be summarized as follows:

Conceptual basis improvement: temporal dimensions can be eventually more relevant than geographical dimensions to determine the current patterns of biodiversity abundance and distribution in agricultural landscapes. In addition, agroecosystems (i.e., the matrices of agricultural landscapes) should not be considered as natural “non-habitats”, since they have resident species. On the other hand, agricultural activities are possibly the main anthropogenic pressure on biodiversity conservation due to pollution, introduction of exotic species and the destruction of natural ecosystems. The diversity of an agricultural landscape can be considered a direct measure of its conservation value. In order to increase it, agricultural practices should be less invasive.

Technological/methodological development: We are working to develop multi-taxa systematized sampling procedures in long-term biodiversity monitoring programs, and molecular markers to identify the species, the individuals of mammal terrestrial carnivores and their familiar lineages in microgeographic scale. We are also improving the use of stable isotopes of C and N in order to better understand the trophic structure of agricultural landscapes. The outcomes of this project will allow, for the first time, a broad view of wildlife adaptation to agricultural landscapes in terms of the use of space and feeding ecology by the species. We are also developing and validating models of water use for urban and agricultural purposes, as well as models to estimate biomass of native vegetation in altered environments such as in restoration areas.

Institutional articulation and improvement: This project is deeply related with the impacts the current proposed change in the Brazilian Forest Code might have on biodiversity. The dubious role of the media on this and other environmental issues have been pointed by this project. In addition, our results suggest a necessary interdisciplinary approach for the conflict between agriculture and conservation including the improvement of the related institutions in terms of research, education, extension, public policy and law enforcement.

MAIN PUBLICATIONS

Ferraz KMPMB, Peterson AT, Scachetti-Pereira R, Vettorazzi CA, Verdade LM. 2009. Distribution of capybaras in an agroecosystem, Southeastern Brazil, based on ecological niche modeling. *Journal of Mammalogy*. **90**:189–194.

Ferronato BO, Marques TS, Guardia, I, Longo ALB, Piña CI, Bertoluci J, Verdade LM. 2009. The turtle *Trachemys scripta elegans* (Testudines, Emydidae) as an invasive species in a polluted stream of southeastern Brazil. *Herpetological Bulletin*. **109**: 29-34.

Joly CA, Rodrigues RR, Metzger JP, Haddad CFB, Verdade LM, Oliveira MC, Bolzani VS. 2010. Biodiversity conservation research, training, and policy in São Paulo. *Science*. **328**: 1358-1359.

Meche A, Martins MC, Lofrano BESN, Hardaway CJ, Merchant M, Verdade LM. 2009. Determination of heavy metals by inductively coupled plasma-optical emission spectrometry in fish from the Piracicaba River in Southern Brazil. *Microchemical Journal*. **94**: 171-174.

Verdade LM, Rosalino LM, Gheler-Costa C, Pedroso NM, Lyra-Jorge MC. 2011. Adaptation of mesocarnivores (Mammalia: Carnivora) to agricultural landscapes of Mediterranean Europe and Southeastern Brazil: A trophic perspective. p.1-38. In: Rosalino, L.M. & C. Gheler-Costa [Eds.]. *Middle-Sized Carnivores in Agricultural Landscapes*. Nova Science Publishers, New York. (ISBN 978-1-61122-033-9).

Luciano Martins Verdade

Centro de Energia Nuclear na Agricultura
Universidade de São Paulo

Laboratório de Ecologia Isotópica
Caixa Postal 96
CEP 13400-970 – Piracicaba, SP – Brasil

+55-19-3429-4070
lmverddae@usp.br