Laboratorio de Evolución
Facultad de Ciencias
Universidad de la República

Curso de Profundización y Posgrado

# Refugios pleistocénicos y diversidad biológica

3 de mayo - 22 de junio de 2004

Docentes: Enrique Lessa y Guillermo D'Elía

**Objetivo**

El propósito de este curso es estudiar bibliografía seleccionada sobre la teoría de los refugios pleistocénicos y su posible papel en la génesis y mantenimiento de la diversidad biológica, con énfasis en las Américas.

**Requisitos**

Ser estudiante de maestría o estudiante de nivel de profundización. En el último caso, haber aprobado el examen de Evolución.

**Organización**

- Dos reuniones semanales, los martes y jueves de cada semana, de 14 a 16 hs.
- El curso se ganará con un trabajo final de unas 12 páginas de texto, consistente en un análisis crítico de la teoría de refugios. El trabajo debe incluir un panorama general de la teoría y su estado actual, y puede asimismo profundizar en un aspecto particular.

**Preinscripciones**

Del 12 al 23 de abril de 2004 en la Secretaría del PEDECIBA Biología. Habrá un máximo de 20 cupos.

## Calendario

| Semanas/días | Lecturas |
|---|---|
| Semana 1. | Fundamentos |
| 4 de mayo | Haffer, J. 1969. Speciation in Amazonian forest birds. Science 165: 131-137. |
| 6 de mayo | van der Hammen, T., y H. Hooghiemstra. 2000. Neogene and Quaternary history of vegetation, climate, and plant diversity in Amazonia. Quaternary Science Reviews 19: 725-742. |
| Semana 2. | Patrones de distribución |
| 11 de mayo | Mayr, E., y R. J. O'Hara. 1986. The biogeographic evidence supporting the Pleistocene forest refuge hypothesis. Evolution 40: 55-67. |
| 13 de mayo | Nores, M. 2004. The implications of Tertiary and Quaternary sea level rise events for avian distribution patterns in the lowlands of northern South America. Global Ecol. Biogeogr. 13: 149-161. |

| | |
|---|---|
| Semana 3. | Cambio climático |
| 18 de mayo | Colinvaux, P. A., P. E. De Oliveira. y M. B. Bush. 2000. Amazonian and neotropical plant communities on glacial time-scales: the failure of the aridity and refuge hypotheses. Quaternary Science Reviews 19: 141-169. |
| 20 de mayo | Cowling, S. A., M. A. Maslin, y M. T. Sykes. 2001. Paleovegetation simulations of lowland Amazonia and implications for Neotropical allopatry and speciation. Quaternary Research 55: 140–149. |
| Semana 4. | Filogenias y relojes moleculares |
| 25 de mayo | Cracraft, J., y R. O. Prum. Patterns and processes of diversification: speciation and historical congruence in some Neotropical birds. Evolution 42: 603-620. |
| 27 de mayo | Klicka, J., y R. M. Zink. 1997. The importance of recent ice ages in speciation: a failed paradigm. Science 277: 1666-1669.<br><br>Arbogast, B. S., y J. B. Slowinski; Klicka, J., y R. M. Zink. 1998. Pleistocene speciation and the mitochondrial DNA clock. Science 282: 1955. |
| Semana 5. | Filogeografía |
| 1 de junio | Joseph, L., C. Moritz, y A. Hugall. 1995. Molecular support for vicariance as a source of diversity in rainforest. Proc. R. Soc. London Ser. B. 260: 177-182.<br><br>Hugall, A., C. Moritz, A. Moussalli, y J. Stanisic. 2002. Reconciling paleodistribution models and comparative phylogeography in the Wet Tropics rainforest land snail *Gnarosophia bellendenkerensis* (Brazier 1875). PNAS 99: 6112-6117. |
| 3 de junio | Conroy, C. J. and J. A. Cook. 2000. Phylogeography of a post-glacial colonizer: *Microtus longicaudus* (Muridae: Rodentia). Molecular Ecology 9: 165-175.<br><br>Hewitt, G. 2000. The genetic legacy of the Quaternary ice ages. Nature 405: 907-913. |
| Semana 6. | Genética de poblaciones |
| 8 de junio | Milá, B. D. Girman, M. Kimura and T. B. Smith. (2000). Genetic evidence for the effect of a postglacial population expansion on the phylogeography of a North American songbird. Proceedings of the Royal Society, London 267: 1-8 |
| 10 de junio | Lessa, E. P., J. A. Cook, y J. L. Patton. 2003. Genetic footprints of demographic expansion in North America, but not Amazonia, during the late Quaternary. PNAS 100: 10331-10334. |
| Semana 7. | Síntesis, orientación del trabajo final |
| 22 de junio | Reunión final del curso. |

**Bibliografía** (* indica pdf disponible)


* Abbott, R. J., L. C. Smith, R. I. Milne, R. M. M. Crawford, K. Wolff, y J. Balfour. 2000. Molecular analysis of plant migration and refugia in the Arctic. Science 289: 1343-1346.

* Arbogast, B. S., y J. B. Slowinski; Klicka, J., y R. M. Zink. 1998. Pleistocene speciation and the mitochondrial DNA clock. Science 282: 1955.

* Avise, J.C., y D. Walker. 1998. Pleistocene phylogeographic effects on avian populations and the speciation process. Proc. R. Soc. Lond. Ser. B 265:547-563.

Brown, J. H., y M. V. Lomolino. 1998. Biogeography. Second Edition. Sinauer Assoc., Sunderland, 692 pp.

Brown, K. S. 1987. Conclusions, synthesis, and alternative hypotheses. Pp. 175-196 en T. C. Whitmore y G. T. Prance (eds.), Biogeography and Quaternary history in tropical America. Oxford Monographs on Biogeography No. 3, Oxford University Press, Oxford.

* Brown, K. S., P. M. Sheppard, y J. R. G. Turner. 1974. Quaternary refugia in tropical America: evidence from race formation in *Heliconius* butterflies. Proc. R. Soc. Lond. B. 187: 369-378.

* Bush, M. V. 1994. Amazonian speciation: a necessarily complex model. J. Biogeogr. 21: 5-17.

* Colinvaux, P. A., P. E. De Oliveira. y M. B. Bush. 2000. Amazonian and neotropical plant communities on glacial time-scales: the failure of the aridity and refuge hypotheses. Quaternary Science Reviews 19: 141-169.

* Colwell, R. K. 2000. A barrier runs through it... or maybe just a river. PNAS 97: 13470-13472.

* Conroy, C. J. and J. A. Cook. 2000. Phylogeography of a post-glacial colonizer: *Microtus longicaudus* (Muridae: Rodentia). Molecular Ecology 9: 165-175.

* Costa, L. P. 2003. The historical bridge between the Amazon and the Atlantic Forest of Brazil: a study of molecular phylogeography with small mammals. Journal of Biogeography 30: 71–86.

* Cowling, S. A., M. A. Maslin, y M. T. Sykes. 2001. Paleovegetation simulations of lowland Amazonia and implications for Neotropical allopatry and speciation. Quaternary Research 55: 140–149.

* Cracraft, J., y R. O. Prum. Patterns and processes of diversification: speciation and historical congruence in some Neotropical birds. Evolution 42: 603-620.

* Cruzan, M., y A. Templeton. 2000. Paleoecology and coalescence: phylogeographic analysis of hypotheses from the fossil record. Trends in Ecology and Evolution 15: 491-496.

* Freitas, H. A., L. C. R. Pessenda, R. Aravena, S. E. M. Gouveia, A. S. Ribeiro, y R. Boulet. 2001. Late Quaternary vegetation dynamics in the southern Amazon basin inferred from carbon isotopes in soil organic matter. Quaternary Research 55: 39-46.

* Gathorne-Hardy, F. J., Syaunkani, R. G. Davies, P. Eggleton, y D. T. Jones. 2002. Quaternary rainforest refugia in south-east Asia: using termites (Isoptera) as indicators Biological Journal of the Linnean Society 75: 453–466.

* Graham, M., P. Dayton, y J. Erlandson. 2003. Ice ages and ecological transitions on temperate coasts. Trends in Ecology and Evolution 18: 33-40.

* Haffer, J. 1969. Speciation in Amazonian forest birds. Science 165: 131-137.

* Hellberg, M. E., D. P. Balch, y K. Roy. 2001. Climate-Driven Range Expansion and Morphological Evolution in a Marine Gastropod. Science 292: 1707-1710.

* Hewitt, G. 2000. The genetic legacy of the Quaternary ice ages. Nature 405: 907-913.

* Hooghiemstra, H., y T. van der Hammen. 1998. Neogene and Quaternary development of the neotropical rainforest: the forest refugia hypothesis, and a literature overview. Earth-Science Reviews 44: 147–183.

* Hugall, A., C. Moritz, A. Moussalli, y J. Stanisic. 2002. Reconciling paleodistribution models and comparative phylogeography in the Wet Tropics rainforest land snail *Gnarosophia* bellendenkerensis (Brazier 1875). PNAS 99: 6112-6117.

* Jones, C. B. 1987. Evidence supporting the Pleistocene forest refuge hypothesis for primates. Biotropica 19: 373-375.

* Joseph, L., C. Moritz, y A. Hugall. 1995. Molecular support for vicariance as a source of diversity in rainforest. Proc. R. Soc. London Ser. B. 260: 177-182.

* Klicka, J., y R. M. Zink. 1997. The importance of recent ice ages in speciation: a failed paradigm. Science 277: 1666-1669.

* Knapp, S., y J. Mallet. 2003. Refuting refugia? Science 300: 71-72.

* Ledru, M.-P., Cordeiro, R. C., Dominguez, J. M., Martin, L., Mourguiart, P., Sifeddine, A., y Turcq, B. 2001. Late-Glacial Cooling in Amazonia Inferred from Pollen at Lagoa do Caçó, Northern Brazil. Quaternary Research 55, 47–56.

* Lessa, E. P., J. A. Cook, y J. L. Patton. 2003. Genetic footprints of demographic expansion in North America, but not Amazonia, during the late Quaternary. PNAS 100: 10331-10334.

* Liepelt, S., R. Bialozyt, y B. Ziegenhagen. 2002. Wind-dispersed pollen mediates postglacial gene flow among refugia. PNAS 99: 14590-14594.

* Marchelli1, P., y L. A. Gallo. 2004. The combined role of glaciation and hybridization in shaping the distribution of genetic variation in a Patagonian southern beech. Journal of Biogeography 31: 451–460.

* Mayr, E., y R. J. O'Hara. 1986. The biogeographic evidence supporting the Pleistocene forest refuge hypothesis. Evolution 40: 55-67.

* Milá, B. D. Girman, M. Kimura and T. B. Smith. (2000). Genetic evidence for the effect of a postglacial population expansion on the phylogeography of a North American songbird. Proceedings of the Royal Society, London 267: 1-8.

* Moritz, C., J. L. Patton, C. J. Schneider, y T. B. Smith. 2000. Diversification of rainforest faunas: an integrated molecular approach. Ann. Rev. Ecol. Syst. 31: 533-563.

* Nores, M. 2004. The implications of Tertiary and Quaternary sea level rise events for avian distribution patterns in the lowlands of northern South America. Globa. Ecol. Biogeogr. 13: 149-161.

* Parenti, L. R. 1982. The refuge theory: a critique. Syst. Zool. 31:527-529.

* Patton, J. L., y M. F. Smith. 1992. mtDNA phylogeny of Andean mice: a test of diversification across ecological gradients. Evolution 46:174-183.

* Pennington, R. T., Lavin, M., Prado, D. E., Pendry, C. A., Pell, S. K., y Butterworth, C. A. 2004. Historical climate change and speciation: neotropical seasonally dry forest plants

show patterns of both Tertiary and Quaternary diversification. Phil. Trans. R. Soc. Lond. B 515 - 538.

* Petit, R. J., I. Aguinagalde, J.-L. de Beaulieu, C. Bittkau, S. Brewer, R. Cheddadi, R. Ennos, S. Fineschi, D. Grivet, M. Lascoux, A. Mohanty, G. Müller-Starck, A. Palmé, J. P. Martín, S. Rendell, y G. G. Vendramin. 2003. Glacial refugia: hotspots but not melting pots of genetic diversity. Science 300: 1563-1565.

Pielou, E. C. 1991. After the Ice Age—the return of life to glaciated North America. Univ. Chicago Press, Chicago, 366 pp.

* Prance, G. T. 1996. Islands in Amazonia. Phil. Trans.R. Soc. Lond. B 351: 823-833.

* Schaal, B. A., y K. M. Olsen. 2000. Gene genealogies and population variation in plants. PNAS 97: 7024-7029.

* Simpson, B. B., y J. Haffer. 1978. Speciation patterns in the Amazonian forest biota. Annual Review of Ecology and Systematics 9: 497-518.

* Stewart, J, y A. Lister. 2001. Cryptic northern refugia and the origins of the modern biota. Trends in Ecology and Evolution 16: 608-613.

* Stewart, J. R. 2003. Comment on "Buffered Tree Population Changes in a Quaternary Refugium: Evolutionary Implications". Science 299: 825.

* Taberlet, P., y R. Cheddadi. 2002. Quaternary Refugia and Persistence of Biodiversity. Science 297: 2009-2010.

* Tarkhnishvili, D., A. Hille, y W. B. Hme. 2001. Humid forest refugia, speciation and secondary introgression between evolutionary lineages: differentiation in a Near Eastern brown frog, *Rana macrocnemis*. Biological Journal of the Linnean Society 74: 141–156.

* Tuomisto, H., y K. Ruokolainen. 1997. The role of ecological knowledge in explaining biogeography and biodiversity in Amazonia. Biodiversity and Conservation 6: 347-357.

* Tzedakis, P. C., I. T. Lawson, M. R. Frogley, G. M. Hewitt, y R. C. Preece. 2003. Response to Comment on "Buffered Tree Population Changes in a Quaternary Refugium: Evolutionary Implications". Science 299: 825.

* Tzedakis, P., C., I. T. Lawson, M. R. Frogley, G. M. Hewitt, y R. C. Preece. 2002. Buffered Tree Population Changes in a Quaternary Refugium: Evolutionary Implications. Science 297: 2044-2047.

* van der Hammen, T., y H. Hooghiemstra. 2000. Neogene and Quaternary history of vegetation, climate, and plant diversity in Amazonia. Quaternary Science Reviews 19: 725-742.

Whitmore, T., C., y G. T. Prance (eds.). 1987. Biogeography and Quaternary history in tropical America. Clarendon Press, Oxford, 214 pp.

* Wilf, P., N. R. Cúneo, K. R. Johnson, J. F. Hicks, S. L. Wing, y J. D. Obradovich. 2003. High plant diversity in Eocene South America: evidence from Patagonia. Science 300: 122-125.