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Title

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Permalink

<https://escholarship.org/uc/item/6nb5f0jp>

Journal

Molecular Ecology, 16(1)

ISSN

0962-1083

Author

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Publication Date

2007

DOI

10.1111/j.1365-294x.2006.3253_3.x

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John C. Avise — Recipient of 2006 Molecular Ecology Prize



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John Avise's career has coincided with, and to a considerable degree, guided the rise and expansion of molecular ecology and molecular evolution. Indeed, he has been a preeminent leader in both fields. John's first scientific paper on the evolutionary genetics of cave fishes, published in 1972 as an outcome of his Master's thesis, quickly became a Citation Classic. This early application of protein electrophoresis to natural populations was conducted in Robert K. Selander's laboratory at the University of Texas. It was probably the first multi-locus allozyme survey of any fish species. It was an auspicious beginning for a highly productive and highly successful scientific career. John has published nearly 300 scientific articles, plus nine books — and still counting. He enjoys the rare distinction of being a 'Highly Cited Author' on the ISI Web of Knowledge list.

Listing the scientific milestones in John's career would take much space. A sample should suffice. In the late 1970s at the University of Georgia, he introduced, with Bob Lansman, mitochondrial (mt) DNA methods to population biology. Wes Brown, working independently of Avise and Lansman during this same time period, was the other pioneer who recognized and documented the distinctive molecular and transmission properties of mtDNA that make it such a powerful tool for research in population genetics. mtDNA remains one of the most popular and successful molecular systems for a great variety of studies in molecular ecology and evolution.

John Avise is the acknowledged father of the field of phylogeography. He coined the term, defined the discipline's major principles, wrote the leading textbook

(*Phylogeography*), and provided many of the field's earliest and still most fascinating empirical results. He was among the early leaders who came to appreciate the multi-dimensional genetic perspectives in conservation biology, as witnessed in *Conservation Genetics*, an early compendium that he co-edited with Jim Hamrick. John has been a tireless advocate for nature and for natural history studies. He has led the successful melding of molecular genetics with traditional biological and field observations. His seminal and widely used textbook, *Molecular Markers, Natural History, and Evolution* (now in its second edition), remains the basic reference and touchstone for these studies.

John has investigated a great variety of genetic processes in nature, often in collaboration with others, notably his 24 graduate students, of which many have become prominent scientists. Influential and oft-classic papers that emerged from Avise's lab have encompassed, among other topics: histocompatibility polymorphisms and clonal diversity in coral reef invertebrates; phylogeographic analyses of individual species and regional biotas, such as the terrestrial, maritime, and freshwater faunas of the southeastern United States; genetic analysis of hybridization and introgression phenomena in vertebrate and invertebrate taxa, which include the introduction and application of cyto-nuclear disequilibrium statistics; population genetics and evolution of endangered species of marine turtles; population genetics of clonal vertebrates, including gynogenetic and hybridogenetic fishes and polyembryonic mammals; speciation patterns and processes in birds, fishes, and other animal groups; genetic analyses of mating systems and reproductive behaviors in many invertebrates, reptiles, amphibians, and fishes; and much, much more.

John Avise's many achievements have been recognized with numerous awards and honors. Among them: Sloan Fellowship in Molecular Evolution, Pew Fellowship in Marine Conservation, Caesar Kleberg Foundation Medal for Wildlife Conservation, Brewster Memorial Award from the American Ornithologists' Union, and Wilhelmine Key Award from the American Genetics Association. He is a fellow of the American Association for the Advancement of Science, and has been elected to the American Academy of Arts and Sciences and the National Academy of Sciences. John has served as President of the Society for the Study of Evolution, the American Genetics Association, and the Society for Molecular Biology and Evolution. He has served on the editorial boards of 15 journals in molecular biology, ecology, evolution, and conservation.

John was born in Grand Rapids, Michigan in 1948 and attended the University of Michigan, receiving a B.S. degree

in Natural Resources. His Master's degree in Zoology at the University of Texas preceded a two-year stint as a lab technician for Michael H. Smith at the Savannah River Ecology Laboratory in Aiken, South Carolina. He then joined Francisco Ayala's research group at the University of California, Davis, where he received his Ph.D. in Genetics. In 1975, he joined the faculty at the University of Georgia (UGA) and worked his way up the ranks from Assistant Professor to Distinguished Professor of Genetics. He retired from UGA in 2005 to assume his current position of Distinguished Professor of Ecology and Evolutionary Biology at the University of California, Irvine. His research and writing continue unabated and he is co-organizing with Ayala a colloquium series sponsored by the National Academy of Sciences, under the umbrella title *In the Light of Evolution*, with each colloquium devoted to a different biological topic that is important to society as well as scientifically interesting. The first colloquium, entitled *Adaptation and Complex Design*, was held at the Beckman Center of the National Academy of Sciences in Irvine, December 1–2, 2006. The second colloquium, on *Biodiversity and Extinction*, will be held December 7–8, 2007, also at the Academy's Beckman Center in Irvine.

John has written 'trade' books for audiences beyond the scientific community. They include *Captivating Life*, an autobiography as well as a historical record of the birth and development of molecular ecology; *The Genetic Gods*, an essay on evolution and religion; *The Hope, Hype, and Reality of Genetic Engineering*, on genetically modified organisms; *Genetics in the Wild*, a compilation of nature's most intriguing genetic phenomena; and, most recently, *Evolutionary Pathways in Nature*, a thoughtful and broadly-encompassing examination of the power and utility of phylogenetic perspectives in biology.

John thinks of himself as a natural historian at heart, a geneticist in mindset, and a concerned environmentalist in his gut. I am pleased to convey his deep appreciation for this year's Molecular Ecology Prize, which he graciously accepts on behalf of his students and postdocs, who are listed below.

Francisco J. Ayala
December, 2006

Avise, J.C. and R.K. Selander, 1972. Evolutionary genetics of cave-dwelling fishes of the genus *Astyanax*. *Evolution* 26:1–19.

Avise, J.C. 1994. *Molecular Markers, Natural History, and Evolution*. Chapman & Hall, New York (511 pp.). [A second and much-revised edition was published in 2004 by Sinauer, Sunderland, MA. (684 pp.).]

Avise, J.C. and J.L. Hamrick (eds). 1996. *Conservation Genetics: Case Histories from Nature*. Chapman & Hall, New York (512 pp.).

Avise, J.C. 1998. *The Genetic Gods: Evolution and Belief in Human Affairs*. Harvard University Press, Cambridge, MA. (279 pp.).

Avise, J.C. 2000. *Phylogeography: The History and Formation of Species*. Harvard University Press, Cambridge, MA. (447 pp.).

Avise, J.C. 2001. *Captivating Life: A Naturalist in the Age of Genetics*. Smithsonian Institution Press, Washington, D.C. (212 pp.).

Avise, J.C. 2002. *Genetics in the Wild*. Smithsonian Institution Press, Washington, D.C. (248 pp.).

Avise, J.C. 2004. *The Hope, Hype, and Reality of Genetic Engineering*. Oxford University Press, New York (242 pp.).

Avise, J.C. 2006. *Evolutionary Pathways in Nature: A Phylogenetic Approach*. Cambridge University Press, New York (286 pp.).

Graduate students (chronological order by date of the degree)

Michael Douglas (1978); Robert Chapman (1980); John Patton (1980); Charles Aquadro (1981); Joe Neigel (1984); Lou Kessler (1984); Nancy Saunders (1985); Trip Lamb (1986); Biff Bermingham (1986); Carol Reeb (1989); Marty Ball (1990); Brian Bowen (1992); Steve Karl (1992); Kim Scribner (1992); Matt Hare (1996); Kurt Wollenberg (1997); Adam Jones (1998); Glenn Johns (1998); DeEtte Walker (1998); Devon Pearse (2001); Anthony Fiumera (2001); Elizabeth Dakin (2003); Mark Mackiewicz (2005); Judith Mank (2006); Felipe Barreto (current); Rosemary Byrne (current).

Postdoctoral associates (chronological order by date of departure)

Paulo Prodöhl (1997); Guillermo Ortí (1997); DeEtte Walker (1999); Andrew DeWoody (2000); Brady Porter (2001); Andrey Tatarenkov (current).