



## **Benjamin B. Normark**

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### **Education**

- 1994 Ph.D., Ecology and Evolutionary Biology, Cornell University.
- 1985 B.A., Linguistics, Yale University. Magna cum laude with distinction in the major.

### **Positions and Fellowships**

- 2006- Associate Professor, Dept. of Plant Soil and Insect Sciences, UMass Amherst.
- 2006-07 Visiting Scholar, School of Integrative Biology, University of Queensland.
- 2004-06 Assistant Professor, Dept. of Plant Soil and Insect Sciences, UMass Amherst.
- 2000-04 Assistant Professor, Dept. of Entomology, UMass Amherst.
- 1997-2000 Postdoctoral Fellow (w/ Brian Farrell), MCZ, Harvard University.
- 1996-97 N.S.F. International Research Fellow (w/ Roger Blackman), NHM, London.
- 1994-96 A. P. Sloan Postdoctoral Fellow (w/ Nancy Moran), Dept. of EEB, Univ. of Arizona.
- 1989-92 N.S.F. Graduate Fellow, Cornell University.
- 1988-93 Andrew D. White Fellow, Cornell University.

### **Peer-Reviewed Journal Articles**

- Andersen, J. C., Wu, J., Gruwell, M. E. Gwiazdowski, R., Santana, S., Feliciano, N. M., Morse, G. E., and B. B. Normark. Submitted. Phylogenetic analysis of armored scale insects (Hemiptera: Diaspididae) based on nuclear, mitochondrial, and endosymbiont DNA sequences. *Molecular Phylogenetics and Evolution*.
- Gruwell, M. E., J. Wu, and B. B. Normark. In press. Diversity and phylogeny of *Cardinium* bacteria associated with armored scale insects (Hemiptera: Diaspididae). *Annals of the Entomological Society of America*.
- Rugman-Jones, P., J. C. Andersen, J. Morse, B. B. Normark and R. Stouthamer. In press. Molecular phylogenetics of *Abgrallaspis aguacatae* Evans, Watson, and Miller and several congeners. *Annals of the Entomological Society of America*.
- Burke, G. R., B. B. Normark, C. Favret, and N. A. Moran. 2009. Evolution and diversity of facultative symbionts from the aphid subfamily Lachninae. *Applied and Environmental Microbiology* 75: 5328-5335.
- Buckley, T. R., D. Attanayake, D.-C. Park, and S. Ravindran, T. R. Jewell, and B. B. Normark. 2008. Evolution of parthenogenesis in the New Zealand stick insect genus *Acanthoxyla* Uvarov (Phasmatodea: Phasmatidae): evidence from multiple loci. *Molecular Phylogenetics and Evolution* 48: 335-349.

- Gruwell, M. E., G. E. Morse, and B. B. Normark. 2007. Phylogenetic congruence of armored scale insects (Hemiptera: Diaspididae) and their primary endosymbionts from the phylum Bacteroidetes. *Molecular Phylogenetics and Evolution* 44: 267-280.
- Úbeda, F., and B. B. Normark. 2006. Sibling competition, male killers and the origins of paternal genome elimination. *Theoretical Population Biology* 70: 511-526.
- Gwiazdowski, R. A., R. G. Van Driesche, A. Desnoyers, S. Lyon, S. Wu, N. Kamata, and B. B. Normark. 2006. Possible geographic origin of beech scale, *Cryptococcus fagisuga* (Hemiptera: Eriococcidae), an invasive pest in North America. *Biological Control* 39: 9-18.
- Normark, B. B. 2006. Perspective: maternal kin groups and the evolution of asymmetric genetic systems -- genomic imprinting, haplodiploidy, and parthenogenesis. *Evolution* 60: 631-642.
- Morse, G. E., and B. B. Normark. 2006. A molecular phylogenetic study of armoured scale insects (Diaspididae). *Systematic Entomology* 31: 338-349.
- Provencher, L. M., G. E. Morse, A. R. Weeks, and B. B. Normark. 2005. Parthenogenesis in the *Aspidiotus nerii* complex (Hemiptera: Diaspididae): a single origin of a worldwide, polyphagous lineage associated with *Cardinium* bacteria. *Annals of the Entomological Society of America* 98: 629-635.
- Normark, B. B. 2004. Haplodiploidy as an outcome of coevolution between male-killing cytoplasmic elements and their hosts. *Evolution* 58: 790-798.
- Normark, B. B. 2003. Evolution of alternative genetic systems in insects. *Annual Review of Entomology* 48: 397-423.
- Normark, B. B., O. P. Judson, and N. A. Moran. 2003. Genomic signatures of ancient asexual lineages. *Biological Journal of the Linnean Society* 79: 69-84.
- Jordal, B. H., R. A. Beaver, B. B. Normark, and B. D. Farrell. 2002. Extraordinary sex ratios, and the evolution of male neoteny in sib-mating *Ozopemon* beetles. *Biological Journal of the Linnean Society* 75:353-360.
- Jordal, B. H., B. B. Normark, B. D. Farrell, and L. R. Kirkendall. 2002. Extraordinary haplotype diversity in haplodiploid inbreeders: phylogenetics and evolution of the bark beetle genus *Coccotrypes*. *Molecular Phylogenetics and Evolution* 23: 171-188.
- Pollock, D. A., and B. B. Normark. 2002. The life cycle of *Micromalthus debilis* LeConte (Coleoptera: Archostemata: Micromalthidae): historical review and evolutionary perspective. *Journal of Zoological Systematics and Evolutionary Research* 40: 105-112.
- Normark, B. B. 2001. On the adaptive significance of polar body transmission and the polyploid bacteriome in Pseudococcidae and Diaspididae. *Bolletino di Zoologia Agraria e di Bachicoltura* 33: 151-160.
- Farrell, B. D., A. S. Sequeira, B. O'Meara, B. B. Normark, J. H. Chung, and B. H. Jordal. 2001. The evolution of agriculture in beetles (Curculionidae: Scolytinae and Platypodinae). *Evolution* 55: 2011-2027.
- Normark, B. B. 2000. Molecular systematics and evolution of the aphid family Lachnidae. *Molecular Phylogenetics and Evolution* 14: 131-140.
- Blackman, R. L., J. M. Spence, and B. B. Normark. 2000. High diversity of structurally heterozygous karyotypes and rDNA arrays in parthenogenetic aphids of the genus *Trama* (Aphididae: Lachninae). *Heredity* 84: 254-260.
- Jordal, B. H., B. B. Normark, and B. D. Farrell. 2000. Evolutionary radiation of an inbreeding haplodiploid beetle lineage (Curculionoidea, Scolytinae). *Biological Journal of the Linnean Society* 71: 483-499.
- Normark, B. B., and N. A. Moran. 2000. Testing for the accumulation of deleterious mutations in asexual eukaryote genomes using molecular sequences. *Journal of Natural History* 34: 1719-1729.
- Sequeira, A., B. B. Normark, and B. D. Farrell. 2000. Evolutionary assemblage of the conifer fauna: distinguishing ancient from recent associations in bark beetles. *Proceedings of the Royal Society of London, Series B: Biological Sciences* 267: 2359-2366.

- Normark, B. B. 1999. Evolution in a putatively ancient asexual lineage: recombination and rapid karyotype change. *Evolution* 53: 1458-1469. (Erratum, 53: 2016.)
- Normark, B. B., B. H. Jordal, and B. D. Farrell. 1999. Origin of a haplodiploid beetle lineage. *Proceedings of the Royal Society of London, Series B: Biological Sciences* 266: 2253-2259.
- Normark, B. B., and A. A. Lanteri. 1998. Incongruence between morphological and mitochondrial-DNA characters suggests hybrid origins of parthenogenetic weevil lineages (genus *Aramigus*). *Systematic Biology* 47: 475-494.
- Judson, O. P., and B. B. Normark. 1996. Ancient asexual scandals. *Trends in Ecology and Evolution* 11: 41-46.
- Normark, B. B. 1996. The evolution of parthenogenesis in the *Aramigus tessellatus* species complex (Coleoptera: Curculionidae): Evidence from mitochondrial DNA sequences. *Evolution* 50: 734-745.
- Normark, B. B. 1996. Polyploidy of parthenogenetic *Aramigus tessellatus* (Say) (Coleoptera: Curculionidae). *Coleopterists' Bulletin* 50: 73-79.
- Normark, B. B., and A. A. Lanteri. 1996. *Aramigus uruguayensis* (Coleoptera: Curculionidae), a new species based on mitochondrial DNA and morphological characters. *Entomological News* 107: 311-316.
- Lanteri, A. A., and B. B. Normark. 1995. Parthenogenesis in tribe Naupactini (Coleoptera: Curculionidae). *Annals of the Entomological Society of America* 88: 722-731.
- Normark, B. B., A. R. McCune, and R. G. Harrison. 1991. Phylogenetic relationships of neopterygian fishes, inferred from mitochondrial DNA sequences. *Molecular Biology and Evolution* 8: 819-834.

## Dictionaries

- Barnhart, R. K., ed. 1988. *The Barnhart Dictionary of Etymology*. H. W. Wilson, New York. [Credited as an editor.]
- Flexner, S. B., ed. 1987. *The Random House Dictionary of the English Language*, 2nd ed., Unabridged. Random House, New York. [Credited as an etymology assistant.]
- Barnhart, R. K., ed. 1986. *The American Heritage Dictionary of Science*. Houghton Mifflin, Boston. [Credited as an editor.]

## Other Publications

- Normark, B. B. 2009. Evolution of Sex. Pages 570-572 in M. Ruse and J. Travis, eds. *Evolution: The First Four Billion Years*. Harvard University Press, Cambridge.
- Normark, B. B., 2009. Unusual gametic and genetic systems. Pages 507-538 in D.J. Hosken, T. Birkhead, and S. Pitnick, eds. *Sperm Biology: An Evolutionary Perspective*. Academic Press, Amsterdam.
- Normark, B. B., and Kirkendall, L. R. 2009. Parthenogenesis in Insects and Mites. Pp 753-757 in V. H. Resh and R. Cardé (Eds.), *Encyclopedia of Insects*, 2nd Ed. Academic Press, New York.
- Gwiazdowski, R., L. Cushing, and B. B. Normark. 2009. Additional genetic data support native range hypothesis for the invasive beech scale, *Cryptococcus fagisuga* Lindinger. *Biological Control News and Information*: in press.
- Kawai, S., B. B. Normark, and T. Kondo. 2009. Sadao Takagi, world authority on armored scale insects. Pages 309-311 in M. Branco, J. C. Franco, and C. Hodgson, eds. *Proceedings of the XI International Symposium on Scale Insect Studies*. ISA Press, Lisbon.
- Normark, B. B. 2008. Book review of: *Armored Scale Insect Pests of Trees and Shrubs*. *Bulletin of the Canadian Entomological Society* 40:127-128.
- Normark, B. B. 2005. Book review of: *A Catalogue of the Diaspididae of the World, Subfamilies Aspidiotinae, Comstockiellinae and Odonaspidinae*. *Systematic Entomology* 30: 337.
- Normark, B. B. 2005. Using flow cytometry to assess ploidy in armored scale insects (Diaspididae). Pages 49-57 in L. B. Erkiñç and M. B. Kaydan (Eds.), *Proceedings of the Tenth International*

- Symposium on Scale Insect Studies, Adana, Turkey, 19-23 April 2004. Scientific and Technical Research Council of Turkey, Ankara.
- Morse, G. E., M. E. Gruwell, L. E. Claps, and B. B. Normark. 2005. Towards a combined molecular and morphological phylogenetic analysis of Diaspididae. Pages 79-94 *in* L. B. Erkiş and M. B. Kaydan (Eds.), Proceedings of the Tenth International Symposium on Scale Insect Studies, Adana, Turkey, 19-23 April 2004. Scientific and Technical Research Council of Turkey, Ankara.
- Gruwell, M. E., C. D. von Dohlen, K. Patch, and B. B. Normark. 2005. Preliminary PCR survey of bacteria associated with scale insects (Hemiptera: Coccoidea). Pages 101-116 *in* L. B. Erkiş and M. B. Kaydan (Eds.), Proceedings of the Tenth International Symposium on Scale Insect Studies, Adana, Turkey, 19-23 April 2004. Scientific and Technical Research Council of Turkey, Ankara.
- Normark, B. B. 2004. The sex lives of scales. *Natural History* 113: 38-44.
- Normark, B. B. 2004. The biology of demons. *Evolution* 58: 676-679. [book review]
- Normark, B. B. 2004. The strange case of the armored scale insect and its bacteriome. *Public Library of Science -- Biology* 2: 298-301.
- Kirkendall, L. R., and B. B. Normark. 2003. Parthenogenesis. Pages 851-856 *in* V. H. Resh and R. Cardé (Eds.), *Encyclopedia of Insects*. Academic Press, New York.
- Braig, H. R., B. Turner, B. B. Normark, and R. Stouthamer. 2002. Microorganism-induced parthenogenesis. Pages 1-62 *in* R. N. Hughes (Ed.), *Reproductive Biology of Invertebrates, Volume XI: Progress in Asexual Reproduction*. Wiley, Chichester.
- Normark, B. B. 2002. Unruly Hamilton. *Trends in Genetics* 18: 377. [book review]
- Judson, O. P., and B. B. Normark. 2000. Sinless originals. *Science* 288: 1185-1186. [Perspective]
- Normark, B. B. 2000. Phylogeny and evolution of alternative genetic systems in insects. *Journal of Reproduction and Development* 46, Supplement: 17-18. [abstract]
- Judson, O. P., and B. B. Normark. 1996. Reply. *Trends in Ecology and Evolution* 11: 297.
- Normark, B. 1989. Manuscript variants and Old English word forms. *Journal of English Linguistics* 22: 173-175.

### **Invited Seminars (since 2000)**

- 2009 Dept. of Ecology & Evolutionary Biology, University of Tennessee Knoxville.  
Evolutionary Studies Program, SUNY New Paltz.  
Dept. of Biology, UMass Boston.
- 2008 Centre for Ecological and Evolutionary Studies, Univ. of Groningen, Netherlands.  
Institute of Evolutionary Biology, University of Edinburgh, UK.
- 2007 School of Integrative Biology, University of Queensland, Australia.  
Ecology/Evolution seminar series, UC Davis.
- 2006 Dept. of Biology, Indiana University.  
Dept. of Entomology, UC Riverside.  
Dept. of Organismic and Evolutionary Biology, Harvard University.  
Dept. of Entomology, Cornell University.  
Dept. of Entomology, North Carolina State University.
- 2005 Dept. of Biological Sciences, Vanderbilt University.
- 2003 Population & Evolutionary Genetics/Genomics seminar series, Harvard University.
- 2002 Dept. of Entomology, University of Maryland.
- 2001 Dept. of Biology, UMass Boston.  
Dept. of Entomology, UC Davis.
- 2000 Depts. of Botany and Zoology, Duke University.  
Dept. of Organismic and Evolutionary Biology, Harvard University.  
Dept. of Biology, Smith College.

### **Invited Symposium Papers (since 2000)**

- 2009 Normark, B. B. Haplodiploidy and Sperm Evolution. Biology of Spermatozoa (BoS.10), Darbyshire, UK.
- 2006 Normark, B. B. Genetic conflict and the origins of asymmetric genetic systems, in "Reproductive Strategies," National Institute for Basic Biology, Okazaki, Japan.
- 2005 Normark, B. B. Evolution and root weevils: parthenogenesis, polyphagy, and pestiferousness, in "Biology and management of root weevils," Entomology Society of America, Fort Lauderdale, FL.
- 2005 Normark, B. B. Paternal genome elimination in insects, Gordon Research Conference on Epigenetics, Plymouth, NH.
- 2005 Normark, B. B. Endosymbionts of scale insects, in "Insect endosymbionts as targets and agents of evolutionary change: recent insights and opportunities," Society for the Study of Evolution, Anchorage, AK.
- 2002 Normark, B. B., N. A. Moran, and O. P. Judson. Genomic signatures of ancient asexual lineages, in "Intraclonal genetic variation: ecological and evolutionary aspects," Linnean Society and Royal Entomological Society, London, UK.
- 2002 Normark, B. B. Phylogeny and evolution of alternative genetic systems in Sternorrhyncha, in "Phylogeny and evolution of Sternorrhyncha," Entomology Society of America, Fort Lauderdale, FL.
- 2002 Normark, B. B. Evolution of unusual genetic systems in scale insects, New England Molecular Evolutionary Biologists, Woods Hole, MA.

### **Graduate Students**

Lisa Provencher (Entomology MS 2003), Sean Werle (OEB Ph.D. 2004), Matthew E. Gruwell (Entomology / OEB Ph.D. 2008), Jeremy Andersen (OEB MS 2009), Rodger Gwiazdowski (Entomology / OEB Ph.D. expected 2009), Jin Wu (Entomology / OEB Ph.D. expected 2010).

Other graduate students advised as dissertation or thesis committee member: Sharon Dornhoff (OEB Ph.D. 2001), Colin Little (OEB MS 2004), Chad Hoefler (OEB / Entomology Ph.D. 2005), Baiqing Wang (OEB / Entomology Ph.D. 2005), Steven Johnson (OEB Ph.D. 2005), Clayton Winter (OEB MS 2006), Sarah Huber (OEB Ph.D. 2007), Julie Urban (Ph.D. 2008, Biological Sciences, University at Albany, NY), Mary Doherty (OEB Ph.D. 2008), Micah Dunthorn (OEB Ph.D. 2009), Kristopher Abell (Entomology Ph.D. student), Annie Paradis (OEB Ph.D. student), Laura Wegener Parfrey (OEB Ph.D. student), Anna Soper (Entomology Ph.D. student), Zhiyi Sun (OEB Ph.D. student), Dan Lahr (OEB Ph.D. student), Artemis Roehrig (Entomology MS student), John Andrade (Entomology MS student), Alexander Tulchinsky (OEB Ph.D. student).

External examiner for: Per Stenberg (Ph.D. 2003, Molecular Biology, Umeå University, Sweden).

### **Postdoctoral Fellow**

Geoff Morse (Ph.D., Harvard, 2003), Darwin Postdoctoral Fellow, Graduate Program in Organismic and Evolutionary Biology, 2002-2004.

### **Courses Taught**

Biology 101, Introductory Biology II (4cr). Co-taught with Adam Porter. Every spring.

Entomology 655, Systematic Entomology (4cr). Fall of even years.

Entomology 697C, Grant Writing (2cr). Fall of even years.

Plant, Soil, and Insect Sciences 397T, Molecular Systematics Lab (3cr). Spring of even years.

Entomology 791-793, Special topic graduate seminars (e.g. Genetic Conflict, Sex Ratios, Evolution of Genetic Systems, Comparative Methods; 1cr.). Fall of odd years.

### **Grants (since 2000)**

- 2009 USDA-AFRI (2009-02310), "Molecular identification and cryptic diversity of armored scale insects intercepted in plant quarantine," \$348,952 / 3 years.
- 2005 NSF (DEB-0447880), "CAREER: Phylogeny and evolution of armored scale insects (Hemiptera: Diaspididae) and their bacterial endosymbionts," \$651,937 / 5 years.
- 2003 Marsden Fund, Royal Society of New Zealand. T. R. Buckley and B. B. Normark. "How long have New Zealand stick insects gone without sex?" \$60,000 (NZ\$100,000)/ 2 years.
- 2003 Graduate Student Mentoring grant, University of Massachusetts. A. Averill, E. Jakob, C. Hoefler, A. H. Porter, and B. B. Normark. "Training effective large-classroom teachers," \$8,000.
- 2002 USDA-NRI (2002-35302-12479), "Molecular systematics of armored scale insects (Diaspididae)," \$200,000 / 3 years.
- 2001 NSF (DEB-0118718), Partnerships for Enhancing Expertise in Taxonomy, "Phylogenetic systematics of scale insects," subcontract on molecular systematics of *Chionaspis*, \$70,391 / 5 years.
- 2001 Faculty Research Grant, University of Massachusetts "Phylogeny and evolution of unusual genetic systems in armored scale insects," \$13,132.
- 2001 USDA Forest Service Cooperative Agreement, "Biological control of Beech Scale," subcontract on molecular systematics of *Cryptococcus*, \$10,000.

### **Committee Chairmanships & Administrative Duties, UMass**

- 2000-present Curator, Entomology Museum.
- 2002-present Entomology Seminar coordinator.
- 2009-present Graduate Program Director, Entomology.
- 2006 Chair, Entomology Graduate Program admissions committee.
- 2002-2003 Chair, Personnel Committee, Dept. of Entomology.
- 2002 Chair, ad hoc committee to select internal department chair, Dept. of Entomology.
- 2003-2004 Chair, Search Committee for Darwin Postdoctoral Fellow, OEB.

### **Professional Memberships**

- Society for the Study of Evolution  
Entomological Society of America  
American Association for the Advancement of Science

### **Peer Review of Manuscripts and Grant Proposals (since 2000)**

- American Naturalist, Annals of the Entomological Society of America, BioEssays, Biological Journal of the Linnean Society, Biological Reviews, Biology Letters, BioTechniques, Cladistics, Current Biology, Ecology Letters, Entomologica Americana, Environmental Entomology, European Journal of Entomology, Evolution, Evolutionary Ecology Research, Genetical Research, Genetics, Heredity, Insectes Sociaux, Israel Journal of Entomology, Journal of Applied Entomology, Journal of Economic Entomology, Journal of Heredity, Journal of Theoretical Biology, Molecular Biology and Evolution, Molecular Ecology, Molecular Phylogenetics and Evolution, PNAS, Proceedings of the Royal Society B, PLoS Biology, PLoS One, Systematic Entomology, Trends in Ecology and Evolution, Zoologica Scripta, Zoological Science.
- NSF, USDA, Royal Society of New Zealand (Marsden Fund), Australian Biological Resources Study.

### **Other Professional Activities**

- twice Member, Systematic Biology proposal review panel, Department of Environmental Biology, National Science Foundation, Washington, DC. [dates omitted to preserve confidentiality]

- 2010 Organizer, "Genetics and the origin of species: the continuing synthesis," a symposium to honor the career and legacy of Richard G. Harrison, Ithaca, NY.
- 2009 Member, Advisory board for Conceptual Biology textbook, Sinauer Associates.
- 2006 Organizer, New England Molecular Evolutionary Biologists annual conference (NEMEB XVII), UMass Amherst.
- 2006- Member, Editorial Board, Comparative Cytogenetics (St. Petersburg).