

## Curriculum Vitae: Philip W. Hedrick (July, 2013)

**Personal Data:** Born - 21 November 1942, Swampscott, Massachusetts

### **Education:**

1960-1962	Hanover College, Indiana
1962-1963	American University of Beirut, Lebanon
1963-1964	B.A. Hanover College - Biology
1964-1966	M.S. Univ. Minnesota - Genetics
1966-1968	Ph.D. Univ. Minnesota - Genetics

Dissertation: Selection in Finite Populations (Advisor, R.E. Comstock)

### **Experience:**

#### **Primary Appointments**

1964-1965	Research Assistant, Univ. Minnesota
1965-1968	N.I.H., Predoctoral Fellow, Univ. Minnesota (with R. E. Comstock)
1968-1969	N.I.H., Postdoctoral Fellow, Univ. Chicago (with R. C. Lewontin)
1969-1973	Assistant Professor, Univ. Kansas
1973-1979	Associate Professor, Univ. Kansas
1975-1976	Visiting Associate Professor, Univ. Calif. - Davis
1979-1988	Professor, Univ. Kansas
1982-1983	Visiting Professor, Univ. Calif. - Berkeley
1988-1992	Professor of Biology, Pennsylvania State Univ.
1992-	Ullman Professor, Arizona State Univ.

#### **Other Appointments**

1970 (summer)	Visiting Professor, Univ. Groningen, Groningen, Netherlands
1979 (summer)	Visiting Professor, Univ. Groningen, Groningen, Netherlands
1980 (summer)	Visiting Professor, Univ. Texas, Houston
1981 (summer)	Visiting Professor, Univ. Washington
1982 (summer)	Visiting Professor, Washington Univ.
1982-1983	Visiting Professor, Univ. Calif. - Berkeley
1984-1988 (summer)	Visiting Professor, Univ. Calif. - Berkeley
1986 (January)	Visiting Lecturer, Nordic Graduate Course in Plant Breeding Univ. Helsinki, Finland
1988-1989(Dec-Feb)	Visiting Professor, Univ. New England, Armidale, Australia
1990 (Jan.-March)	Distinguished Research Fellow, Bodega Marine Lab.
1991 (March)	Visiting Professor, Kyushu Univ., Fukuoka, Japan
1992 (summer)	Visiting Professor, Oulu Univ., Oulu, Finland
1995 (summer)	Visiting Professor, Aarhus University, Aarhus, Denmark

1995-present	Adjunct Professor, Department of Ecology and Evolutionary Biology, Univ. Arizona
2010 (May-June)	Visiting Professor, Univ. Zurich, Zurich, Switzerland
2011 (Feb.-March)	Visiting Professor, Donana Biological Station-CSIC, Seville, Spain

### ***Offices and Elected Positions***

1970-1975	Managing Editor, <i>Evolution</i>
1977-1979	Council Member, <i>Evolution</i>
1978-1990	Editor, <i>Drosophila Information Service</i>
1986-1989	Secretary, <i>American Society of Naturalists</i>
1987-present	Fellow, <i>American Association for Advancement of Science</i>
1992	President, <i>American Society of Naturalists</i>
2002	President, <i>American Genetics Association</i>

### ***Editorial Positions***

1987-1990	Associate Editor, <i>Evolution</i>
1988-1994	Editorial Board, <i>Journal of Theoretical Biology</i>
1990-1995	Editorial Board, <i>Genetica</i>
1991-2001	Board of Editors, <i>Conservation Biology</i>
1997-2002	Board of Editors, <i>Animal Conservation</i>
1999-present	Board of Editors, <i>Conservation Genetics</i>
2001-2004	Board of Editors, <i>Journal of Heredity</i>
2002-2006	Board of Editors, <i>Heredity</i>
2004-2006	Associate Editor, <i>Molecular Ecology</i>
2006-present	Board of Editors, <i>Molecular Ecology</i>
2006-2011	Board of Editors, <i>Evolutionary Applications</i>

### ***Panels, Recovery Teams, and Committees***

1983	Panel Member, NSF-Population Biology and Physiological Ecology
1986-1991	Technical Board, American Livestock Breeds Conservancy
1987-1988	Scientific Advisor, Hooded Crane Species Survival Plan
1992	Panel Member, NSF - Conservation Biology
1992-1998	Winter-Run Chinook Salmon Recovery Team
1992-1997	Board of Directors, Institute for Agricultural Biodiversity
1994-2010	Mexican Wolf Recovery Team
1994	Genome Resource Banking Committee - CBSG
1994, 1999	Florida Panther Genetics Committee - CBSG
1999	Whooping Crane Review Team
1999	Red Wolf Program Review Committee
1999	PHVA of Desert Bighorn Sheep in New Mexico
2000	PHVA of Wolves in the Southern Rockies
2000-2003	Red Wolf Recovery Team
2001-2002	Nevada Genomics Center Advisory Board

2001	Committee on the Genetics of Wild Horses
2001	PHVA of Mexican wolves
2002	Organizer of Molecular Evolutionary Genetics Symposium
2003-present	Chiricahua Leopard Frog Recovery Team
2005-present	Pallid Sturgeon Recovery Team Genetics Advisory Group
2005	Salmon in Alaska Review, Center for Independent Experts
2006-2007	Expert witness for World Wildlife Fund on wolves in Norway
2006	Outside Expert for the Finnish Centre of Excellence in Population Genomic Research
2008	Workshop on Applying Conservation Biology to Endangered Species Recovery Goals: The Wolf as a Case Study
2008	Panel on Artificial Propagation of Delta Populations (CA)
2008	Bison Genetics Advisory Panel
2010	Assessing Techniques for Bison Genetics Evaluation Panel

***Invited Symposium Lectures:***

1975. Annual Drosophila Conference - Baton Rouge, Louisiana. *Simulation of X-linked Selection in Drosophila.*

1980. Population Genetics Workshop - Stanford, California. *Factors Affecting Rates of Chromosomal Evolution.*

1980. Midwest Population Biology Meeting - West Lafayette, Indiana *Genetic Hitchhiking: A New Evolutionary Factor?*

1983. Behavior Genetics Meeting - London, England. *Regulatory Gene Variation: Adaptation or Genetic Hitchhiking?*

1983. XV International Congress of Genetics - New Delhi, India. *Speciation: A Population Genetics Perspective.*

1984. Population Genetics in Forestry - Gottingen, Germany. *Inbreeding and Selection in Natural Populations.*

1984. Workshop on Genetic Management of Captive Populations - Front Royal, Virginia. *Protein Variation, Fitness, and Captive Propagation.*

1985. Evolutionary Processes and Theory - Jerusalem, Israel. *Evolutionary Genetics: HLA as an Exemplary System.*

1985. Founder Effect in Evolution - Honolulu, Hawaii. *Founder Effect and Genetic Variance.*

1986. Applied Population Biology Symposium (Sloan Foundation) - Davis, California. *Genetics of Conservation in Zoos and Nature Reserves*

1986. European Population Genetics Group (20th Anniversary Meeting) - Nottingham, England. *Evolutionary Genetics: HLA as an Exemplary System*.
1988. The Genetics and Evolutionary Biology of Meiotic Drive - Honolulu, Hawaii. *Segregation Distortion: Effect on Gametic Disequilibrium and Evidence at HLA*.
1988. Genetic Conservation Symposium - Toronto, Ontario. *Conservation Genetics: An Overview*.
1988. Research Priorities in Conservation Biology - Miami, Florida. *Population Viability Analysis - Minimum Viable Population*.
1989. Ecological and Evolutionary Genetics of *Drosophila* - Armidale, Australia. *Habitat Selection and Maintenance of Genetic Variation*.
1989. Analytical Methods for Population Viability Analysis and Management - Front Royal, Virginia. *Allelic Diversity and Heterozygosity*.
1990. Conservation of Genetic Resources for Sustainable Development - Roros, Norway. *Population Genetics Theory in Genetic Conservation*.
1992. Presidential Address, American Society of Naturalists - Berkeley, California. *Evolutionary Genetics of the Major Histocompatibility Complex*.
1992. Finnish-American/International Plant Genetics Symposium - Oulu, Finland. *Evolutionary Genetics and the Major Histocompatibility Complex: Another Classic Example*.
1993. Conservation Genetics - Aarhus, Denmark. *Relevance of the Major Histocompatibility Complex (MHC) to Conservation Genetics*.
1993. Conservation Genetics of Endangered Pacific Salmon - Bodega Bay, California. *Estimation of Effective Population Size in Winter Run Chinook Salmon*.
1994. Ecology and Genetics in Spatially Structured Populations - Tvarmine, Finland. *Metapopulation Dynamics and the Effective Population Size*.
1994. Metapopulations and Wildlife Conservation and Management - Albuquerque, New Mexico. *The Genetics of Metapopulations*.
1994. Navajo-Churro Sheep Association - Chinle, Arizona. *Conservation Breeding in Navajo-Churro Sheep*.
1995. 4th International Workshop on MHC Evolution - St. Augustine, Florida. *Conservation Genetics and MHC*.

1995. European Society of Evolutionary Biology - Edinburgh, Scotland. *Effective Population Size in a Metapopulation*.
1995. The Role of Captive Breeding / Artificial Propagation in the Restoration of Endangered Species - Newport, Oregon. *Conservation Genetics: Gila Topminnow, Florida Panther, and Mexican Wolf*.
1995. Captive Breeding in Pacific Salmon - Bodega Bay, California. *Genetics and Conservation of Salmon*.
1995. Society for Conservation Biology - Fort Collins, Colorado. *Directions in Conservation Biology*.
1995. Southwestern Rare and Endangered Plants - Flagstaff, Arizona. *Molecular and Adaptive Variation: A perspective for Endangered Plants*.
1996. MHC and Behavior - Kiel, Germany. *Balancing Selection and MHC Variation*
1996. The Genetic and Physiological Basis of Heterosis - Bodega Bay, California. *Balancing Selection and the Major Histocompatibility Complex (MHC)*.
1997. Unanswered Questions about Small Populations - Baltimore, Maryland. *Conservation Genetics: Gila Topminnow and Mexican Wolf*.
1997. Arizona Heritage Alliance Seminar - Phoenix, Arizona. *Conservation Genetics and Endangered Species*.
1997. The Effects of Captivity on Endangered Species - Albuquerque, New Mexico. *Genetic Change and Captivity*
1998. Conservation Genetics - Phoenix, Arizona. *Southwest Working Group of Declining Amphibians*.
1998. Inbreeding Depression and Conservation Biology - Sydney, Australia. *Conservation Genetics*.
1998. A General Framework for Genetics, Demography, and Population Viability in Conservation - Sydney, Australia. *Conservation Biology*.
1998. Conservation Genetics Examples, from Gila Topminnows, Winter-run Chinook Salmon, and Other Endangered Species - El Escorial, Spain. *Conservation of Genetic Resources*.
1998. Conservation Genetics Examples, from Gila Topminnows, Winter-run Chinook Salmon, and Other Endangered Species - Uppsala, Sweden. *Conservation Genetics*.

1999. Application of Molecular Genetics to Managing Endangered Species – San Diego. *Population Viability Analysis: Assessing Models for Recovering Endangered Species*.
2000. ESUs and MUs within Species. Missoula, Montana. *Conservation Biology*
2000. Wolf MHC. Manchester, England. *Comparative Evolution of MHC*.
2000. MHC and Captive Breeding. London, England. *Reproduction and Integrated Conservation Science*.
2000. Using Evolutionary Genetic Principles in Conservation Biology. Groningen, Netherlands. *Festschrift for Wilke Van Delden*.
2001. Neutral, Detrimental, and Adaptive Genetic Variation in Conservation Genetics. New York. *Conservation Genetics in the Age of Genomics*
2001. Conservation Genetics. Lausanne, Switzerland. *Conservation Genetics*
2002. Inbreeding Depression in Conservation Biology. Farna, Sweden. *Conservation of Small Wolf Populations*
2002. Research Challenges for Naturalists in the Era of Genomics. Banff, Canada. *Research Challenges for Naturalists in the 21<sup>st</sup> Century*
2002. Recent Developments in Conservation Genetics. Strasbourg, France. *Population and Conservation Genetics of Forest Trees*
2003. Aquatic Resources in Arid Lands. Las Cruces, New Mexico. *Conservation Genetics in Aquatic Species*
2003. Recent Developments in Conservation Genetics. Leeds, England. *Genetic Biodiversity in Natural Populations: Implications for Management - European Society for Evolutionary Biology*.
2003. MHC and Endangered Species. Leeds, England. *Evolutionary Dynamics of the Major Histocompatibility Complex (MHC) - European Society for Evolutionary Biology*
2005. Genetics in the Florida Panther. Live Oak, Florida. *Past effective population size in Florida panthers*.
2005. Conservation Genetics in the European Union. Berlin, Germany. *Effective Population Size and Genetic Differentiation in Conservation Genetics*.
2005. *Recent Developments in Conservation Genetics*. Asilomar, California. Second International Meeting on Conservation Genetics.

2005. *Recent Developments in Conservation Genetics*. Derbyshire, UK. Conservation of Genetic Diversity: Science and Policy Needs in a Changing World.
2006. *Measuring Diversity Among Breeds and Populations*. Minneapolis, MN. 2006 Joint ADSA-ASAS Annual Meeting.
2006. *Recent Developments in Conservation Genetics: Examples from Endangered Topminnows, Wolves, and Florida Panthers*. Flagstaff, AZ. 33<sup>rd</sup> Natural Areas Conference
2006. *Conservation Genetics*. Madrid, Spain. IUFRO Conference Population Genetics and Genomics of Trees: From Gene Function to Evolutionary Dynamics and Conservation.
2007. *Captive Breeding and the Recovery of the Mexican and Red Wolves*. Los Angeles, CA. Microevolutionary Change in Human-altered Environments.
2007. *Population and Conservation Genetics of the Endangered Sonoran Topminnow*. Durham, NC. Developing New Model Systems for Evolutionary Genetics and Genomics Using Poeciliid Fishes.
2007. *Recent Developments in Conservation Genetics*. Moriela, Mexico. Association for Tropical Biology and Conservation.
2007. *Captive Breeding and the Recovery of the Mexican Wolves*. Moriela, Mexico. Association for Tropical Biology and Conservation.
2008. *Captive Breeding of Delta Smelt: Overview of Genetic Issues*. Davis, CA. CABA-CALFED Workshop on Establishment of Delta Smelt Refugial Populations.
2008. *Artificial Propagation and Genetics: Examples, General Principles, and Guidelines*. Sacramento, CA. CALFED Workshop on Artificial Propagation.
2009. *Genetic Rescue and Hybridization*. Trondheim, Norway. Conservation Genetics Symposium.
2009. *Conservation Genetics and North American Bison*. Flagstaff, AZ. 10<sup>th</sup> Biennial Conference of Research on the Colorado Plateau.
2010. *MHC, Inbreeding, and Disease*. St. Louis, MO. Symposium on Mate Choice.
2010. *Conservation Genetics: Its Impact on Conserving Endangered Species*. Emmental, Switzerland. Retreat for Evolutionary Biology, Univ. Zurich.
2011. *Bison Conservation Genetics*. Tulsa, OK. Meeting on Bison Ecological Restoration.

2011. *Conservation Genetics: How it Can Contribute to Recovery*. College Station, TX. Ecological Integration Symposium.

2012. *Conservation Genetics*. Univ. Calif. – Davis. Conservation of Extremely Small Populations.

2012. *Population Genetics of Malaria Resistance in Medicine*. Arizona State Univ., Tempe. Phylomedicine Conference.

***Federal and State Research Grants:***

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|----------|--|
| NSF      | Undergraduate Research Participation (1972) - \$15,000   |
| NSF      | Genetic Variation in Temporally and Spatially Heterogeneous Environments (1973-1975) - \$38,000  |
| NSF      | Genetic Variation in Temporally and Spatially Heterogeneous Environments (1975-1978) - \$47,500  |
| NIH      | Disease Association and the HLA Region (1982-1984) with G. Thomson - U.C. Berkeley - \$180,000   |
| NIH      | Disease Association and the HLA Region (1984-1987) with G. Thomson - U.C. Berkeley - \$280,000   |
| NIH      | Population Genetics of the HLA Region (1985-1988) with G. Thomson - U.C. Berkeley - \$240,000  |
| NIH      | Disease Association and the HLA Region (1987-1992) with G. Thomson - U.C. Berkeley - \$450,000   |
| NIH      | Population Genetics of the HLA Region (1989-1994) with G. Thomson - U.C. Berkeley - \$750,000  |
|          | Menzies Wallflower Research Program (1989-1991), Contract with Humboldt State University - \$12,900  |
| NSF      | Conservation Genetics and Inbreeding Depression (1990-1993) - \$140,000  |
| UC-Davis | Captive Broodstock Breeding Program in Winter-Run Chinook Salmon (1993-1998), Contract with University California - Bodega Bay - \$115,000 |
| NSF      | Inbreeding Depression and Adaptive Genetic Variation in Gila Topminnows (1994-1997) - \$225,000  |



- AZDGF Mexican Wolf Genetics (1994-1996) with Philip Miller - Arizona Heritage Program - \$28,000
- NSF Inbreeding Depression and Adaptive Genetic Variation in Gila Topminnows-REU Supplement (1994) - \$5,000
- AZDGF Microsatellite Variation in Topminnows (1995-1997) with Ruby Sheffer-Arizona Heritage Program - \$33,200.
- AZDGF Genetic Variation in Bighorn Sheep (1996-1998) with Steven Kalinowski-Arizona Heritage Program - \$36,520.
- USFWS Recommendation for Establishing and Maintaining a Broodstock for Bonytail Chub (1996) – US Fish and Wildlife Service - \$4280.
- USBR Gila Topminnow Diseases from Non-native Fishes (1996-1997) - Bureau of Reclamation - \$10,000
- AZDGF MHC and Parasite Resistance in Gila Topminnows (1997-1999) with Timothy Kim - Arizona Heritage Program - \$38,000.
- USFWS Evaluation of the Merging of the Three Mexican Wolf Lineages (1997-1998) - U.S. Fish and Wildlife - \$22,000.
- Genetic Variation for Disease Resistance Genes in the Arabian Oryx (1998) - Phoenix Zoo - \$6,875.
- USBR Genetic Characterizations of Sonoran Topminnow Populations (1998) - Bureau of Reclamation - \$21,171.
- NSF Parasite Resistance in Gila and Yaqui Topminnows (1998-2002) - \$200,000
- AZDGF Microsatellite and MHC variation to distinguish natural lineages of the Sonoran topminnow with Karen Parker (1998-2000) - Arizona Heritage Program - \$40,170.
- USFWS The Impact of Hybridization on Reintroduced Red Wolves (2000-2002) – US Fish and Wildlife Service - \$75,128.
- Winter Run Chinook Salmon Captive Propagation/Broodstock Program (1999-2001) – UC Davis - \$130,000.
- AZDGF Genetic Variation in the Gila Topminnow with Rhonda Lee (2000 – 2002) – Arizona Heritage Program - \$40,130
- USBR Maintenance of Gila Topminnow Stocks (2000-2004) - \$11,050.

	Winter Run Chinook Salmon Genetics (2001-2003) – UC Davis – \$80,000
AZDGF	Genetic Variation in Arizona Springsnails with Carla Hurt (2001-2003) – Arizona Heritage Program - \$47,167
AZDGF	Shell Dyskeratosis in Sonoran Desert Tortoises: Genetic Causes and Population Effects with Rhonda Lee (2002-2004) – Arizona Heritage Program - \$41,063
NSF	Dissertation Research: Tempo and Mode of HLA Evolution in the Americas (written by Daniel Garrigan) (2002-2004) - \$9,307
AZDGF	Conservation Genetics of Arizona Springsnails: Identifying Management Units and Regions of Endemism with Carla Hurt (2003-2005) - Arizona Heritage Program - \$33,050
USFWS	Maintenance of Gila Topminnow Stocks (2005-2006) - \$5,000
AZDGF	Conservation Genetics of Arizona Talussnails with Rhonda Lee (2005-2008) – Arizona Heritage Program - \$60,694.
USFWS	Genetics of Pallid Sturgeon with Ed Heist (2008) – USFWS - \$40,000

***Publications:***

***Books***

- (1) 1983 Hedrick, P.W. *Genetics of Populations*. Jones and Bartlett, Boston, MA. 629 p.
- (2) 1984 Hedrick, P.W. *Population Biology: The Evolution and Ecology of Populations*. Jones and Bartlett, Boston, MA. 445 p.
- (3) 1989 Weaver, R., and P. W. Hedrick. *Genetics*. W. C. Brown, Dubuque, IA., 569 p.
- (4) 1991 Weaver, R., and P. W. Hedrick. *Basic Genetics*. W. C. Brown, Dubuque, IA. 518p.
- (5) 1992 Weaver, R., and P. W. Hedrick. *Genetics* (Second Edition). W. C. Brown, Dubuque, IA. 649 p.
- (6) 1995 Weaver, R., and P.W. Hedrick. *Basic Genetics* (Second Edition). W.C. Brown, Dubuque, IA, 498 p.
- (7) 1997 Weaver, R., and P. W. Hedrick. *Genetics* (Third Edition). W.C. Brown, Dubuque, IA, 638 p.

- (8) 2000 Hedrick, P.W. *Genetics of Populations* (Second Edition). Jones and Bartlett, Boston, 553 p.
- (9) 2005 Hedrick, P.W. *Genetics of Populations* (Third Edition). Jones and Bartlett, Boston, 737p.
- (10) 2011 Hedrick, P.W. *Genetics of Populations* (Fourth Edition). Jones and Bartlett, Boston. 675p.

**Articles**

- (1) 1968 Hedrick, P. W., and R. E. Comstock. Role of linkage in gene frequency change of coat color alleles in mice. *Genetics* 58:297-303.
- (2) 1970 Hedrick, P. W. Selection in finite populations. I. The probability of fixation and rate of response using transition matrix iteration. *Genetics* 65:157-173.
- (3) 1970 Hedrick, P. W. Selection in finite populations. II. The selection limit and rate of response for a Monte Carlo simulation model. *Genetics* 65:175-186.
- (4) 1971 Hedrick, P. W. A new approach to measuring genetic similarity. *Evolution* 25:276-280.
- (5) 1971 Hedrick, P. W. Competition experiments between *Drosophila melanogaster* and *D. simulans*. *Dros. Inf. Serv.* 47:61-62.
- (6) 1971 Hedrick, P. W. A culture which allows sand pupation. *Dros. Inf. Serv.* 47:131.
- (7) 1972 Hedrick, P. W. Possible stable equilibrium for *D. melanogaster* and *D. simulans*. *Dros. Inf. Serv.* 48:128-129.
- (8) 1972 Hedrick, P. W. Maintenance of genetic variation with a frequency-dependent selection model as compared to the overdominant model. *Genetics* 72:771-776.
- (9) 1973 Hedrick, P. W. Factors responsible for a change in interspecific competitive ability in *Drosophila*. *Evolution* 26:513-522.
- (10) 1973 Hedrick, P. W. Genetic variation and the generalized frequency-dependent selection model. *Am. Natur.* 107:800-802.
- (11) 1974 Hedrick, P. W. Genetic variation in a heterogeneous environment. I. Temporal heterogeneity and the absolute dominance model. *Genetics* 78:757-770.
- (12) 1974 Hedrick, P. W. X-linked selection. *Dros. Inf. Serv.* 51:34-3.6.

- (13) 1975 Hedrick, P. W. Genetic similarity and distance: comments and comparisons. *Evolution* 29:362-366.
- (14) 1976 Hedrick, P. W. Simulation of X-linked selection in *Drosophila*. *Genetics* 83:551-571.
- (15) 1976 Hedrick, P. W., M. Ginevan, and E. Ewing. Genetic polymorphism in heterogeneous environments. *Ann. Rev. Ecol. Syst.* 7:1-32.
- (16) 1976 Hedrick, P. W. Genetic variation in a heterogeneous environment. II. Temporal heterogeneity and directional selection. *Genetics* 84:145-157.
- (17) 1978 Hedrick, P. W., and E. Murray. Average heterozygosity revisited. *Am. J. Hum. Genet.* 30:377-382.
- (18) 1978 Hedrick, P. W. Genetic variation in a heterogeneous environment. V. Spatial heterogeneity in finite populations. *Genetics* 89:389-401.
- (19) 1978 Hedrick, P. W., S. Jain, and L. Holden. Multiple gene systems in evolution. *Evol. Biol.* 11:101-184.
- (20) 1978 Hedrick, P. W. Genetic variation in a heterogeneous environment. VI. A possible experimental system. *J. Hered.* 69:135-136.
- (21) 1979 Hedrick, P. W., and L. R. Holden. Hitch-hiking: An alternative to coadaptation for the barley and slender wild oat examples? *Heredity* 43:79-86.
- (22) 1979 Hedrick, P. W., and E. Murray. Competition between wild-caught *D. melanogaster* and *D. simulans*. *Dros. Inf. Serv.* 55:58-60.
- (23) 1980 Hedrick, P. W. Hitchhiking: A comparison of linkage and partial-selfing. *Genetics* 94:791-808.
- (24) 1980 Hedrick, P. W., and J. F. McDonald. Regulatory gene evolution. *Heredity* 45:85-99.
- (25) 1980 Hedrick, P. W. Selection in finite populations. III. An experimental test. *Genetics* 96:297-313.
- (26) 1981 Hedrick, P. W. The establishment of chromosomal variants. *Evolution* 35:322-332.
- (27) 1982 Chakraborty, R., and P. W. Hedrick. Paternity exclusion and the paternity index for two linked loci. *Hum. Hered.* 33:13-23.
- (28) 1982 Hedrick, P. W. Genetic hitchhiking: A new factor in evolution? *Bioscience* 32:845-853.

- (29) 1983 Hedrick, P. W., and E. Murray. Selection and measures of fitness, p. 61-104. In Ashburner et al. (eds.) *The Genetics and Biology of Drosophila* Vol. 3d. Academic Press, NY.
- (30) 1983 Hedrick, P. W. Recombination and directional selection. *Nature* 302:727.
- (31) 1983 Hedrick, P. W., and G. Thomson. Evidence for balancing selection at HLA. *Genetics* 104:449-456.
- (32) 1983 Chakraborty, R., and P. W. Hedrick. Heterozygosity and genetic distance of proteins. *Nature* 304:155.
- (33) 1983 Hedrick, P. W. Neutrality or selection at HLA? *Am. J. Hum. Genet.* 35:1055-1057.
- (34) 1984 Hedrick, P. W., and E. Louis. Speciation: A population genetics perspective, p. 251-262. *Proc. XV International Congress of Genetics IV*.
- (35) 1984 Hedrick, P. W., and D. Levin. Kin founding and the fixation of chromosomal variants. *Am. Natur.* 124:789-797.
- (36) 1985 Hedrick, P. W. Coat variants in cats: Gametic disequilibrium between unlinked loci. *J. Hered.* 76:127-131.
- (37) 1985 Ahmad, M., and P. W. Hedrick. Electrophoretic variation in the common mussel, *Mytilus edulis*: No evidence for gametic disequilibrium. *Heredity* 55:47-51.
- (38) 1985 Hedrick, P. W. Inbreeding and selection in natural populations, p. 71-91. In H. R. Gregorius (ed.) *Population Genetics in Forestry*. Lecture Notes in Biomathematics 60, Springer-Verlag, New York.
- (39) 1985 Thomson, G., F. Nicholas, W. Bodmer, M. O'Neill, P. W. Hedrick, and E. Hudes. Analysis of negative and multiple HLA antigen disease associations: Multilocus models. *Tissue Antigens* 26:293-306.
- (40) 1985 Peetz, E. W., G. Thomson, and P. Hedrick. Charge changes in protein evolution. *Mol. Biol. Evol.* 3:84-94.
- (41) 1986 Hedrick, P. W., and G. Thomson. A two-locus neutrality test with applications to humans, *Escherichia coli*, and lodgepole pine. *Genetics* 112:135-156.
- (42) 1986 Hedrick, P. W., P. Brussard, F. W. Allendorf, J. Beardmore, and S. Orzack. Protein variation, fitness, and captive propagation. *Zoo Biol.* 5:91-99.
- (43) 1986 Hedrick, P. W., and C. C. Cockerham. Partial inbreeding: equilibrium heterozygosity and the heterozygosity paradox. *Evolution* 40:856-861.

- (44) 1986 Hedrick, P. W., G. Thomson, and W. Klitz. Evolutionary genetics: HLA as an exemplary system, p. 583-606. In Karlin and Nevo (eds.) *Evolutionary Processes and Theory*, Academic Press.
- (45) 1986 Hedrick, P. W. Average inbreeding or equilibrium inbreeding? *Am. J. Hum. Genet.* 38:965-970.
- (46) 1986 Hedrick, P. W. Genetic polymorphism in heterogeneous environments: A decade later. *Ann. Rev. Ecol. Syst.* 17:535-566.
- (47) 1987 Hedrick, P. W. Populations genetics of intragametophytic selfing. *Evolution* 41:137-144.
- (48) 1987 Hedrick, P. W. Estimation of the rate of partial inbreeding. *Heredity* 58:161-166.
- (49) 1987 Hedrick, P. W. Gametic disequilibrium in cats: epistasis is an unlikely cause. *J. Hered.* 78:204.
- (50) 1987 Hedrick, P. W. Genetic load and the mating system in homosporous ferns. *Evolution* 41:1282-1289.
- (51) 1987 Hedrick, P. W., G. Thomson and W. Klitz. Evolutionary genetics and HLA: Another classic example. *Biol. J. Linn. Soc.* 31:311-331.
- (52) 1987 Hedrick, P. W. Genetic disequilibrium measures: Proceed with caution. *Genetics* 117:331-341.
- (53) 1987 Hedrick, P. W. Genetic bottlenecks. *Science* 237:963.
- (54) 1988 Hedrick, P. W. HLA sharing, recurrent spontaneous abortion, and the genetic hypothesis. *Genetics* 119:199-204.
- (55) 1988 Hedrick, P. W., and G. Thomson. Maternal-fetal interactions and the maintenance of histocompatibility polymorphism. *Genetics* 19:205-212.
- (56) 1988 Hedrick, P. W. Does segregation distortion influence gametic disequilibrium? *Genet. Res.* 52:237-242.
- (57) 1988 Hedrick, P. W. Genetic variation in Przewalski's horses. *J. Hered.* 79:401.
- (58) 1988 Hedrick, P. W. Letter to the editor. *Bull. Ecol. Soc. Amer.* 69:68.
- (59) 1988 Hedrick, P. W. Inference of recombinational hotspots using gametic disequilibrium values. *Heredity* 60:435-438.

- (60) 1989 Van Vuren, D., and P. W. Hedrick. Genetic conservation of feral populations of Livestock. *Cons. Biol.* 3:312-317.
- (61) 1989 Hedrick, P. W., M. S. Gaines and M. L. Johnson. Owl predation on small mammals. *Univ. Kansas Natural Hist. Occas. Papers.* 1-7.
- (62) 1989 Hedrick, P. W., and T. S. Whittam. Sex in diploids. *Science* 342:331.
- (63) 1990 Hedrick, P. W. Mating systems and evolutionary genetics, p. 83-115. In K. Wohrmann and S. Jain (eds.), *Population Biology*. Springer-Verlag.
- (64) 1990 Hedrick, P. W., and O. Muona. Linkage of viability genes to marker loci in selfing organisms. *Heredity* 64:67-72.
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