

M. Deane Bowers
CURRICULUM VITAE
September, 2017

PRESENT POSITION

Chair, Ecology and Evolutionary Biology, July 2014 – present.
Professor of Biology and Curator of Entomology, University of Colorado, 1995 – present

ADDRESS: University of Colorado Museum of Natural History and
Department of Ecology and Evolutionary Biology
University of Colorado
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Boulder, CO 80309
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RESEARCH INTERESTS: chemical ecology, insect ecology and evolution, Lepidoptera, plant-insect interactions, multitrophic interactions, insect defenses, biological control of invasive plants, effects of nitrogen deposition on multitrophic interactions, insects and climate change

PREVIOUS POSITIONS

2010-2011 Visiting Researcher, Brown University (sabbatical)
2007-2008 Interim Director, University of Colorado Museum of Natural History
1996-1997 Visiting Researcher, University of California, Davis (sabbatical)
1989-1995 Associate Professor of Biology and Curator of Entomology,
University of Colorado
1986-1989 Associate Professor of Biology and Hessel Associate Curator of
Lepidoptera, Harvard University
1986-1987 Visiting Associate Professor in Chemistry, Colorado State University
1981-1986 Assistant Professor of Biology and Hessel Assistant Curator of
Lepidoptera, Harvard University
1977-1979 Teaching Associate, University of Massachusetts
1974-1975 Teaching Assistant, University of Massachusetts,

EDUCATION

Post-doctoral Research Associate, Stanford University, California. 1979-1981
University of Massachusetts, Amherst, Massachusetts (Ph.D. 1979) 1974-1979
Smith College, Northampton, Massachusetts (B.A. 1974) 1970-1972, 1973-1974
Williams College (exchange program) 1972-1973

HONORS AND AWARDS

Outstanding Graduate Student Mentor Award, Graduate School, University of Colorado
Boulder (2016)
Elected as a Fellow of the Entomological Society of America (2015)

College Scholar Award, University of Colorado (for 2010-2011)
Faculty Fellowship, University of Colorado (2003 – 2004)
Lund Lecturer, University of Georgia (2003)
Griswold Lecturer, Cornell University (2002)
Chair (1998) of the Gordon Research Conference on “Plant-Herbivore Interactions”
University of Colorado at Boulder: Boulder Faculty Assembly Award for Excellence in
Research (1996)
Co-chair (1995) of the Gordon Research Conference on “Plant-Herbivore
Interactions”
Vice-president, Lepidopterists’ Society (1992 - 1993)
University of Massachusetts, Chancellor’s Fellowship (1975 – 1977)

FELLOWSHIPS AND GRANTS

Current Funding

External Sources

- 2016—Boulder County Open Space. Bee community response to the 2013 flood. \$10,000.
Co-PI; PI: Adrian Carper.
2015—NSF “Collaborative research: Understanding the evolution of diet breadth through
ecoimmunology”. Co-PI; (PI: Angela Smilanich, University of Nevada, Reno).
\$331,900 to University of Colorado; total award \$600,000. 3/1/2015 – 2/28/2018.

Previous Funding

External Sources

- 2012—NSF “Collaborative Research: Southwest Collection of Arthropods Network (SCAN): A
Model for Collections Digitization to Promote Taxonomic and Ecological Research”. PI.
One of 10 participating institutions. 2012 – 2017. \$104,000 to Bowers.
2014—NSF Dissertation Improvement grant for Caitlin Kelly, “Chemical Mediation of
Multitrophic Interactions: A Test of the Tri-trophic Interactions Hypothesis”. \$12,246.
2014 – 2016.
2013—USDA “Impacts of herbaceous bioenergy production systems on bee communities:
implications for pollinator declines and pollinator conservation” PI Mary Jamieson;
Co-PIs Deane Bowers, Andrew Norton (CSU). \$499,997. 2013-2016,
2012—NSF Dissertation Improvement grant for Susan Whitehead, “Chemical Ecology of *Piper*
(Piperaceae) Seed Dispersal by Frugivorous Bats in the Genus *Carollia* (Phyllostomidae).
\$14,995, 2012-2014.
2011--National Geographic Waitt Grant . PI: S.R. Whitehead, with co-PIs M.D. Bowers, B.
Herrera-Rodriguez, M. Fernanda-Quesada, and A. Trowbridge . \$14,870.
2010—NSF. “RET Supplement to: Collaborative research: Are sequestered allelochemicals
benefits or detriments to wasp and fly parasitoids?”. Bowers PI, L. Dyer and G. Gentry
(Tulane University) Co-PI’s. \$10,375.
2009—NSF. Dissertation Improvement Grant for Carolina Quintero. “The Importance of Plant
Ontogeny for Tritrophic Interactions”. \$8,227.
2009— NSF. “REU Supplement to: Collaborative research: Are sequestered allelochemicals
benefits or detriments to wasp and fly parasitoids?”. Bowers PI, L. Dyer and G. Gentry
(Tulane University) Co-PI’s. \$12,000.
2008—NSF Dissertation Improvement Grant for Mary Jamieson, “Effects of soil nitrogen
enrichment on the chemical mediation of multitrophic interactions”. \$6,627.

- 2007—NSF. “A multi-species study of grasshopper phenology, distribution and body size responses to climate changes in the Front Range of Colorado”. C. Nufio PI, Bowers and Guralnick, Co-PIs. \$392,000 for 5 years.
- 2007-2011—NSF “REU Supplements to: A multi-species study of grasshopper phenology, distribution and body size responses to climate changes in the Front Range of Colorado”. C. Nufio PI, Bowers and Guralnick, Co-PIs. \$18,000.
- 2007—City of Boulder Open Space and Mountain Parks. “The influence of nitrogen availability on Dalmatian Toadflax (*Linaria dalmatica*) and its specialist herbivore, *Calophasia lunula*”. Bowers PI, M. Jamieson, Co-PI. \$6,280 for 1 year.
- 2007—NSF. “REU Supplement to: Collaborative research: Are sequestered allelochemicals benefits or detriments to wasp and fly parasitoids?”. Bowers PI, L. Dyer and G. Gentry (Tulane University) Co-PI’s. \$6,000.
- 2007—City of Boulder Open Space and Mountain Parks. “Long-term survey of butterfly communities on city of Boulder OSMP Land”. Bowers PI, N. Robinson, Co-PI. \$6,235 for 1 year.
- 2006--NSF. “Collaborative research: Are sequestered allelochemicals benefits or detriments to wasp and fly parasitoids?”. Bowers PI, L. Dyer and G. Gentry (Tulane University) Co-PI’s. \$293,400 for 5 years to University of Colorado.
- 2005--NSF. “Instrumentation for the analysis of biogenic organic compounds”. R. Monson PI, Bowers, Co-PI. \$248,474 for 2 years.
- 2005--NSF. “Improvement of the Gordon Alexander collection of Orthoptera at the University of Colorado” \$202, 201 for 2.5 years. Bowers PI, Co-PI’s C. Nufio, R. Guralnick.
- 2005—NSF. “REU Supplement: Improvement of the Gordon Alexander collection of Orthoptera at the University of Colorado”. \$6,000.
- 2001—NSF. "Research Experiences for Undergraduates, Undergraduate Research in Behavior, Ecology and Evolution". \$200,000 for 3 years. Co-PI, M. Breed project director.
- 1997--NSF. “Support for the 1998 Gordon Conference on Plant-Herbivore Interactions”. \$28,000 for 1 year.
- 1996—NSF. “Analytical chemical analysis in an ecological context: a High Pressure Liquid Chromatography Workstation, Fluorometer, and Spectrophotometer”. Co-PIs: Steve Schmidt, Russ Monson, Ted Raab. \$48,000.
- 1996—NSF. “The Evolution of Unpalatability in Insects: Biochemistry in an Evolutionary Context”. \$30,000 for 1 year.
- 1995—NSF. "Research Experiences for Undergraduates, Undergraduate Research in Behavior, Ecology and Evolution". \$150,000 for 3 years. Bowers, project director.
- 1994--NSF. “Support for the Gordon Research Conference on the Chemistry of Plant-Herbivore Interactions”. Mark Rausher Co-PI. \$7,300
- 1994--U.S. Department of Agriculture. “Support for the Gordon Conference on the Chemistry of Plant-Herbivore Interactions”. Mark Rausher Co-PI. \$7,300
- 1994—NSF. "Renovation and expansion of the E.P.O. Biology greenhouses". 7 Co-PI's. \$240,000.
- 1994--City of Boulder Open Space. “An insect survey of the Dowdy Draw Open Space. \$8,000 for 1 year. Virginia Scott, Co-PI.
- 1993—NSF. "Relative effects of hostplant chemistry and insect predators on herbivorous insects and their hostplants". \$100,000 for 3 years.
- 1993--City of Boulder Open Space, "An insect database for Boulder County", \$4000 for 4 months
- 1992—NSF. "Research Experiences for Undergraduates, Undergraduate Research in Behavior, Ecology and Evolution". \$150,000 for 3 years. Bowers, project director
- 1992--NSF Dissertation improvement grant for Mark Camara. (\$7,000)
- 1992--NSF Dissertation improvement grant for Lee Dyer. (\$8,000)

- 1991—NSF. "Research Experiences for Undergraduates: Undergraduate Research in Behavior, Ecology, and Evolution" (with Bill Bowman, Mike Breed, Pam Diggle, and Steve Schmidt). \$49,634 for 1 year.
- 1990—NSF. "Research Experiences for Undergraduates: Undergraduate Research in Behavior and Ecology" (with Bill Bowman, Mike Breed, Russ Monson, and Steve Schmidt). \$40,000 for 1 year.
- 1989—NSF. "The effects of hostplant chemistry and invertebrate predators on caterpillar foraging and hostplant fitness" \$140,500 for 3 years.
- 1989—NSF. "Research Experiences for Undergraduates: An Interdisciplinary Grant in Evolutionary Biology (with Steve Austad, James Carpenter, and Bruce Waldman) \$120,000 for 3 years
- 1988—NSF. "Research Experiences for Undergraduates: An Interdisciplinary Grant in Evolutionary Biology" (with Steve Austad, Rodney Honeycutt, and Bruce Waldman) \$40,000 for 1 year
- 1987--Whitehall Foundation, "Recycling Plant Chemical Defenses and the Evolution of Unpalatability". \$62,670 for 2 years.
- 1987—NSF. "Research Experiences for Undergraduates: an Interdisciplinary Program in Ecology, Evolution, Behavior and Genetics (with Steve Austad, James Birchler, Rodney Honeycutt, and Bruce Waldman). \$40,000 for 1 year
- 1987—NSF. "Improvement of the Insect Collections of the Museum of Comparative Zoology (with J.M. Carpenter and E.O. Wilson). \$143,438 for 2 years.
- 1986—NSF. Visiting Professorships for Women, "Processing of Plant Allelochemicals by Insect Herbivores". \$80,661 for 1 year.
- 1983—NSF. "Hostplant Specialization and the Evolution of Unpalatability: the Role of Iridoid Glycosides". \$70,000 for 2 years.
- 1982—NSF. "Improvement of the Insect Collections of the Museum of Comparative Zoology". (with R.J. McGinley and E.O. Wilson) (3 years, \$160,000).

Internal Sources

- 2015-- University of Colorado Outreach Program. "The Bees' Needs part II". PI Deane Bowers, Alex Rose and Virginia Scott, Co-PIs. 2015-2016. \$8,000.
- 2013—University of Colorado Outreach Program. "The Bees' Needs: a Citizen Science Project". PI Alex Rose, Deane Bowers and Virginia Scott, Co-PIs. 2013 – 2016. \$24,000.
- 2010—University of Colorado College Scholars Award. "Effects of an Invasive Weed on the Ecology and Evolution of a Rare Butterfly". One half year's salary for sabbatical at Brown University.
- 2007—University of Colorado LEAP Program. "Assessing the Effects of Human Nitrogen Inputs on an Invasive Weed and Its Biological Control Agent". Bowers, PI. \$8,000 for 1 year.
- 2005 – 2006—CRCW, University of Colorado. "Caterpillar chemical defense and its effects on parasitoids", \$5,120
- 2003 – 2004—CRCW, University of Colorado. "The ecology and evolution of caterpillar chemical defense", \$5,600
- 1994--CRCW, University of Colorado. "Metabolic cost of detoxifying plant chemical defenses and the host specialization of herbivorous insects", \$6,800
- 1992--CRCW grant, University of Colorado, "The effects of temporal and spatial heterogeneity on the interaction of a plant and its insect herbivores", \$3,200

PROFESSIONAL SOCIETIES

International Society of Chemical Ecology
Ecological Society of America
Entomological Society of America
Lepidopterists' Society
American Association of Museums
Xerces Society

PROFESSIONAL ACTIVITIES

Review of 15 – 20 manuscripts for professional journals per year
NSF preproposal panel, Population and Community Ecology, April, 2016
NSF full proposal panel, Informal Science Education, May, 2015
NSF full proposal panel, Systematics and Biodiversity, October 2014
NSF Preproposal Panel, Systematics and Biodiversity, April 2012
NSF Preproposal Panel, Informal Science Education, October 2011
Organizing Committee 2012 meeting of the Lepidopterists' Society
Organized 2016 meeting of the High Country Lepidopterists
Organized 2008 meeting of the High Country Lepidopterists
Organized 2006 meeting of the High Country Lepidopterists
Organized 2004 meeting of the High Country Lepidopterists
Organized 2001 meeting of the High Country Lepidopterists
Editor, Journal of the Lepidopterists' Society. 1998 – 2001
NSF panel on Informal Science Education, March 2009
NSF panel on Ecological Processes and Evolution, April 2009
NSF panel for the PEET (Partnerships for Enhancing Expertise in Taxonomy), May 2001
NSF Ecology Panel, October, 1995; April, 1996; October, 1998, October, 1999, April
2000, October, 2006
Chair, Gordon Conference on “Chemistry of Plant-Animal Interactions”, 1998
Co-chair, Gordon Conference on “Chemistry of Plant-Animal Interactions”, 1995
NSF Panel, Postdoctoral grants, February, 1994
NSF Panel, Postdoctoral grants, May, 1993
Ecological Society of America, Committee on Women and Minorities, 1992 - 1995
USDA Panel, Research in entomology, July, 1993
NSF meeting of site directors of REU programs, August, 1993
Program chair of Lepidopterists Society meeting, Fort Collins Colorado, July 1993
Oecologia editorial board, 1992 - 1998
Chemoecology editorial board, 1990 - present
Biochemical Systematics and Ecology editorial Board, 1996 - present
Journal of the Lepidopterists' Society, editorial board - 1991 - 2001
Review of grant proposals for NSF and USDA
Organized and ran the fall, 1984 meeting of the Population Biologists of New
England, at Harvard University
Lepidopterists' Society Executive Council, 1979 - 1982 and 1986 - 1989
Lepidopterists' Society Associate Editor, 1987 - 1992
Lepidopterists' Society Vice-President, 1992 - 1993
Cambridge Entomological Society president, 1984 - 1985
Cambridge Entomological Society editorial board, 1981 – 1989

MEMBERSHIP OF DEPARTMENTAL AND UNIVERSITY COMMITTEES

Museum

Salary equity committee, fall 2017
Promotion to Full Professor, J. Eberle, fall 2016
Acting Director CU Museum, 6 weeks in fall 2013
Merit Committee, 2011, 2013
Tenure Committee, Vertebrate Curator, 2013
Search Committee (chair), Botany curator, 2011-2012
Tenure Committee (chair), Botany Curator, 2009 - 2010
Search Committee, Botany Curator, 2008 - 2009
Museum and Field Studies Program Interim Director, Fall, 2007
Bio Hall Committee, 2007 – 2011
Marketing Committee, 2007 - 2008
Salary Committee, 2006 – 2007, 2007 – 2008, 2008 – 2009, 2013-2014
Director Exploratory Committee (Chair), 2006 - 2007
Search Committee, Vertebrate Zoologist, 2006 - 2007
Museum Program Review Committee, 2005 - 2006
Museum Self-Study Committee, 2004 – 2005
Museum BFA representative, 2000 - 2008 (except sabbatical year, 2003 – 2004)
American Association of Museums Accreditation Committee, 2000 – 2002
Centennial Committee, 2002 - 2003
Building Committee, 1998 – 2002
Curriculum Committee, 1991-1993, 1998 – 2000, 2005-2006, 2007 – 2008, 2012-2013
Steering Committee, 1999 – 2001
Art Selection Committee, 2000 – 2001
Search Committee Chair, Invertebrate zoologist and curator, 1999-2000
Evaluation Committee (chair) for Linda Cordell, Director CU Museum, 1999
Self-Study Committee, 1998 – 1999
Reappointment Committee (chair) Alan DeQueiroz, 1998
Promotion Committee Judith Harris, 1998 – 1999
By-laws Committee, 1998
Acting Director, summer, 1998
Building Committee, 1996 – 1999
Committee to review the status of Hunter Building, 1994
Collection Committee, 1992 – 2005, chair 2004 - 2005
Museum Studies Task Force, 1993
Reappointment Committee (chair), Tom Ranker, 1992
Post-tenure review committee, S-K. Wu, 1991
Post-tenure review committee, W. Hay, 1990
Museum Exhibits Committee, 1989-1990
Search Committee, Herbarium Curator, 1989-1990

Department of Ecology and Evolutionary Biology

Merit Committee (Chair)—2015, 2016, 2017
Executive Committee (Chair)—2015, 2016, 2017
Space Committee (Chair)—2015, 2016, 2017
Arts and Science Council representative, 2013 - 2014
Tenure Committee (Chair), Patrick Kociolek, 2007 - 2008

Executive Committee, 2007 – 2008, 2013 - 2014
 Search Committee, Ecologist, 2004 - 2005
 Reappointment Committee for T. Lemieux (chair), 2004 – 2005
 Graduate Committee, 1998 – 1999, 2004 – 2013
 Reappointment Committee, Pei Tsai, 2003
 Strategic Planning Committee, 2001 – 2002
 Space Committee, 2002
 Salary Committee, 2001, 2006-2007
 Student Computer Facility, 1998 - 2001
 Undergraduate Curriculum Committee, 1997
 Divisional structure committee, 1997
 Reappointment committee, Alan DeQueiroz, 1998
 Chair, Graduate Committee, 1993 - 1995
 Associate Chair of EPO Biology, 1993 - 1995
 General Biology Committee, 1992 - 1994
 Reappointment Committee, Tom Ranker, 1992
 Search Committee: Plant-animal interactions, 1990 - 1991.
 EPOB Executive Committee, 1990 - 1991, 1993 - 1995
 EPOB Greenhouse Committee, 1990 - present; chair, 1992-1993
 EPOB Greenhouse construction committee, 1992 - 1994
 Coordinator, General Biology final, fall, 1990.
 General Biology laboratory review committee, 1991.

University of Colorado

University of Colorado Research Misconduct Committee—2017-2019
 New faculty workshop—member of panel on starting out as a faculty member at CU,
 2017
 Provost's Advisory Board, University of Colorado, 2016-2017
 Research Innovations Advisory Board, University of Colorado, 2016 – 2018
 Internal Evaluation Committee, Department of French and Italian, University of
 Colorado, 2016
 New Chairs workshop—member of panel on graduate student mentoring, 2016
 New Faculty Workshop—led discussion on setting up a lab, 2015
 Libraries Tenure and Promotion Committee, 2015
 Undergraduate Research Opportunities Program Advisory Committee, 2007 – 2014
 Arts and Sciences Tenure and Promotion Committee, 2009 – 2013
 BFA Research Faculty Evaluation Committee, 2007- 2008
 BFA Administrator Appraisal Committee, 2006 - 2010
 CRCW Committee, 2004 - 2007
 Boulder Faculty Assembly Executive Committee, 2001 – 2003, 2004 - 2005
 Boulder Faculty Assembly Secretary, 2002 – 2003, 2004 – 2005
 Chancellor's Committee on Gay, Lesbian, Bisexual and Transgendered Issues, 2001 –
 2015
 BFA Committee on Women, 2001 - 2003
 Evaluation Committee (chair) for Linda Cordell, 1999
 Science Advisor, Hughes Initiative Program, 1998 – 2014
 BFA Awards Committee, 1999, 2006, 2014
 Internal Review Committee for Fine Arts, 1998
 University Diversity Committee, 1994 - 1996
 Women's Advisory Team, 1997 – 1999 (chair, 1999)
 Search Committee: Museum Director, 1992 – 1993

CURATORIAL ACTIVITIES

Curated museum exhibits (University of Colorado)

- 2017-2018. "Becoming Butterflies" travelling exhibit. Developed travelling exhibit to be set up at University of Nevada, Reno.
- 2016-2017. "Becoming Butterflies". Exhibit on the biology of butterflies featured at the University of Colorado Museum of Natural History and CU South Denver.
- 2010-2011. "Beetles". Exhibit at University of Colorado Museum of Natural History, featuring the diversity of beetles, using about 1000 specimens from the CU Entomology section collection.
- 2002-2003. "A window to the future; a door to the past". 100th anniversary of the CU Museum of Natural History. Curated insect portion of exhibit.
- 2010 - Present. Curated and provided specimens and text for numerous small exhibits in the CU Museum's "Biolounge", including exhibits on Monarch butterflies, state insects, Colorado Hairstreak (Colorado State Insect), insect gynandromorphs, beetle art.

Collection Administration

- University of Colorado Museum of Natural History Entomology Section
- Insect and arachnid collection: approximately 850,000 specimens, with special strengths in Hymenoptera, Orthoptera, Lepidoptera, and Coleoptera
- Supervise: Collection Manager (Virginia Scott); Graduate Assistant; several volunteers
- Answer questions from the public about insects (30 – 40 per year)
- Insect identification (5 – 10 per year)
- Collection tours (courses, school groups, visitors) (4 – 8 per year)

Major Collection-Related Projects

- Databasing of ground-dwelling arthropods (as part of NSF TCN grant): databased over 100,000 specimens of ground-dwelling arthropods. 2012 - 2017
- Addition of over 80,000 bee and wasp specimens to collection through grants from U.S.D.A., City of Boulder Open Space, Boulder County Open Space.
- Imaging of targeted Orthoptera, Hymenoptera, and Coleoptera specimens for NSF TCN grant. 2012 - 2017.
- Digitization of historical Alexander Orthoptera collection (collected 1959, 1960, 1961) and incorporation into CU insect collection (~40,000 specimens) 2009-2012.
- Incorporation of ~40,000 Orthoptera specimens, collected as part of NSF grant.
- Accession and incorporation of Lepidoptera collection.
- Accession and incorporation of Watkins Orthoptera collection (approximately 10,000 specimens). Donated in 2014.

OUTREACH ACTIVITIES

- Participation in "Girls in the Museum Exploring Science" (GAMES) program and the University of Colorado Museum of Natural History. 2010 - present.
- Give numerous talks and presentations to public schools and public groups about insects.
- Contribute to Evolution Outreach programs through Department of Ecology and Evolutionary Biology (featured speaker 2010 and 2014)

"The Bees' Needs" Citizen Science Project (2013 - 2017). Provided bee blocks to citizen scientists and oversaw data collection from these participants.
Science Advisory Board, Butterfly Pavilion (1995 - 2016)
Consultant for Baltimore Checkerspot restoration project, Maryland. 2010 - 2014.

TEACHING

University of Colorado:

Biology 6300. Introduction to Research. Graduate seminar for new graduate students, Fall 2014, 2015, 2016, 2017.
Museum 5140, Collections Management, Fall, 2003, 2005; Spring, 2008, 2010, 2012, 2014
Biology 4660/5660. Insect Biology. (for advanced undergraduates and graduate students) fall, 1991, 1993, 1995, 1997, 2000, 2008, 2011, 2013, 2015, 2017 (lecture and laboratory)
Biology 6300. Graduate seminar in Chemical Ecology, fall, 2005
Biology 1220. General Biology, Spring, 2005, 2006
Biology 5320. Graduate Course in Plant-Animal Interactions, spring, 2003.
Museum 5196. Advanced Graduate Course in Entomology, fall 2002
Biology 4800/5800. Critical thinking: Plant-animal interactions, fall 1994, 1997, 1998.
Biology 6200. Graduate seminar in plant-insect interactions.
Biology 5280. Graduate course in laboratory techniques (with 4 co-instructors).
Biology 4130/5130. Plant-animal interactions. for advanced undergraduates and graduate students. spring 1990, fall 1992.
Biology 1230. General Biology. fall, 1990, 1992
Biology 6210. Graduate seminar in nutritional ecology and biochemistry. Spring 1991.
Museum 4936/5936. Internship in entomology. spring 1991, 1992, 1993, 1994.
Biology 6250. Graduate seminar, "Scientific Survival". fall, 1996, spring 1997, 1998, 1999, 2000, 2003, 2005.
Museum 5200. Collections and Data Management. spring, 1998, 1999, 2000.

Harvard University:

Biology 132. Chemical Ecology (lecture and laboratory)
Biology 116. Insect Biology: Structure and Function (lecture and laboratory)
Biology 252. Plant-Animal Interactions (graduate seminar)
Biology 280. Plant Products, Pests, and Pathogens (graduate seminar, co-taught)
Biology 10. Invertebrate Zoology (the insect lectures)
Biology 144. Biology of the Flower (team-taught; my responsibility was for 1/4 of the course the section on pollination biology and herbivory)

Colorado State University:

Entomology 570. Chemical Ecology (lecture and laboratory; co-taught)

Organization for Tropical Studies (OTS)

Faculty resource person, 1986, 1992, 2002

The Lepidoptera Course (American Museum of Natural History, taught at Southwest Research Station, Arizona)

Instructor, August 2012, 2013

STUDENTS

Graduate Students, Harvard University

Mark Skinner (Ph.D. 1988)
Eric Fajer (Ph.D. 1990)
Kathy Burgess (Ph.D. 1991)

Graduate Students, University of Colorado

Karolyn Darrow (MBS, 1993)
Lee Dyer (Ph.D., 1994)
Ruth Heisler (M.A., 1995)
Mark Camara (Ph.D., 1995)
Jamie Alton (M.S., 1997)
Jill Dreves (M.S., 2001)
Celeste Park (M.A., 2001)
MarieAnn de la Fuente (Ph.D. 2002)
Steve Armstead (M.S. 2003)
David Bettman (M.A. 2004)
Kasey Barton (Ph.D. 2007)
Ken Keefover-Ring (Ph.D. 2008, coadvised)
Jessica Vargas (M.A. 2009)
Jeff McClenahan (M.S. 2009)
Natalie Robinson (M.A. 2009; Ph.D. 2013, co-advised)
Crystal Boyd (M.S. 2011)
Mary Jamieson (Ph.D. 2010, co-advised)
Carolina Quintero (Ph.D. 2011)
Susan Whitehead (Ph.D. 2013)
Katie Wolfson (M.S. 2015)
Collin Schwantes (M.A 2015)
Brian Stucky (Ph.D. 2015, coadvised)
Caitlin Kelly (Ph.D. 2016)
Megan Blanchard (Ph.D. expected 2018)
Tobin Hammer (Ph.D. expected 2018, co-advised)
Katherine Hernandez (Ph.D. expected 2021)

Post-doctoral Fellows

Gillian Puttick (1981-1983)
Suzanne Dobler (1993-1996)
Dana Garrigan (1994 - 1996)
Cesar Nufio (2005 – 2009)
Evan Lampert (2007 – 2010)
Susan Whitehead (2013 – 2014)
Peri Mason (2013 – 2016)
Adrian Carper (2013 – 2018)

Graduate Student Committees (University of Colorado only)

Rick Adams, Elizabeth Ammon, Jan Bernstein, Robin Bingham, Kate Bowell, Amanda Cook, Dave Denton, Tim Farkas, David Fleck, Anna Goebel, Nate Howard, Jo Jeral, Ken Keefover-Ring, Scott Kelley, David Knochel, Claire Lay, Bethany Lewis, Marcy Litvak, Claire Lay, Margaret McDole, Terry McGlynn, Chris McGuire, Sam Messier, Kailen Mooney, Mardy Nelson, Michelle Ochomogo, Sonora Rasmussen, Michael Rodriguez,

Terry Smith-Glaser, Brian Stucky, Tim Szewczyk, Amy Trowbridge, Shaharra Usnick, Ann West, Mathhew Wilkins, Carla Wise, Jane Zelikova

Graduate Student Committees—other Universities

Leah Dudley (Univeristy of Missouri, Ph. D. 2005)
Angela Smilanich (Tulane University, Ph.D. 2008)
Christina Alba (Colorado State University, Ph.D. 2011)
Peri Mason (Wesleyan University, Ph.D. 2012)
Leif Richardson (Dartmouth University, Ph.D. 2015)
Jessica Bray (Virginia Commonwealth, M.S. 2015)
Cheryl Bowker (Colorado State University, Ph.D. 2017)
Nate Haan (University of Washington, Ph.D. 2017)
Stacy Endriss (Colorado State University, Ph.D. expected 2017)
Elizabeth Barnes (University of Denver, Ph.D. expected 2017)
Laurel Cepero (University of Denver, M.A.)

Undergraduate Honors Theses (at University of Colorado only)

Demetri Theodoratus (1998) *magna cum laude*
Megan Petri (2008) *summa cum laude*
Frances Drachenberg (2010) *magna cum laude*
Angela Knerl (2010) *summa cum laude*
Sean MacNamara (2011) *cum laude*
Daniel Minahan (2011) *magna cum laude*
Mike Belazis (2012) *magna cum laude*
Jordan Tiramani (2012) *cum laude*
Pornsawan Poopat (2013) *cum laude*
Alexandra Morphew (2017), *summa cum laude*
Micaela Enger (2017), *cum laude*

Undergraduate students doing independent research (at University of Colorado only)

Michele Arntz, Mike Belazis, Lauren Bradley, Patty Brezovar, Eowyn Burke, Marie Ann de la Fuente, Scott Denton, Frances Drachenburg, Robb Ecker, Alexander Ellis, Micaela Ender, Tara Glover, Colin Gottlieb, Alex Hill, Kevin Johnson, Janine Johnston, Heidi Kippenhan, Angela Knerl, Quinn Langsfeld, Edwin Lynch, Sean MacNamara, Marie Massa, Kelly Matheson, Jeff McClenahan, Danny Minnahan, Alex Morphew, Ann Nelson, Celeste Park, Pornsawan Poopat, Katie Ramsey, Pamela Ridley, Joni Sakurada, Nathan Sanders, Erin Schon, Kelly Sensecqua, Jan Simms, Shelby Soulia, Demetri Theodoratus, Leslie Van Stelten, Allyson Sudborough, Jordan Tiramani, Jason Wong, Abigail Wright, Megan Zabinski

FIELD EXPERIENCE

North America--Northern California, Colorado and New England
South America--Peru, Argentina, Costa Rica, Venezuela

INVITED SEMINARS AND SYMPOSIA PARTICIPATION (last 10 years)

2016 Boulder Valley Schools Teacher Education Program
University of Colorado Museum of Natural History
Northern Arizona University

- Tufts University
- 2015 Entomological Society of America, Minneapolis, Minnesota. Invited symposium presentation.
- 2014 University of Colorado Evolution Outreach Program. Keynote speaker.
Entomological Society of America, Portland, Oregon. Invited symposium presentation.
Laboratorio Ecotono, CONICET-INIBIOMA, Universidad Nacional del Comahue, Bariloche, Argentina.
University of Wyoming
University of Wisconsin
- 2013 Entomological Society of America, Austin, Texas. Symposium on Plant Secondary Chemistry and Insect-Plant Interactions: The Role of Iridoid Glycosides (Co-Organizer)
Entomological Society of America, Austin Texas. Symposium on The Environment as the Sculptor: How Abiotic Factors Shape Plant-Insect Interactions
University of Denver
- 2012 Dartmouth University
State of Maryland Natural Resources
University of Colorado Museum of Natural History
- 2011 Binghamton University
University of Nevada at Reno
- 2010 Brown University
Rhode Island Audubon Society
Dartmouth University
- 2009 Texas A&M University
Swarthmore College
Butterfly Pavillion
University of Colorado Museum
- 2008 International Congress of Entomology, Durban, South Africa. Symposium on Role of Plant Chemistry in Multi-trophic Interactions
- 2007 Western Interior Paleontological Society, Symposium on Evolution and the Fossil Record
Colorado College
Entomological Society of America, Symposium in honor of Elizabeth Bernays
Butterfly Pavilion
Colorado Native Plant Society, keynote speech

PAPERS AND POSTERS PRESENTED AT PROFESSIONAL MEETINGS (last 10 years)

* = undergraduate contributors

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- 2017 Ecological Society of America. Bowers, M.D. (presenter), N. Muchoney, P. Mason, A. Smilanich. Non-native plants and native herbivores: chemical defense and higher trophic levels.
Ecological Society of America. Manson, J. (presenter), R. Irwin, M.D. Bowers. "Increased nectar secondary metabolites following nectar robbing in a high alpine plant".
Ecological Society of America. Muchoney, N. (presenter), M.D. Bowers, P.A. Mason, M.B. Teglas, and A. M. Smilanich. "Consequences of novel host plant utilization for pathogen exposure, immunocompetence, and chemical defense in wild populations of *Euphydryas phaeton*".
Ecological Society of America. Blanchard, M. (presenter) and M.D. Bowers. "From pods to populations; Variation in lupine seed defense across scales".

- Ecological Society of America. Bohanon*, K.H. (presenter), A.L. Carper, M.D. Bowers. “Effects of woody debris and its management in wild bee communities along Colorado’s Front Range”. Poster
- Ecological Society of America. N. Haan (presenter), J. Bakker, and M.D. Bowers. “Novel and ancestral host plants and their effects on the endangered butterfly Taylor’s checkerspot”.
- Ecological Society of America. Carper, A. (presenter), C. Schwantes, S. Endriss, A. Norton, M.D. Bowers, M. Jamieson. “Exploring variation in local and landscape factors driving grassland bee communities in Colorado”.
- Gordon Conference on Plant Herbivore Interactions. Bowers, M.D. (presenter), N. Muchoney, P.A. Mason, A.M. Smilanich. “Consequences of novel host plants for native insect herbivores: pathogens, immune response and chemical defense”. Poster.
- Front Range Open Space Research Symposium, Boulder, CO. Carper, A.L. (presenter) & M.D. Bowers. The conservation value of woody debris for cavity-nesting bees on Boulder County Open Space.
- Gordon Conference on Plant Herbivore Interactions. Megan Blanchard (presenter) and M.D. Bowers. “Within and between plant variation in lupine alkaloids”. poster
- 2016 Ecological Society of America. “Conservation grassland plantings promote wild cavity-nesting bee reproduction in agroecosystems”. Poster. Alexandra Morphew* (presenter), Adrian Carper, M. Deane Bowers, Mary Jamieson.
- Ecological Society of America. “How does allocation of defensive compounds change with tissue type over the growing season?”. Poster. Megan Blanchard (presenter), M. Deane Bowers.
- Lepidopterists’ Society. “Localization of defense chemicals in two checkerspot butterflies (*Euphydryas*, Nymphalidae)”. M. Deane Bowers (presenter) and Peri Mason.
- International Congress of Entomology. “Utilization of a novel host plant impairs immunity and increases pathogen prevalence in wild populations of *Euphydryas phaeton*. Poster. N. Muchoney (presenter), P. Mason, M. Teglas, J. Hsueh, M.D. Bowers, A. Smilanich.
- International Congress of Entomology. “The Bees’ Needs: Integrating ecological research and outreach”. V. Scott (presenter), A. Rose, A.L. Carper, M.D. Bowers.
- International Congress of Entomology. “Host range expansion and the insect immune response”. A. Smilanich, P. Mason, C. Mo, N. Muchoney, T. Langus, S. Yoon, M.D. Bowers.
- International Congress of Entomology. “Host plant effects on buckeye (*Junonia coenia*) survival and immunity during infection with the *Junonia coenia* denovirus. Poster. C. Mo (presenter), M.D. Bowers, P. Mason, M. Teglas, J. Hsueh, C. Dodson, A. Smilanich.
- 2015 Entomological Society of America. “*The Bees’ Needs*: Assessing the conservation value of bee nesting blocks through citizen science”. Poster. Virginia Scott (presenter), Alexandra Rose, Collin Schwantes, Katherine Wolfson, Adrian Carper, M. Deane Bowers.
- Eastern Branch Entomological Society. “Responses of the Catalpa Sphinx and its primary parasitoid to high and low levels of iridoid glycosides”. Jessica Bray (presenter), Deane Bowers, and Karen Kester.
- Citizen Science Conference. “Partnering for discovery: Exploring the connection between citizen science and museums.” Katie Wolfson (presenter) and Deane Bowers.

- AAAS. “Imagine all the imaging: One entomology collection’s quest for the perfect insect image”. Katie Wolfson (presenter), Megan Blanchard, Virginia Scott, and Deane Bowers.
- Ecological Society of America, Baltimore, MD. “Nectar chemistry mediates the behavior of parasitized bees: consequences for plant fitness”. Leif Richardson (presenter), Rebecca Irwin, Deane Bowers
- 2014 Ecological Society of America meeting, Sacramento, CA. “Iridoid glycosides in floral nectar alter pollinator behavior and pollen transfer dynamics”. Leif Richardson (Presenter), Rebecca Irwin, Deane Bowers
- Entomological Society of America, Portland, Oregon. “Population variation in chemical defense in the specialist butterfly, *Euphydryas phaeton* (Nymphalidae)”. Peri Mason (presenter) and Deane Bowers.
- Entomological Society of America, Portland, Oregon. “Consequences of non-native host plants for caterpillars and their natural enemies”. Deane Bowers (presenter). Invited symposium presentation.
- Entomological Society of America, Portland, Oregon. “Interactions between territorial soldier beetles (*Chauliognathus basalis*) and bees visiting sunflowers (*Helianthus perfoliaris*). Poster. Collin Schwantes (presenter) and Deane Bowers.
- Entomological Society of America, Portland, Oregon. “Responses of *Catalpa* Sphinx and its primary parasitoid to vary levels of host plant iridoid glycosides”. Poster. Jessica Bray (presenter), Deane Bowers, and Karen Kester.
- Entomological Society of America, Portland, Oregon. “Extreme weather events and native bees: Effects of the 2013 Colorado flood”. Poster. Virginia Scott (presenter), Adrian Carper, and Deane Bowers.
- Entomological Society of America, Portland, Oregon. “Conservation grasslands support diverse native bee assemblages in agroecosystems”. Poster. Adrian Carper (presenter), Collin Schwantes, Stacy Endriss, Andrew Norton, Deane Bowers, Mary Jamieson.
- 2013 Gordon Conference on Plant-Herbivore Interactions. Ventura, California. “Sequestration of iridoid glycosides by a specialist geometrid and the evolution of iridoid sequestration in the Lepidoptera”. Deane Bowers (Presenter). Poster.
- Gordon Conference on Plant-Herbivore Interactions. Ventura, California. “Effects of sustained herbivory on conifer defenses: consequences for herbivore performance”. Amy Trowbridge (presenter), Deane Bowers, Henry Adams, Nate McDowell, and Russell Monson. Poster.
- Gordon Conference on Plant-Herbivore Interactions. Ventura, California. “Chemical trade-offs in seed dispersal: Defensive metabolites in fruits alter preferences of seed-dispersing bats”. Susan Whitehead (presenter), Maria Obando-Quesada, Deane Bowers. (Poster).
- Gordon Conference on Plant-Herbivore Interactions. Ventura, California. Chemical defense profiles in native and non-native *Lonicera* species: partitioning variance and associations with herbivore resistance. Deah Lieurance, Sourav Chakraborty, Susan R. Whitehead, Jeff Powell, Pierluigi Bonello, Deane Bowers, and Don Cipollini (Presenter). Poster.
- Gordon Conference on Plant-Herbivore Interactions. Ventura, California. Does nectar robbing induce iridoid glycosides in *Linaria vulgaris*? Jessamyn Manson (presenter), Rebecca Irwin, Deane Bowers. Poster.
- Entomological Society of America. Austin, Texas. “Plant chemical variation and trophic interactions: time is of the essence”. Deane Bowers (Presenter) and Carolina Quintero. (invited symposium contributor)

- Entomological Society of America. Austin, Texas. “Ecology and evolution of iridoid glycoside sequestration in the Lepidoptera”. Deane Bowers. (invited symposium contributor).
- Entomological Society of America. Austin, Texas. “The Bees’ Needs: a Citizen Science Project. Virginia Scott (presenter), Alex Rose, Deane Bowers. Poster.
- 2012 Terrestrial Invasive Species Conference, “Variation in defensive secondary metabolites of native and non-native *Lonicera* species grown in the common garden: responses to nutrient availability and relationships with herbivore resistance” Deah Lieurance (Presenter), Sourav Chakraborty, Pierluigi Bonello, Susan Whitehead, Deane Bowers and Don Cipollini
- Guild of Rocky Mountain Ecologists and Evolutionary Biologists. “Chemical ecology of *Eucaterva variaria* (Geometridae) and its host plant, Desert Willow, *Chilopsis linearis* (Bignoniaceae)”
- Lepidopterists’ Society, Denver, Colorado. “Chemical ecology of *Eucaterva variaria* (Geometridae) and its host plant, Desert Willow, *Chilopsis linearis* (Bignoniaceae)”
- Ecological Society of America, Portland, Oregon. “Does variation in defensive secondary metabolites in native and non-native *Lonicera* species explain invasive success?: responses to nutrient availability and relationships with herbivore resistance in a common garden experiment” Deah Lieurance (Presenter), Sourav Chakraborty, Pierluigi Bonello, Susan Whitehead, Deane Bowers and Don Cipollini
- 2011 Ecological Society of America, Austin, Texas. “Are ripe fruit secondary compounds a function of foliar defense: patterns of intra-specific variation in *Lonicera x bella*” (with Susan Whitehead, presenter).
- Lepidopterists Society, New Haven, Connecticut. “Within and between year variation in chemical defense of two co-occurring butterfly species” (with Alex Hill*, Frances Drachenburg*, Carolina Quintero)
- 2010 Gordon Conference on Plant-Herbivore Interactions. Galveston, Texas, “Annual variation in chemical defense of two checkerspot butterflies”. (with Alexander Hill*, Frances Drachenburg*, and Carolina Quintero). (poster)
- Gordon Conference on Plant-Herbivore Interactions. Galveston, Texas, “Effects of host plant species on performance of caterpillars and their parasitoids: a comparison of two systems” (with Evan Lampert, presenter). (poster).
- Society for the Study of Evolution. “Phytochemical variation in *Mimulus guttatus* (Yellow Monkey Flower)” (with Liza Holeski (presenter), Ken Keefover-Ring and Rick Lindroth.
- Ecological Society of America. “Ontogenetic variation in herbivore defense phenotypes in the introduced weed *Verbascum thapsus* (common mullein)” (with Christina Alba-Lynn (presenter), Dana Blumenthal and Ruth Huffbauer).
- Guild of Rocky Mountain Ecologists and Evolutionary Biologists. Pingree Park, CO Whitehead, S.R. and M.D. Bowers “Are ripe fruit secondary compounds a consequence of foliar defense? Patterns of intraspecific chemical variation in *Lonicera tatarica* (Caprifoliaceae)”
- 2009 Ecological Society of America, “Caterpillar chemical defense: sources of variation and effects on an endoparasitoid”. (with Evan Lampert and Lee Dyer)
- Ecological Society of America, “Effects of plant ontogeny on chemical defense of *Plantago lanceolata*”. (with Carolina Quintero, presenter).
- Guild of Rocky Mountain Population Biologists, “Caterpillar chemical defense: sources of variation and effects on an endoparasitoid”. (with Evan Lampert)

- Spring symposium, Department of Ecology and Evolutionary Biology, University of Colorado. The effect of ingested iridoid glycosides on the White Peacock (Lepidoptera: Nymphalidae). (with Angela Knerl*, presenter).
- 2008 North Central Branch of the Entomological Society of America, “Host plant identity and interactions between a generalist herbivore and its parasitoid”. (with Evan Lampert, presenter).
- International Congress of Entomology, Durban, South Africa, “Variation in caterpillar chemistry: Effects on predators versus parasitoids”. (invited symposium presentation).
- International Congress of Entomology, Durban, South Africa, “Multi-trophic maintenance of herbivore populations: How plant secondary chemistry indirectly benefits parasitoid natural enemies”, (with Angela Smilanich, presenter, Lee Dyer, Jeff Chambers).
- Ecological Society of America, Milwaukee, WI, “The effects of climate change on the grasshoppers of the southern Rocky Mountains of Colorado”, (with C. Nufio, presenter).
- Entomological Society of America, “A comparison of mixed host plant diets on the sequestration of iridoid glycosides by three lepidopteran species” (with Evan Lampert, presenter).
- Guild of Rocky Mountain Ecologists and Evolutionary Biologists. “Impacts of diet variation in secondary compounds on a generalist herbivore”. (with Evan Lampert, presenter)
- 2007 Gordon Conference on Plant-Herbivore Interactions, “Iridoid glycosides in an invasive weed, Dalmatian Toadflax (*Linaria dalmatica*) and its biological control agent (*Calophasia lunula*)” (poster).
- Ecological Society of America, “Effects of nitrogen deposition on biological control of an invasive weed, *Linaria dalmatica* (Scrophulariaceae). Poster (with Mary Jamieson, presenter).
- Ecological Society of America, “Costs of sequestration in the buckeye caterpillar (*Junonia coenia*). Smilanich, A.M., Dyer, L.A., Chambers, J.Q., and Bowers, M.D.
- Entomological Society of America, “Costs of sequestration in the Buckeye caterpillar, *Junonia coenia* (Nymphalidae)”. (with Angela Smilanich, presenter, Lee Dyer, Jeff Chambers).
- Entomological Society of America, “Caterpillar chemistry: Sequestration of iridoid glycosides by woolly bears (Arctiidae)”. Invited symposium presentation.
- Entomological Society of America, “Tritrophic interactions among *Catalpa*, the *Catalpa* Sphinx (*Ceratomia catalpae*), and the parasitoid *Cotesia congregata*”. Poster. (With Evan Lampert, presenter, and Lee Dyer).
- Colorado Native Plant Society. “Eating and being eaten: Plant-insect interactions in the Colorado Front Range”. Key note speaker.

PUBLICATIONS (Peer-reviewed)

H-index = 46 (Google Scholar)

* indicates undergraduate author

** indicates graduate student or post-doctoral author

132. Kelly**, C. and M.D. Bowers. 2017. The perennial *Penstemon*: variation across years, populations and tissues. *Journal of Chemical Ecology* 43:599-607.

131. Mason**, P. and M.D. Bowers. 2017. Localization of defensive chemicals in two congeneric butterflies (*Euphydryas*, Nymphalidae). *Journal of Chemical Ecology* 43:480-486 .
130. Trowbridge**, A., M. D. Bowers, R.A. Monson. 2016. Conifer monoterpene chemistry during an outbreak enhances consumption and immune response of an eruptive folivore. *Journal of Chemical Ecology* 42:1381-1292.
129. Schultz, C. J. Zemaitis, C. Thomas, M.D. Bowers, E. Crone. 2016. Nontarget effects of grass-specific herbivores differ among species, chemicals and host plants in *Euphydryas* butterflies. *Journal of Insect Conservation* 20: 867-877.
128. Whitehead**, S., M. Obando Quesada, M. D. Bowers. 2016. Chemical trade-offs in seed dispersal: Defensive metabolites in fruits deter consumption by mutualist bats. *Oikos* 125:927-937..
127. Whitehead**, S., J. Tiramani*, M.D. Bowers. 2016. Iridoid glycosides from fruits reduce the growth of fungi associated with fruit rot. *Journal of Plant Ecology* 9: 357-366.
126. Kelly**, C. and M.D. Bowers. 2016. Preference and performance of generalist and specialist herbivores on chemically defended host plants. *Ecological Entomology* 41: 308-316.
125. Richardson, L.** , M.D. Bowers, R. Irwin. 2016. Nectar chemistry mediates the behavior of parasitized bees: consequences for plant fitness. *Ecology* 97:325-337.
124. Lieurance**, D., S. Chakraborty, S.R. Whitehead**, J. Powell, P. Bonello, M.D. Bowers, D. Cipollini. 2015. Comparative herbivory rates and secondary metabolite profiles in the leaves of native and non-native *Lonicera* species. *Journal of Chemical Ecology* 41:1069-1079.
123. Bowers, M.D. 2015. From caterpillars to chemistry. In: L.A. Dyer and M.L. Forister (eds.). *The Lives of Lepidopterists*. Springer. Pp. 3 – 9.
122. Hammer**, T. and M.D. Bowers 2015. Gut microbes may facilitate insect herbivory of chemically defended plants. *Oecologia* 179:1-14.
121. Lampert**, E. and M.D. Bowers. 2015. Incompatibility between plant-derived defensive chemistry and immune response of 2 sphingid herbivores. *Journal of Chemical Ecology* 41:85-92.
120. Murphy, S., J. Lill, M.D. Bowers, and M. Singer. 2014. Enemy-free space for parasitoids. *Environmental Entomology* 43:1465-1474..
119. Keefover-Ring, K., L.M. Holeski, M. Deane Bowers, A.D. Clauss, and R. L. Lindroth. 2014. Phenylpropanoid glycosides of *Mimulus guttatus* (yellow monkeyflower). *Phytochemistry Letters* 10:132-139.
118. Lampert**, E., L. A. Dyer, and M.D. Bowers. 2014. Dietary specialization and the effects of plant species on potential multitrophic interactions of three species of nymphaline caterpillars. *Entomologia Experimentalis et Applicata* 153:207-216.
117. Alba**, C., M. D. Bowers, D. Blumenthal, R.A. Hufbauer. 2014. Chemical and mechanical defenses vary among maternal lines and leaf ages in *Verbascum thapsus* L. (Scrophulariaceae) and reduce palatability to a generalist insect. *PLOS One* 9(8): e104889.
116. Quintero**, C., E.C. Lampert**, and M.D. Bowers. 2014. Time is of the essence: Direct and indirect effects of plant ontogenetic trajectories on higher trophic levels. *Ecology* 95:2589-2602.
115. Robinson**, N., T. Kadlec, M.D. Bowers, R.P Guralnick. 2014. Integrating species traits and habitat characteristics into models of butterfly diversity in an urban fragmented ecosystem. *Ecological Modelling* 281:15-25.

114. Whitehead**, S. and M.D. Bowers. 2014. Chemical ecology of fruit defense: synergistic and antagonistic interactions among amides from *Piper*. *Functional Ecology* 28:1094-1106.
113. Whitehead**, S.R., M. Leonard, C. Jeffrey, C. Dodson, L.A. Dyer, and M.D. Bowers. 2013. Optimal defense theory predicts patterns of secondary metabolite allocation to fruits and seeds in *Piper reticulatum*. *Journal of Chemical Ecology* 39:1373-1384..
112. Knerl, A*, and M.D. Bowers. 2013. Incorporation of an introduced weed into the diet of a native butterfly: Consequences for preference, performance and chemical defense. *Journal of Chemical Ecology* 39:1313-1321.
111. Whitehead**, S. and M.D. Bowers. 2013. Evidence for the adaptive significance of secondary compounds in vertebrate-dispersed fruits. *American Naturalist* 182:563-577. **Recognized by the Faculty of 1000.**
110. Lampert**, E. and M.D. Bowers. 2013. Detrimental effects of plant compounds on a polyembryonic parasitoid are mediated through its highly polyphagous herbivore host. *Entomologia Experimentalis et Applicata* 148:267-274.
109. Bowers, M.D. and L. Richardson. 2013. Use of two oviposition plants in populations of the Baltimore Checkerspot, *Euphydryas phaeton* (Nymphalidae). *Journal of the Lepidopterists' Society* 67:299-300.
108. Bowers, M.D. and J. Schmitt. 2013. Overcrowding leads to lethal oviposition mistakes by the Baltimore Checkerspot, *Euphydryas phaeton* (Nymphalidae). *Journal of the Lepidopterists' Society* 67:227-229.
107. Holeski**, L., K. Keefover-Ring**, M.D. Bowers, Z. T. Harnenz, and R.L. Lindroth. 2013. Patterns of phytochemical variation in yellow monkeyflower (*Mimulus guttatus*). *Journal of Chemical Ecology* 39: 525-536.
106. Quintero**, C. and M.D. Bowers. 2013. Moderate insect herbivory alters chemical defenses and growth of *Penstemon virgatus* (Plantaginaceae) during seedling development. *Annals of Botany* 112:661-669.
105. Whitehead**, S. and M.D. Bowers. 2013. Iridoid and secoiridoid glycosides in a hybrid complex of bush honeysuckles (*Lonicera spp.*, Caprifoliaceae): implications for evolutionary ecology and invasion biology. *Phytochemistry* 86:57-63.
104. Richards**, L.A., E.C. Lampert**, M.D. Bowers, C.D. Dodson, A.M. Smilanich, and L.A. Dyer. 2012. Synergistic effects of iridoid glycosides on the survival, development and immune response of a specialist caterpillar (*Junonia coenia*, Nymphalidae). *Journal of Chemical Ecology* 38:1276-1284..
103. McGuire**, C., C. Nufio, M.D. Bowers and R.P. Guralnick. 2012. Thermal regime trends along a plains-to-alpine elevational transect in the Colorado Front Range over a 54 and 20 year record. *PLOSOne* 7(9) e44370;
102. Jamieson**, M.A., M.D. Bowers, A.C. Pagan*, T. Seastedt. 2012. Influence of soil nitrogen availability and insect biocontrol on chemical defense and performance traits of an invasive plant (*Linaria dalmatica*). *American Journal of Botany* 99: 1630-1637.
101. Robinson**, N., S. Armstead**, M.D. Bowers. 2012. Butterfly response to and recovery from drought in a temperate ecosystem. *Entomologia Experimentalis et Applicata* 145:50-61.
100. Jamieson**, M.A. and M.D. Bowers. 2012. Plant-mediated effects of soil nitrogen enrichment on a chemically defended specialist herbivore, *Calophasia lunula*. *Ecological Entomology* 37:300-308.
99. Pankoke**, H., M. D. Bowers, S. Dobler. 2012. The interplay between toxin-releasing β -glucosidase and plant iridoid glycosides impairs larval development in a

- generalist caterpillar, *Grammia incorrupta* (Arctiidae). Insect Biochemistry and Molecular Biology 42:426-434.
98. Alba**, C., R. Hufbauer, and M.D. Bowers. 2012. Combining optimal defense theory and the evolutionary dilemma model to refine predictions regarding plant invasion. Ecology 93:1912-1921.
 97. Quintero**, C. and M.D. Bowers. 2012. Changes in plant chemical defenses and nutritional quality as a function of ontogeny in *Plantago lanceolata* (Plantaginaceae). Oecologia 168:471-481.
 96. Lampert**, E., L.A. Dyer, and M.D. Bowers. 2011. Chemical defense across three trophic levels: *Catalpa bignonioides* (Bignoniaceae), the caterpillar *Ceratomia catalpae* (Lepidoptera: Sphingidae), and its endoparasitoid *Cotesia congregata* (Hymenoptera: Braconidae). Journal of Chemical Ecology 37:1063-1070.
 95. Jamieson**, M.A. and M.D. Bowers. 2011. Soil nitrogen availability and herbivore attack influence the chemical defenses of an invasive plant (*Linaria dalmatica*; Plantaginaceae). Chemoecology 22: 1-11.
 94. Quintero**, C. and M.D. Bowers. 2011. Plant induced defenses depend more on plant age than previous history of damage: implications for plant-herbivore interactions. Journal of Chemical Ecology 37:992-1001.
 93. Alba**, C., R. Hufbauer, D. Blumenthal, M.D. Bowers. 2011. Evolution of growth but not structural or chemical defense in *Verbascum thapsus* (common mullein) following introduction to North America. Biological Invasions 13:2379-2389.
 92. Lampert**, E. and M.D. Bowers. 2011. A comparison of sample preparation techniques for quantifying iridoid glycosides sequestered by lepidopteran larvae. Journal of Chemical Ecology 37:496-499.
 91. Smilanich, A., J.G. Vargas**, L.A. Dyer, M.D. Bowers. 2011. Effects of ingested secondary metabolites on the immune response of a polyphagous caterpillar (*Grammia incorrupta*, Arctiidae). Journal of Chemical Ecology 37:239-245.
 90. Nufio, C., J. McClenahan** and M.D. Bowers. 2011. Grasshopper response to reductions in habitat area as mediated by subfamily classification and life history traits. Journal of Insect Conservation 15:409-419.
 89. Pankoke**, H., M.D. Bowers, and S. Dobler. 2010. Influence of iridoid glycoside containing host plants on midgut β -glucosidase activity in the yellow woolly bear *Spilosoma virginica* Fabricius (Arctiidae). Journal of Insect Physiology 56:1907-1912.
 88. Lampert**, E. And M.D. Bowers. 2010. Host plant influences on iridoid glycoside sequestration of generalist and specialist caterpillars. Journal of Chemical Ecology 36:1101-1104.
 87. Nufio, C., McGuire**, C., Bowers, M.D. and Guralnick, R. 2010. Grasshopper community response to climatic change: variation along an elevational gradient. PLOS One 5(9):e12977.
 86. Lampert**, E., L.A. Dyer, and M.D. Bowers. 2010. Caterpillar chemical defense and parasitoid success: *Cotesia congregata* (Hymenoptera: Braconidae) parasitism of *Ceratomia catalpae* Lepidoptera: Sphingidae). Journal of Chemical Ecology 36: 992-998.
 85. Lampert**, E. and M.D. Bowers. 2010. Effects of plant diet on the quality of the generalist, *Trichoplusia ni* (Noctuidae), as a host for the polyembryonic parasitoid *Copidosoma floridanum* (Hymenoptera: Encyrtidae). Entomologia Experimentalis et Applicata 134:287-295.
 84. Jamieson**, M. and M.D. Bowers. 2010. Iridoid glycoside variation in the invasive plant Dalmatian Toadflax, *Linaria dalmatica* (Plantaginaceae), and sequestration by

- the biological control agent *Calophasia lunula* (Noctuidae). *Journal of Chemical Ecology* 36:70-79.
83. Bennett**, A., J. Bever, and M.D. Bowers. 2009. Arbuscular mycorrhizal fungi can suppress inducible plant responses and alter plant defensive strategies following herbivory. *Oecologia* 160:771-779.
 82. Smilanich**, A., L.A. Dyer, J. Chambers, and M.D. Bowers. 2009. Immunological cost of chemical defence and the evolution of herbivore diet breadth. *Ecology Letters* 12:612-621.
 81. Nufio, C., Lloyd**, K., Bowers, M.D., Guralnick, R. 2009. Gordon Alexander, Grasshoppers, and Climate Change. *American Entomologist* 55:10 - 13.
 80. Bowers, M.D. 2009. Chemical Defenses in Woolly Bears: Sequestration and Efficacy against Predators and Parasitoids. Chapter 5 in: W. Conner (ed.). *Tiger Moths and Woolly Bears: Behavior, Ecology and Natural History of the Arctiidae*. Oxford University Press. Pp. 83-101.
 79. Bowers, M.D. and C. Nufio. 2008. The Gordon Alexander grasshopper collection: Newly curated and available on-line. *Newsletter of the Orthopterists' Society* 27(2): 6 - 8.
 78. Barton**, K.E. and M.D. Bowers. 2006. Neighbor species alter resistance phenotypes in *Plantago* (Plantaginaceae). *Oecologia* 150:442-452.
 77. Prudic**, K., Oliver**, J. and M.D. Bowers. 2005. Soil nutrient effects on oviposition preference, larval performance, and chemical defense of a specialist insect herbivore. *Oecologia* 143:578-587.
 76. Fuchs*, A. and M.D. Bowers. 2004. Patterns of iridoid glycoside production and induction in *Plantago lanceolata* (Plantaginaceae) and the importance of plant age. *Journal of Chemical Ecology* 30:1723-1742.
 75. Bowers, M.D. 2003. Coevolution of insects and plants. In: *Encyclopedia of Plant and Crop Science*. M. Kogan and S. Rao (eds.). Marcel Dekker Inc.
 74. Bowers, M.D. 2003. Defensive chemistry and ecology of the *Catalpa* Sphinx, *Ceratomia catalpae* (Sphingidae). *Journal of Chemical Ecology* 29:2359-2367.
 73. Stamp, N.E. and M.D. Bowers. 2000. Herbivore response to hostplant genotype and presence of predators. *Ecological Entomology* 25:486-492.
 72. Stamp, N.E. and M.D. Bowers. 2000. Do enemies of herbivores influence plant growth and chemistry? Evidence from a semi-natural experiment. *Journal of Chemical Ecology* 26:2367-2386..
 71. Jarzomski**, C., N.E. Stamp, and M.D. Bowers. 2000. Effects of nutrients and herbivory on iridoid glycosides and growth of plantain. *Oikos* 88:371-379.
 70. Darrow**, K. and M. D. Bowers. 1999. Effects of nutrition and time on induction of iridoid glycosides in *Plantago lanceolata* (Plantaginaceae). *Journal of Chemical Ecology* 25:1427-1440.
 69. Theodoratus*, D. H. and M.D. Bowers. 1999. Effects of sequestered iridoid glycosides on prey choice of the Prairie Wolf Spider, *Lycosa carolinensis* (Lycosidae). *Journal of Chemical Ecology* 25: 283-295.
 68. Ellis*, A. and M.D. Bowers. 1998. Effects of diet on growth of buckeye (*Junonia coenia*) and painted lady (*Vanessa cardui*) caterpillars in the laboratory and field. *Journal of the Lepidopterists' Society* 52:65-75.
 67. Strohmeyer**, H.H., N.E. Stamp, C.M. Jarzomski**, M. D. Bowers. 1998. Effects of prey species and prey diet on two invertebrate predators, stinkbugs and jumping spiders. *Ecological Entomology* 23:68-79.
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