

M. Deane Bowers

CURRICULUM VITAE -- 2006

PRESENT POSITION

Professor of Biology and Curator of Entomology, 1995 - present
University of Colorado

ADDRESS: University of Colorado Museum and
Department of E.P.O. Biology
University of Colorado
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Boulder, CO 80309
(303) 492-5530

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RESEARCH INTERESTS: chemical ecology, insect ecology and evolution, Lepidoptera, multitrophic interactions, insect defenses

PREVIOUS POSITIONS

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,
Introductory Zoology

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

Faculty Fellowship, University of Colorado (2003 - 2004)
Lund Lecturer, University of Georgia (2003)
Griswold Lecturer, Cornell University (2002)
Elected 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)

Elected Co-chair (1995) of the Gordon Research Conference on "Plant-Herbivore Interactions"
Elected Vice-president, Lepidopterists' Society (1992 - 1993).
University of Massachusetts, Chancellor's Fellowship (1975 - 1977)

FELLOWSHIPS AND GRANTS

External Sources

- 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 3 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.
- 2002 - NSF. Dissertation Improvement Grant: An investigation of the dynamic roles of model and mimic in a classic mimicry system". \$9,394. Katy Prudic, graduate student.
- 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 \$28,000, with an additional \$20,000 matching funds from University of Colorado.
- 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

- 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
 Lepidopterist's Society

PROFESSIONAL ACTIVITIES

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 for the PEET (Partnerships for Enhancing Expertise in Taxonomy), May 2001
 NSF Ecology Panel, October, 1995; April, 1996; October, 1998, October, 1999, April 2000

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 manuscripts for American Naturalist, Ecology, Evolution, Oecologia, Psyche,
 Journal of the Lepidopterist's Society, Journal of Chemical Ecology, Science,
 Environmental Entomology, Ecological Entomology.
 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.
 Consultant for Genetics Institute
 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 University and Departmental Committees

Museum

Search Committee, Vertebrate Zoologist, 2006 - 2007
 Museum Program Review Committee, 2005 - 2006
 Museum Self-Study Committee, 2004 - 2005
 Museum BFA representative, 2000 - present (except sabbatical year, 2003 - 2004)
 American Association of Museums Accreditation Committee, 2000 - 2002
 Centennial Committee, 2002 - 2003
 Building Committee, 1998 - 2002
 Curriculum Committee, 1998 - 2000, 2005-2006
 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 - present

Committee to review the status of Hunter Building, 1994
Collection Committee, 1992 - present, chair 2004 - 2005
Museum Studies Task Force, 1993
Reappointment Committee (chair), Tom Ranker, 1992
Post-tenure review committee, S-K. Wu, 1991
Curriculum Committee, 1991 - present
Post-tenure review committee, W. Hay, 1990
Museum Exhibits Committee, 1989-1990
Search Committee, Herbarium Curator, 1989-1990

EPO Biology

Search Committee, Ecologist, 2004 - 2005
Reappointment Committee for Tom Lemieux (chair), 2004 - 2005
Graduate Committee, 2004 - 2007
Reappointment Committee, Pei Tsai, 2003
Strategic Planning Committee, 2001 - 2002
Space Committee, 2002
Salary Committee, 2001
Student Computer Facility, 2000 - 2001
Student Computer Facility, 1998 - 1999
Graduate Committee, 1998-1999
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

CRCW Committee, 2004 - 2007
BFA Awards Committee, 2006
Boulder Faculty Assembly Executive Committee, 2001 - 2003, 2004 - 2005
Boulder Faculty Assembly Secretary, 2002 - 2003, 2004 - 2004
Chancellor's Committee on Gay, Lesbian, Bisexual and Transgendered Issues, 2001 - present
BFA Committee on Women, 2001 - 2003
Evaluation Committee (chair) for Linda Cordell, 1999
Science Advisor, Hughes Initiative Program (1998 - present)
BFA Awards Committee, 1999

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

TEACHING

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)

University of Colorado:

Museum 5140, Collections Management, Fall, 2005
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 4660/5660. Insect Biology. for advanced undergraduates and graduate students, fall, 1991, 1993, 1995 (lecture and laboratory)
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.

Organization for Tropical Studies (OTS)

Faculty resource person, 1986, 1992, 2002

STUDENTS

Graduate Students, Harvard University

Mark Skinner (Ph.D. 1988) Pollination Biology and Floral Evolution in the genus *Lilium*.

Eric Fajer (Ph.D. 1990) Research on the effects of elevated CO₂ environments on plant-insect interactions.

Graduate Students, University of Colorado

Karolyn Darrow (MBS, 1993).

Lee Dyer (Ph.D., 1994).

Ruth Heisler (M.A., May 1995).

Mark Camara (Ph.D. , 1995).

Jamie Alton (M.S., May, 1997).

Jill Dreves (M.S., 2001)

Celeste Park (M.A., 2001)

MarieAnn de la Fuente (Ph.D. 2002).

Steve Armstead (M.S. 2003)

Kasey Barton (Ph.D. expected 2006)

David Bettman (M.A. 2004)

Mary Jamieson (co-advised with Tim Seastedt) (Ph.D. expected 2009)

Jessica Vargas (Ph.D. expected 2010)

Carolina Quintero (Ph.D. expected 2010)

Natalie Robinson (M.A. expected 2008)

Marisa Pankowski (M.S. expected 2008)

Susan Whitehead (Ph.D. expected 2011)

Post-doctoral Fellows

Gillian Puttick (1981-1983)

Suzanne Dobler (1993-1996)

Dana Garrigan (1994 - 1996)

Cesar Nufio (2005 - 2007)

Graduate Student Committees (University of Colorado only)

Rick Adams, Elizabeth Ammon, Jan Bernstein, Robin Bingham, Amanda Cook, Dave Denton.

David Fleck, Anna Goebel, Nate Howard, Jo Jeral, Ken Keefover-Ring, Scott Kelley, David

Knochel, Marcy Litvak, Claire Lay, Margaret McDole, Terry McGlynn, Sam Messier, Kailen

Mooney, Mardy Nelson, Sonora Rasmussen, Terry Smith-Glaser, Shaharra Usnick, Ann

West, Carla Wise, Jane Zelikova

Graduate Student Committees—other Universities

Leah Dudley (University of Missouri)

Angela Smilanich (Tulane University)

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

Michele Arntz, Patty Brezovar, Eowyn Burke, Marie Ann de la Fuente, Scott Denton, Robb

Ecker, Alexander Ellis, Tara Glover, Colin Gottlieb, Kevin Johnson, Janine Johnston, Heidi

Kippenhan, Marie Massa, Kelly Matheson, Ann Nelson, Celeste Park, Katie Ramsey, Pamela Ridley, Joni Sakurada, Erin Schon, Kelly Senescqua, Jan Simms, Demetri Theodoratus, Leslie Van Stelten, Allyson Sudborough, Nathan Sanders

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)

- 2006 Wesleyan University
University of Oregon
Georgetown University
University of Maryland
- 2005 Symposium on the Biology of the Arctiidae
University of Missouri, Columbia
- 2004 Colorado State University
Indiana University (2 seminars)
- 2003 Western State University
University of Georgia (2 seminars)
American Association of University Women, Boulder Chapter
- 2002 SUNY Binghamton (2 seminars)
Cornell University (2 seminars)
University of Colorado Museum
Organization for Tropical Studies
- 2001 Smith College
Brown University
Denver Museum of Natural History
- 2000 Plant Animal Interactions Symposium, SICB meeting, Atlanta, Georgia
University of Kansas
University of Utrecht, Netherlands
- 1999 La Selva Biological Station, La Selva Costa Rica
University of Vermont
Association of Educational and Research Greenhouse Curators—invited talk
Boulder County High Schools student research program
Hughes Initiative Training Program for Science Teachers, Boulder, Colorado;
Butterfly Pavilion, Westminster, Colorado;
Boulder Planning Group;
University of Colorado Directors' Club
- 1998 Entomological Society of America;
University of Colorado Museum,
University of Colorado TV
- 1997 Stanford University;
University of California at Santa Cruz;
Bodega Bay Marine Lab, California;
Lepidopterists' Society Meeting, Symposium on Lepidopteran Biology;

- Phytochemical Society, Symposium on "Interactions of Plants with other Organisms"
 U.S. Air Force Academy, Colorado Springs;
 Colorado State University, Fort Collins;
 University of Freiburg, Germany
- 1996 University of California, Berkeley;
 University of California, Davis;
 Plant Physiologists Meeting, Symposium on Plant-Insect Interactions.

PAPERS PRESENTED AT PROFESSIONAL MEETINGS (last 10 years)

- 2006 Lepidopterists' Society, "Sequestration of host plant defense compounds by a biological control agent, *Calophasia lunula* (Noctuidae)"
 International Society of Chemical Ecology, "Ontogeny of checkerspot chemical defense" (poster)
- 2005 Lepidopterists' Society, "Chemical defense of checkerspot butterflies: the importance of hostplant and life stage"
- 2005 Lepidopterists' Society, "Processing of Iridoid Glycosides by members of the Arctiidae"
- 2003 Ecological Society, "Competition and neighbors affect chemical defense of *Plantago lanceolata*." (with K. Barton, presenter)
- 2002 Ecological Society, "Effects of soil nitrogen enrichment on the chemical defense and fitness of a specialist insect herbivore" (with K. Prudic presenter)
- 1997 Lepidopterists' Society, "Caterpillar chemical defense and the response of invertebrate predators"

PUBLICATIONS

1. Bowers, M.D. 1978. Observations on *Erora laeta* (Lycaenidae) in New Hampshire. *J. Lepid. Soc.* 32:140-141.
2. Bowers, M.D. 1978. Over-wintering behavior in *Euphydryas phaeton* (Nymphalidae). *J. Lepid. Soc.* 32:282-288.
3. Bowers, M.D. and D. C. Wiernasz. 1979. Avian predation on the palatable butterfly, *Cercyonis pegala* (Satyridae). *Ecol. Entomol.* 4:205-209.
4. Bowers, M.D. 1980. Unpalatability as a defense strategy of *Euphydryas phaeton* (Lepidoptera: Nymphalidae). *Evolution* 34:586-600.
5. Bowers, M.D. 1981. Unpalatability as a defense strategy of western checkerspot butterflies (*Euphydryas*, Nymphalidae). *Evolution* 35:367-375.
6. Bowers, M.D. 1983. Mimicry in North American checkerspot butterflies: *Chlosyne harrissii*, a Batesian mimic of *Euphydryas phaeton* (Lepidoptera: Nymphalidae). *Ecol. Entomol.* 8:1-8.
7. Bowers, M.D. 1983. Iridoid glycosides and larval hostplant specificity in checkerspot butterflies (*Euphydryas*, Nymphalidae). *J. Chem. Ecol.* 9:475-493.
8. Bowers, M.D. 1984. Iridoid glycosides and hostplant specificity in larvae of the buckeye butterfly, *Junonia coenia* (Nymphalidae). *J. Chem. Ecol.* 10:1567-1577.
9. Bowers, M.D. 1985. Larval hostplant choice in checkerspot butterflies: *Euphydryas chalcedona*, *E. colon*, and hybrids. *Psyche* 92:39-48.

10. Bowers, M.D., I. L. Brown, and D. Wheye. 1985. Bird predation as a selective agent in a butterfly population. *Evolution* 39:93-103.
11. Bowers, M.D. and G.M. Puttick. 1986. The fate of ingested iridoid glycosides in lepidopteran herbivores. *J. Chem. Ecol.* 12:169-178.
12. Bowers, M.D. 1986. Population differences in larval hostplant use in a checkerspot butterfly. *Ent. Exp. & Appl.* 40:61069.
13. Stamp, N.E. and M.D. Bowers. 1986. Growth of the buckmoths *Hemileuca lucina* and *H. maia* (Saturniidae) on their own and on each other's hostplants. *J. Lepid. Soc.* 40:214-217.
14. Bowers, M.D., R. Crabtree, S. Harrison, C. Sobrevilla, M. Wells, and L. Wolfe. 1987. Predation on *Anartia fatima* (Nymphalidae) in Costa Rica. *J. Lepid. Soc.* 41:75-76.
15. Cornell, J.C., N.E. Stamp, and M.D. Bowers. 1987. Developmental change in aggregation, defense and escape behavior of buckmoth caterpillars, *Hemileuca lucina* (Saturniidae). *Behav. Ecol. and Sociobiol.* 20:383-388.
16. Williams, E.H. and M.D. Bowers. 1987. Oviposition and larval hostplant use in the montane checkerspot, *Euphydryas gillettii* (Nymphalidae). *Am. Midl. Natur.* 118:153-161.
17. Bowers, M.D. and N.E. Stamp. 1987. Patterns of oviposition in *Hemileuca lucina* (Saturniidae). *J. Lepid. Soc.* 41:131-140.
18. Bowers, M.D. and G.M. Puttick. 1988. The effect of qualitative variation in iridoid glycosides on generalist and specialist lepidopteran herbivores. *J. Chem. Ecol.* 14:319-334.
19. Puttick, G.M. and M.D. Bowers. 1988. The effect of iridoid glycosides on growth, survival, and food choice of the armyworm, *Spodoptera eridania* (Lepidoptera: Noctuidae). *J. Chem. Ecol.* 14:335-351.
20. Pereyra, P. and M.D. Bowers. 1988. Iridoid glycosides as oviposition stimulants for the buckeye, *Junonia coenia* (Nymphalidae). *J. Chem. Ecol.* 14:917-928.
21. Stamp, N.E. and M.D. Bowers. 1988. Direct and indirect effects of predatory wasps on gregarious larvae of the buckmoth, *Hemileuca lucina* (Saturniidae). *Oecologia* 75:619-624.
22. Bowers, M.D. 1988. Plant allelochemistry and mimicry. In: P. Barbosa and D. Letourneaux (eds.). *Novel Aspects of Plant-Insect Interactions*. John Wiley and Sons. pp. 273-311.
23. Bowers, M.D. 1988. Chemistry and coevolution: Iridoid glycosides, plants and herbivorous insects. In: *Chemical Mediation of Coevolution*. K Spencer (ed.). Academic Press. pp. 133-165.
24. Cornell, J.D., N.E. Stamp and M.D. Bowers. 1988. Variation and developmental change in activity of gregarious caterpillars, *Hemileuca lucina* (Saturniidae) *Psyche* 95:45-58.
25. Bowers, M.D. and Z. Larin. 1989. Acquired chemical defense in the lycaenid butterfly, *Eumaeus atala*. *J. Chem. Ecol.* 15:1133-1146.
26. Fajer, E.D., M. D. Bowers, and F.A. Bazzaz. 1989. The effects of enriched carbon dioxide atmospheres on plant/insect herbivore interactions. *Science* 243:1198-1200.
27. Bowers, M.D. and G.M. Puttick. 1989. Iridoid glycosides and insect feeding preferences: gypsy moths, *Lymantria dispar* (Lymantriidae) and Buckeyes, *Junonia coenia* (Nymphalidae). *Ecol. Entomol.* 14:247-256.
28. Belofsky, G., M.D. Bowers, S. Janzen, and F.R. Stermitz. 1989. Iridoid glycosides of *Aureolaria flava* (Scrophulariaceae) and their sequestration by *Euphydryas phaeton* (Nymphalidae) butterflies. *Phytochemistry* 28:1601-1604.
29. Bowers, M.D. 1990. Recycling plant allelochemicals for insect defense. In: J. Brown, J.O. Schmidt and D.L. Evans (eds.). *Insect Defenses*. SUNY Press. pages 353-386.

30. Bowers, M.D. and S.D. Farley. 1990. The behaviour of gray jays (*Perisoreus canadensis*) towards palatable and unpalatable Lepidoptera. *Animal Behaviour* 39:699-705.
31. Mauricio, R. and M.D. Bowers. 1990. Do caterpillars disperse their damage?: Foraging behaviour of *Euphydryas phaeton* (Nymphalidae) and *Pieris rapae* (Pieridae) on their hostplants. *Ecological Entomology* 15:153-161.
32. Stamp, N.E. and M.D. Bowers. 1990. Variation in food quality and temperature constrain foraging of gregarious caterpillars. *Ecology* 71:1031-1039.
33. Stamp, N.E. and M.D. Bowers. 1990. Phenology of nutritional differences between new and mature leaves and its effect on caterpillar growth. *Ecological Entomology* 15:447-454.
34. Stamp, N.E. and M.D. Bowers. 1990. Parasitism of buckmoth caterpillars (*Hemileuca lucina*: Saturniidae) by tachinid flies. *Journal of the Lepidopterist's Society* 44:199-200.
35. Stamp, N.E. and M.D. Bowers. 1990. Body temperature, behavior and growth of early-spring caterpillars (*Hemileuca lucina*: Saturniidae). *Journal of the Lepidopterists' Society* 44:143-155.
36. Fajer, E.D., M.D. Bowers, and F.A. Bazzaz. 1991. The effects of enriched CO₂ atmospheres on insect herbivores. *Ecology* 72:751-754.
37. Fajer, E.D., M.D. Bowers, and F.A. Bazzaz. 1991. Performance and allocation patterns of the perennial herb, *Plantago lanceolata*, in response to simulated herbivory and an elevated CO₂ environment. *Oecologia* 87:37-42.
38. Bowers, M.D., N.E. Stamp, and E.D. Fajer. 1991. Factors affecting calculation of nutritional indices for foliage feeding insects: an experimental approach. *Entomologia Experimentalis & Applicada* 61:101-116.
39. Bowers, M.D. 1991. The Iridoid glycosides. In: G. Rosenthal and M. Berenbaum (eds.). *Herbivores: their Interaction with Plant Secondary Metabolites* (2nd ed.). pp. 297-325.
40. Stamp, N.E. and M.D. Bowers. 1991. Indirect effects of invertebrate predators on caterpillars and their foraging patterns. *Oecologia* 88:325-330.
41. Bowers, M.D., N.E. Stamp, and S.K. Collinge. 1992. Early stage of host range expansion in a specialist insect, *Euphydryas phaeton* (Nymphalidae). *Ecology* 73:526-536.
42. Bowers, M.D. 1992. Evolution of unpalatability and the cost of chemical defense in insects. In: M. Isman and B. Roitberg (eds.). *Chemical Ecology of Insect-Plant Interactions*. Chapman and Hall, New York. pp. 216-244.
43. Bowers, M.D. and S.K. Collinge. 1992. Sequestration and metabolism of iridoid glycosides by larvae of the Buckeye, *Junonia coenia* (Nymphalidae). *Journal of Chemical Ecology* 18:817-831.
44. Bowers, M.D. and Stamp, N.E. 1992. Chemical variation within and between individuals of *Plantago lanceolata* (Plantaginaceae). *Journal of Chemical Ecology* 18:985-995.
45. Fajer, E.D., M.D. Bowers, and F.A. Bazzaz. 1992. The effects of nutrients and enriched CO₂ environments on production of carbon-based allelochemicals in *Plantago*: a test of the carbon/nutrient balance hypothesis. *American Naturalist* 140:707-723.
46. Stamp, N.E. and Bowers, M.D. 1992. Behavior of specialist and generalist caterpillars on plaintain, *Plantago lanceolata* (Plantaginaceae). *Ecological Entomology* 17:273-279.

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- De la Fuente, M.A. and M.D. Bowers. Population variation in trichomes and iridoid glycosides in *Plantago lanceolata* (Plantaginaceae) and effects on butterfly oviposition. To be submitted to *Ecological Entomology*.

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