

# LEE A. DYER

Associate Professor  
Department of Biology  
ldyer@unr.edu



## *EDUCATIONAL RECORD*

B.A. Biochemistry; University of California, Santa Barbara; 5/87

B.A. English; University of California, Santa Barbara; 5/87

Ph.D. Ecology; University of Colorado, Boulder; 8/94

Dissertation title: Lepidopteran larval defenses against predators in tropical and temperate systems: the importance of diet breadth and chemistry.

Dissertation committee: M.D. Bowers (advisor), M. Breed, M. Grant, Y. Linhart, G. Carey

## *TEACHING EXPERIENCE*

- Lecturer, University of California, Santa Cruz, 2/95 - 6/95
- Visiting Professor, Colorado State University, Fort Collins, 8/98 - 12/98
- Assistant Professor, Mesa State College, 8/95 - 7/00
- Associate Professor, Mesa State College, 8/00 - 12/00
- Assistant Professor, Tulane University, 1/01 - 7/02
- Associate Professor, Tulane University, 8/03 - 7/04
- **Full Professor, Tulane University, 8/04 - 6/08**
- Associate Professor, University of Nevada Reno, 7/08 - present

## *PUBLICATIONS*

### **Peer reviewed articles, chapters, and reviews [h-index: 20]**

1. Dyer, L.A. and T. Floyd. 1993. Determinants of predation on phytophagous insects: the importance of diet breadth. *Oecologia* 96:575-582.
2. De la Fuente, M.A., L.A. Dyer, and M.D. Bowers. 1994. The iridoid glycoside, catalpol, as a deterrent to the predator *Camponotus floridanus* (Formicidae). *Chemoecology* 5/6:13-18.
3. Dyer, L.A. 1995. Tasty generalists and nasty specialists? A comparative study of antipredator mechanisms in tropical lepidopteran larvae. *Ecology* 76:1483-1496.
4. Folgarait, P.J., L.A. Dyer, R.J. Marquis, and H.E. Braker. 1996. Leaf-cutting ant (*Atta cephalotes*) preferences for five native tropical plantation tree species growing under different light conditions. *Ent. Exp. et App.* 80:521-531.

5. Dyer, L.A. and M.D. Bowers. 1996. The importance of sequestered iridoid glycosides as a defense against an ant predator. *Journal of Chemical Ecology* 22:1527-1539.
6. Dyer, L.A. 1997. Effectiveness of caterpillar defenses against three species of invertebrate predators. *Journal of Research on the Lepidoptera* 34:48-68.
7. Letourneau, D.K. and L.A. Dyer. 1998. Experimental manipulations in lowland tropical forest demonstrate top-down cascades through four trophic levels. *Ecology* 79:1678-1687.
8. Letourneau, D.K. and L.A. Dyer. 1998. Density patterns of *Piper* ant-plants and associated arthropods: Top predator cascades in a terrestrial system? *Biotropica* 30:162-169.
9. Dyer, L.A. and Gentry, G. 1999. Larval defensive mechanisms as predictors of successful biological control. *Ecological Applications* 9:402-408.
10. Dyer, L.A. and D.K. Letourneau. 1999. Relative strengths of top-down and bottom-up forces in a tropical forest community. *Oecologia* 119:265-274.
11. Dyer, L.A. and D.K. Letourneau. 1999. Trophic cascades in a complex, terrestrial community. *Proceedings of the National Academy of Sciences* 96:5072-5076.
12. Dyer, L.A., Williams, W., Dodson, C., and D.K. Letourneau. 1999. A commensalism between *Piper marginatum* Jacq. (Piperaceae) and a coccinellid beetle. *Journal of Tropical Ecology* 15:841-846.
13. Dyer, L.A. 2000. Cybernetic insect outbreaks. *Ecology* 81:3262-3263.
14. Dodson, C.D., Dyer, L.A., Searcy, J., Wright, Z., and D.K. Letourneau. 2000. Cenoclamamide, a dihydropyridone alkaloid from *Piper cenocladum*. *Phytochemistry* 53:51-54.
15. Dyer, L.A., Dodson, C.D., Beihoffer, J. and D.K. Letourneau. 2001. Trade offs in anti-herbivore defenses in *Piper cenocladum*: ant mutualists versus plant secondary metabolites. *J. Chem. Ecol* 27:581-592.
16. Dyer, L.A. and P.D. Coley. 2002. Latitudinal gradients in tri-trophic interactions. Pages 67-88 *in*: Tschamtkke, T. and Hawkins, B.A. (editors). *Multitrophic Level Interactions*. Cambridge University Press.
17. Gentry, G.L. and L.A. Dyer. 2002. On the conditional nature of neotropical caterpillar defenses against their natural enemies. *Ecology* 83:3108-3119.
18. Dyer, L.A. 2002. A quantification of predation rates, indirect positive effects on plants, and foraging variation of the giant tropical ant, *Paraponera clavata*. *Journal of Insect Science* 2.18:1-7.
19. Dyer, L.A., Dodson, C.D., Gentry, G. 2003. A bioassay for insect deterrent compounds found in plant and animal tissues. *Phytochemical Analysis* 14:381-388.
20. Dyer, L.A. and J.O. Stireman III. 2003. Community-wide trophic cascades and other indirect interactions in an agricultural community. *Basic and Applied Ecology* 4:423-432.
21. Dyer, L.A., Dodson, C.D., Stireman, J.O., Tobler, M.A., Smilanich, A.M., Fincher, R.M., and D.K. Letourneau. 2003. Synergistic effects of three *Piper* amides on generalist and specialist herbivores. *Journal of Chemical Ecology* 29:2499-2514.
22. Dyer, L.A. and D.K. Letourneau. 2003. Top-down and bottom-up diversity cascades in detrital versus living food webs. *Ecology Letters* 6:60-68.
23. Dyer, L.A., Dodson, C.D., and J. Richards. 2004. Isolation, synthesis, and evolutionary ecology of *Piper* amides. Pages 117-139 *in*: Dyer, L.A. and A.N. Palmer (eds.). *Piper*. A model genus for studies of evolution, chemical ecology, and trophic interactions. Kluwer Academic Publishers, Boston.
24. Dyer, L.A., Gentry, G. and M. Tobler. 2004. Fitness consequences of herbivory: impacts on asexual reproduction of tropical rainforest understory plants. *Biotropica* 36:68-73.
25. Dyer, L.A., Dodson, C.D., Letourneau, D.K., Tobler, M.A., Hsu, A., and J.O. Stireman III. 2004. Ecological causes and consequences of variation in defensive chemistry of a neotropical shrub. *Ecology* 2795-2803.

26. Letourneau, D.K., Dyer, L.A., and G. Vega. 2004. Indirect effects of top predator on rain forest understory plant community. *Ecology* 85:2144-2152.
27. Dyer, L.A. 2004. Do not go gentle into that tropical night. In: Adams, R. (ed.). *Reflections by Moonlight*. University Press of Colorado.
28. Stireman III, J.O., L.A. Dyer (corresponding author), D.H. Janzen, M.S. Singer, J.T. Lill, R.J. Marquis, R.E. Ricklefs, G.L. Gentry, W. Hallwachs, P.D. Coley, J.A. Barone, H.F. Greeney, H. Connahs, P. Barbosa, H.C. Morais, and I.R. Diniz. 2005. Climatic unpredictability and caterpillar parasitism: implications of global warming. *Proceedings of the National Academy of Sciences* 102:17384-17387.
29. Dyer, L.A., Matlock, R.M., Cherzad, D., and R. O'Malley. 2005. Predicting successful biological control in banana plantations. *Environmental Entomology* 34:403-409.
30. Stireman, J.O. III, Dyer, L.A., and R.M. Matlock. 2005. Top-down forces in managed versus unmanaged habitats. Pages 303-323 in: Barbosa, P. and I. Castellanos (eds.). *Ecology of Predator-Prey Interactions*. Oxford University Press, Oxford.
31. Letourneau, D.K. and L.A. Dyer. 2005. Multi-trophic interactions and biodiversity: beetles, ants, caterpillars, and plants. Pages 366-385 in: Burslem, D.F.R.P.; Pinard, M.A.; Hartley, S.E. (eds.). *Biotic Interactions in the Tropics: Their Role in the Maintenance of Species Diversity*. Cambridge University Press, Cambridge, UK.
32. Irschick, D., Dyer, L.A., and T. Sherry. 2005. Phylogenetic methods for studying specialization. *Oikos* 110:404-408.
33. Pearson, C.V. and L.A. Dyer (corresponding author). 2006. Trophic diversity in two grassland ecosystems. *Journal of Insect Science* 6:23.
34. Dyer, L.A., M.S. Singer, J.T. Lill, J.O. Stireman III, G.L. Gentry, R.J. Marquis, R.E. Ricklefs, H.F. Greeney, D.L. Wagner, H.C. Morais, I.R. Diniz, T.A. Kursar, and P.D. Coley. 2007. Host specificity of Lepidoptera in tropical and temperate forests. *Nature* 448:696-699.
35. Dyer, L.A. and D.K. Letourneau. 2007. Determinants of lichen diversity in a rainforest understory. *Biotropica* 39:525-539.
36. Dyer, L.A. and R.E. Forkner. 2007. Why are agroecosystems green? *Ecology* 88:1606-1607.
37. Armstrong, M., Berkowitz, A.R., Dyer, L.A. and J. Taylor. 2007. Understanding why students underrepresented in ecology pursue ecology careers: a preliminary case study of 39 African American students. *Frontiers in Ecology and the Environment* 5:415-420.
38. Pearson, C.V., T.J. Massad, L.A. Dyer (corresponding author). 2008. Diversity cascades in alfalfa fields: from plant quality to agroecosystem diversity. *Environmental Entomology* 37:947-955.
39. Fincher, R.M., L.A. Dyer (corresponding author), C.D. Dodson, J. L. Richards, M.A. Tobler, J. Searcy, J. E. Mather, A. J. Reid, J. S. Rolig and W. Pidcock. 2008. Inter- and Intraspecific comparisons of antiherbivore defenses in three species of rainforest understory shrubs. *Journal of Chemical Ecology* 34:558-574.
40. Dyer, L.A. 2008. The ecology of tri-trophic interactions in the tropics. Pages 275-293 in: Carson, W.P. and S.A. Schnitzer (editors). *Tropical Forest Community Ecology*. Blackwell Science, Oxford, UK.
41. Smilanich, A.M., L.A. Dyer, M.D. Bowers, and J.Q. Chambers. 2009. Immunological costs to specialization and the evolution of insect diet breadth. *Ecology Letters* 12:612-621.
42. Smilanich, A.M., L.A. Dyer, and G. L. Gentry. 2009. The insect immune response and other putative defenses as effective predictors of parasitism. *Ecology* 90:1434-1440.
43. Carlson, J.C., L.A. Dyer, F.X. Omlin, and J.C. Beier. 2009. Diversity Cascades and Malaria Vectors. *Journal of Medical Entomology* 46:460-464.
44. Miller, J. and L.A. Dyer. 2009. Special Feature: Diversity of insect-plant interactions in the eastern Andes of Ecuador. *Journal of Insect Science* 9:26, available online: [insectscience.org/9.26](http://insectscience.org/9.26).

45. Stireman III, J.O., H.F. Greeny, and L.A. Dyer. 2009. Species richness and host associations of Lepidoptera-attacking Tachinidae in the northeast Ecuadorian Andes. *Journal of Insect Science* 9:39, available online: [insectscience.org/9.39](http://insectscience.org/9.39).
46. Tepe, E.J., W.A. Kelley, G. Rodríguez-Castañeda, and L.A. Dyer. 2009. Characterizing the cauline domatia of two newly discovered Ecuadorian ant-plants in *Piper*: an example of convergent evolution. *Journal of Insect Science* 9:27, available online: [insectscience.org/9.27](http://insectscience.org/9.27).
47. Connahs, H., G. Rodríguez-Castañeda, T. Walters, T.R. Walla and L.A. Dyer. 2009. Geographical variation in host-specificity and parasitoid pressure of an herbivore (Geometridae) associated with the tropical genus *Piper*. *Journal of Insect Science* 9:28, available online: [insectscience.org/9.28](http://insectscience.org/9.28).
48. Greeney, H.F., T.W. Pyrcz, M.R. Hualingua, P.J. DeVries, and L.A. Dyer. 2009. The early stages of *Pedaliodes poesia* (Hewitson, 1862) in eastern Ecuador (Lepidoptera, Satyrinae, Pronophilina). *Journal of Insect Science* 9:38, available online: [insectscience.org/9.38](http://insectscience.org/9.38).
49. Greeney, H.F., P.J. DeVries, C.M. Penz, R.B. Granizo-T, H. Connahs, J.O. Stireman III, T.R. Walla, and L.A. Dyer. 2009. The early stages and natural history of *Antirrhea adoptive porphyrosticta* (Watkins, 1928) in eastern Ecuador (Lepidoptera, Nymphalidae, Morphinae). *Journal of Insect Science* 9:26, available online: [insectscience.org/9.26](http://insectscience.org/9.26).
50. Grinter, C.C., J.B. Whitfield, H. Connahs, L.A. Dyer, W. Hallwachs, and D.H. Janzen. 2009. Review of Neotropical *Distatrix* Mason (Hymenoptera: Braconidae), with descriptions of six new reared species. *Journal of Insect Science* 9:29, available online: [insectscience.org/9.29](http://insectscience.org/9.29).

#### Edited volumes

51. Dyer, L.A. and A.N. Palmer. 2004. *Piper*. A model genus for studies of evolution, chemical ecology, and trophic interactions. Kluwer Academic Publishers, Boston.

#### Popular or web-based publications (54 and 55 have been cited in the primary literature)

52. Dyer, L.A. and N. Bishop. 2001. In defense of caterpillars. *Natural History* 110:42-47.
53. Dyer, L.A. 2002. Jungle phobias. *Earthwatch* 21:10-11.
54. Dyer, L.A. and G.L. Gentry. 2002. Caterpillars and parasitoids of a tropical lowland wet forest. <http://www.caterpillars.org>.
55. Dyer, L.A., H. Greeney, T. Walla, and G.L. Gentry. 2004. Caterpillars and parasitoids of an Ecuadorian cloud forest. <http://www.caterpillars.org>.
56. Dyer, L.A. 2007. Large scale gradients in tritrophic interactions. *Tropinet* 18(3):1-3.

#### Articles accepted (reviewed, resubmitted) or in review

57. Dyer, L.A., Letourneau, D.K., Vega Chavarria, G. and D. Salazar Amoretti. *Reviewed and revised for Ecology*. Associations among light availability, specialist and generalist *Piper* herbivory and plant diversity in rain forest communities.
58. Dyer, L.A. and D.K. Letourneau. *In review to Oikos*. Diversity cascades: indirect trophic effects involving changes in biodiversity.
59. Rodríguez-Castañeda, G., Dyer, L.A., Brehm, G., Connahs, H., and Forkner, R.E. *In review to Science*. Tropical forests are not flat: How mountains affect herbivore diversity.
60. Rodríguez-Castañeda, G., Dyer, L.A., Gentry, G., Walla, T., and Forkner, R.E. Evidence for ecological effects on the altitudinal range of specialist herbivore diversity in the north-eastern Andes of Ecuador. *Ecology*.
61. Rodríguez-Castañeda, G., Dyer, L.A., Tepe, E., and R.E. Forkner. *Ecology Letters*. The costs and benefits of mutualism: Evaluation of *Piper*-ant plants along an altitudinal gradient in the north-eastern Andes of Ecuador.

62. Fincher, R.M., Smilanich, A.M., and Dyer, L.A. *Arthropod-Plant Interactions*. A meta-analysis of the importance of environmental and genetic sources of variation in plant secondary compound content.
63. Smilanich, A.M., Fincher, R.M., and Dyer, L.A. A quantitative evaluation of the plant-apparency hypothesis using meta-analysis. *Arthropod-Plant Interactions*.
64. Massad, T.J. and L.A. Dyer. A meta-analysis of the effects of global environmental change on plant-herbivore interactions. *Arthropod-Plant Interactions*.
65. Massad, T.J. and L.A. Dyer. Restoration of pasture to forest in Brazil's Mata Atlântica: The roles of herbivory, seedling defenses, and plot design in reforestation. *In review to Ecological Applications*.
66. Massad, T.J. and L.A. Dyer. Plant defense strategies from chemistry to ants—what is a plant's best line of defense? *In review to Journal of Chemical Ecology*.

**Articles and books in preparation (full manuscripts under internal review)**

67. Dyer, L.A., Walla, T., Greeney, H.F., and P.J. Devries. *In prep* (Invited ideas manuscript to Biotropica). Diversity of interactions – a metric for ecological studies in the tropics.
68. Dyer, L.A. and D.K. Letourneau. *In prep*. The ecological toolbox: using a model system to assess the strengths and weaknesses of correlational versus experimental approaches to science. For Ecology.
69. Dyer, L.A., D.K. Letourneau, Steele, P.R. and L. McGinnis. *In prep*. Bottom-up influences on herbivore diversity: A test of the resource concentration hypothesis. For Ecology Letters.
70. Smilanich, A.M. and L.A. Dyer. *In prep*. Effects of pesticide-use on caterpillar-parasitoid interactions in banana plantations. For Environmental Entomology.
71. Dyer, L.A. *In prep*. Chemical cascades in terrestrial communities. For Frontiers in Ecology and the Environment.
72. Sigel, B., Smilanich, A.M., Fincher, R.M., and L.A. Dyer. *In prep*. Effect sizes and ecological journals. For Bulletin of the Ecological Society of America.
73. Matlock, R.M. and L.A. Dyer. *In prep*. Biodiversidad en las bananeras de Costa Rica. CORBANA, Costa Rica.
74. Fincher, R.M., Dyer, L.A., Chambers, J.Q. and R. McHenry. *In prep*. Leaf production, chemical defense, and maintenance costs for tropical rain forest shrub. For Nature.
75. Dyer, L.A. *In prep*. Tropical Ecology. Springer-Verlag, Boston.
76. Smilanich, A.M., Vargas, J., Bowers, M.D., and L.A. Dyer. *In prep*. The effect of diet on the immunocompetance of sequestering and non-sequestering tiger moths. For Ecological Entomology.
77. Dyer, L.A. *In prep*. Field and laboratory experiments demonstrate catastrophic effects of increased temperature, CO<sub>2</sub>, and climatic unpredictability on a ubiquitous tritrophic system. For Climate Change.
78. Dyer, L.A., C.D. Dodson, and J.L. Richards. *In prep*. Inter- and Intra-class synergy in Iridoid glycosides, Piper imides, and Furanocoumarins. Journal of Chemical Ecology
79. Dyer, L.A., C.D. Dodson, J.L. Richards, and A.M. Smilanich. *In prep*. Synergistic effects of *Piper* imides on host plant specialization, immune response in herbivores, and omnivore feeding habits. Journal of Chemical Ecology
80. Pearson, C.V. and L.A. Dyer. *In prep*. A latitudinal gradient in insect feeding guilds in the new world. For Journal of Tropical Ecology.
81. Dyer, L.A., Hazen, R., Massad, T.J., Smilanich, A.M., Gentry, G.L., Greeney, H.F., Garcia Lopez, H., and T. Walla. *In prep*. Effects of climate on relationships between plant density, herbivore abundance, and parasitism levels across 4 forests in the New World. For Ecology.

82. Hazen, R., Dyer, L.A., and G.L. Gentry. *In prep.* Climate change and the intermediate disturbance hypothesis: a test with hurricanes, plants, caterpillars, and parasitoids. For Ecology Letters.

**Papers read** (only includes abstracts for which Dyer is the first author)

83. Dyer, L.A. 1992. The evolution of specialization in phytophagous insects. 90th Annual Meeting of the Society for Study of Evolution.
84. Dyer, L.A. 1994. The importance of chemistry and diet breadth as defenses against a voracious ant predator. 79th Annual Meeting of the Ecological Society of America. *ESA Bulletin* 75:2:221.
85. Dyer, L.A. 1995. Effectiveness of caterpillar defenses against three species of invertebrate predators. 80th Annual ESA Meeting. *Bulletin of the Ecological Society of America* 76:2:205.
86. Dyer, L.A. 1995. A comparison of caterpillar defenses against invertebrate predators: the central role of chemistry. 46th Annual Meeting of the Lepidopterists' Society (Invited symposium).
87. Dyer, L.A. 1996. A model to link ecological and evolutionary theories of specialization. 81st Annual ESA Meeting.
88. Dyer, L.A. 1997. Top-down versus bottom-up effects on herbivores of an understory shrub. 82nd Annual ESA Meeting.
89. Dyer, L.A. 1998. Community wide trophic cascades in a tropical forest. 83rd Annual ESA Meeting.
90. Dyer, L.A. 1999. Top-down and bottom-up community regulation in alfalfa fields. 84th Annual ESA Meeting.
91. Dyer, L.A. 1999. Chemical mediation of trophic interactions in alfalfa fields. 25th Annual Meeting of the Guild of Rocky Mountain Population Biologists.
92. Dyer, L.A. 1999. Predicting natural enemy responses in natural and managed systems. Annual meeting of the Entomological Society of America (Invited symposium).
93. Dyer, L.A. 2000. Trophic Cascades in tropical versus temperate systems. 85th Annual ESA Meeting.
94. Dyer, L.A. and D.K. Letourneau. 2001. Trophic Cascades in a tropical endophytic community. 86th Annual ESA Meeting.
95. Dyer, L.A. 2001. Determinants of diet breadth of phytophagous insects: The role of parasitoids. Annual meeting of the Entomological Society of America.
96. Dyer, L.A., G. Vega, and D.K. Letourneau. 2002. Top-down, bottom-up, and horizontal control of plant diversity in a rainforest understory. Annual meeting of the Ecological Society of America.
97. Dyer, L.A. 2003. Causes and consequences of caterpillar specialization. First International Symposium for Caterpillar Biodiversity and Conservation.
98. Dyer, L.A., Gentry, G.L., and Smilanich, A.M. 2003. Predator and parasitoid response to sequestered secondary compounds. XIII International Entomophagous Insects Workshop.
99. Dyer, L.A., Stireman, J.O., Matlock, R.M., Pearson, C.V. 2004. Is predation more intense in managed versus unmanaged habitats? Annual meeting of the Ecological Society of America.
100. Dyer, L.A. 2005. Climate Change, Extreme Weather Events, and Tritrophic Interactions. Annual meeting of the Entomological Society of America.
101. Dyer, L.A., Fincher, R.M., Dodson, C.D. 2005. Variation in Piper chemical defense: Environmental and genetic influences. Annual meeting of the Ecological Society of America.
102. Dyer, L.A. 2007. Abiotic and biotic gradients in tritrophic interactions. Annual meeting of the Association of Tropical Biologists.
103. Dyer, L.A. Smilanich, A.M., Bowers, M.D., Chambers, J.Q., and G.L. Gentry. 2007. Costs of sequestration in the buckeye caterpillar (*Junonia coenia*). Annual Meeting of the Entomological Society of America.

104. Dyer, L.A., Rodríguez-Castañeda, G. 2007. What factors explain distribution patterns of herbivores along an altitudinal gradient? A tri-trophic community approach. Annual meeting of the Ecological Society of America.
105. Dyer, L.A. 2008. Pervasive diversity cascades in terrestrial ecosystems. Annual Meeting of the Entomological Society of America.
106. Dyer, L.A. 2008. A tritrophic view of diversity. International Congress of Entomology.

## *TEACHING*

### **Spring 2009 - UNR**

Ecology (Bio 314)  
Field Ecology (Bio 394)  
Independent Studies

### **Fall 1995 to Spring 2008**

Taught 18 different courses at Mesa State College (4 courses per semester), Colorado State University (1 semester), and Tulane University as Assistant (3.5 courses per year), Associate (3 courses per year), and Full Professor (1.5 courses per year).

## *COMMITTEE SERVICE*

### **Spring 2009**

UNR - University bylaws committee

### **Fall 1995 to Spring 2008**

Service at Mesa State College and Tulane University included chairing 3 university search committees and 4 departmental search committees, serving on 12 additional search committees, serving on interdepartmental committees (Center for Latin American Studies), and serving on 3 university committees (research, grievance,

## *RESEARCH SUPPORT FROM NON-UNIVERSITY SOURCES*

### **Planned**

- National Science Foundation (NSF), Systematics panel (with M. Forister) \$400,000, July, 2009
- NSF Major Research Instrumentation (MRI), \$300,000, November, 2009
- NSF Chemistry (renewal), \$200,000, December, 2009
- NSF Biotic Surveys and Inventories (renewal), \$350,000 January 2010
- National Institute for Climate Change Research (renewal), \$150,000, January 2010

### **Pending**

- National Science Foundation LTREB (NSF), Ecology, pending, \$500,000
- NSF, PIRE, pending pre-proposal, \$2,800,000
- United States Department of Agriculture (USDA), pending, \$340,000

### **Active/Past**

- NSF, Chemistry, 8/07 – 7/10, \$298,000 (collaborative budget)
- NSF, Biotic Surveys and Inventories (BSI), 9/07 – 8/10, \$500,000 (collaborative budget)
- National Institute for Climate Change Research (NICCR), 6/07-5/12, \$1,250,000 (CoPI with Tornquist and Chambers; renewed yearly; grant stayed at Tulane but Dyer is an active CoPI)
- NSF, Ecology, 8/06 – 7/09, \$293,000 (CoPI with D. Bowers; awarded to University of Colorado)
- NSF, Ecology (SGER), 2/06 – 2/07, \$60,000
- NSF, Dissertation Improvement, 5/05 – 5/07, (for graduate student, M. Fincher) \$9,900
- National Geographic, 9/05 – 10/06, \$25,000 (awarded directly to PI)
- NSF, BSI, 8/04 – 7/07, \$415,000 (collaborative budget, includes supplements)
- NSF, Ecology 5/04 – 4/07, \$345,000 (collaborative budget, includes supplements)
- NICCR, 9/04 – 8/07, \$320,000 (with supplements)
- NSF, Ecology, 5/04 - 4/07, \$220,000 (collaborative budget)
- NSF, Biotic Surveys and Inventories, 8/04 – 7/07, \$350,000 (collaborative budget)
- NIGEC (Department of Energy), 9/04- 8/07, \$285,000 (must be renewed yearly)
- Earthwatch Institute, 5/04 – 1/07, \$90,000 (award does not go through Tulane)

- USDA, 7/02 – 6/04, \$72,000
- LA BOR (equipment grant with T. Bianchi), 1/02 – 1/03, \$101,000
- NSF, Ecology, 9/00 - 8/02, \$178,000
- NSF REU, 1996 (\$5,000), 2001 (\$6,000), 2004 (\$15,000), 2006 (\$12,000), 2009 (\$19,000)
- Organization for Tropical Studies, 10/98, \$10,000
- Earthwatch Institute, 8/00 - 12/03, \$120,000
- Earthwatch Institute, 8/96 - 12/99, \$145,000
- Colorado OSC, 7/98 - 6/00, \$33,000; Lathrop Agricultural Fund, 4/98 - 12/00, \$35,000
- National Geographic, 8/96 - 7/97, \$20,000
- Mellon Foundation, 7/96 - 10/96, \$5,000
- NSF Dissertation, 1/93 – 12/95, \$7,200
- Small grants with undergraduate and graduate students 1/00 – present, > \$80,000

### *HONORS, AWARDS, AND OTHER*

#### **Awards**

1999: Selected as one of Grand Valley's "leaders for the new millennium." Grand Junction Sentinel.

2000: Distinguished Faculty Award. Mesa State College.

2001: Selected as one of New Orleans's "40 under 40." Gambit Weekly.

2003: University of Pittsburgh & Carnegie Museum of Natural History Eminent Ecologist Lecture Series.

#### **Selected examples of books and popular magazine articles about Dyer's research:**

Thorpe, S. 1998. The life and death of the Technicolor caterpillar. *Earthwatch* 17:2-5.

Milius, S. 1999. Weakling ants cheat by pruning the trees. *Science News* 156:231.

Tangley, L. 2001. The gene machine. *Earthwatch* 20:15-21.

Arias, R. 2001. En Costa Rica y Ecuador buscan metodos de control biologico de las orugas. (Published in Spain) *Biologica* 63:9.

Kelley, T. 2002. For larvae lovers, a field guide online. *The New York Times*. April 25:E8.

Johansson, P. 2004. *Tropical Rain Forest: A Web of Life*. Enslow Publishers, New York. (A K-12 book focused on Dyer's research)

#### **Live radio presentations on Dyer's research**

BBC – September 23, 2005

BBC – October 1, 2005

NPR – November 22, 2005

NPR – September 1-4, 2008

#### **A few examples of web pages about Dyer's research and outreach:**

*Feature on pulse of the planet (also played on NPR)*

<http://www.pulseplanet.com/monthlyfeature/featurestories.php?id=173>

*Resources for teachers prepared by teachers involved in the project*

[http://74.125.155.132/search?q=cache:imAFMeWfY3UJ:www.sciencewithharris.org/VeryHungryCaterpillarCounting.doc+\"lee+dyer\"+caterpillars&cd=16&hl=en&ct=clnk&gl=us](http://74.125.155.132/search?q=cache:imAFMeWfY3UJ:www.sciencewithharris.org/VeryHungryCaterpillarCounting.doc+\)

<http://www2.scholastic.com/browse/article.jsp?id=2295>

<http://teacher.scholastic.com/activities/explorer/ecosystems/sites/caterpillars1.htm>

<http://www.lessonlinks.org/ew/earthwatch.htm>

*Articles (New York Times, Science News, National Geographic, other magazines, newspapers, or webpages)*

<http://sciencenow.sciencemag.org/cgi/content/long/2005/1114/3>

<http://www.nytimes.com/2002/04/25/technology/for-larvae-lovers-a-field-guide-online.html>  
<http://www.greendiary.com/entry/global-warming-may-cause-caterpillar-outbreak-warning-human-food-supplies/>  
[http://74.125.155.132/search?q=cache:J70z-IUE1A0J:www.physorg.com/pdf8246.pdf+\"lee+dyeer\"+caterpillars&cd=29&hl=en&ct=clnk&gl=us](http://74.125.155.132/search?q=cache:J70z-IUE1A0J:www.physorg.com/pdf8246.pdf+\)  
<http://www.scidev.net/en/news/climate-change-could-disrupt-natural-pest-control.html>  
<http://english.cri.cn/2239/2005-11-17/88@282586.htm>

*Teachers' research experiences*

<http://insects.about.com/od/thefieldofentomology/a/earthwatch1.htm>  
[http://insects.about.com/od/thefieldofentomology/a/ecuador\\_exped.htm](http://insects.about.com/od/thefieldofentomology/a/ecuador_exped.htm)  
<http://www.wickedlocal.com/sudbury/archive/x1720641203/Teacher-studies-caterpillars-as-part-of-a-national-project>  
[http://www.alcoa.com/global/en/environment/diary\\_olsen.asp](http://www.alcoa.com/global/en/environment/diary_olsen.asp)  
[http://www.alcoa.com/global/en/environment/diary\\_cicela.asp](http://www.alcoa.com/global/en/environment/diary_cicela.asp)  
[http://www.eons.com/groups/topics/earthwatch-climate-change?member\\_id=728090](http://www.eons.com/groups/topics/earthwatch-climate-change?member_id=728090)  
<http://sfarnham.blogspot.com/>

*Volunteers' experiences*

<http://www.earthwatch.org/browse.aspx?ContainerID=caterpillars>  
<http://www.geometer.org/earthwatch98/index.html>

**Peer review and panel service:**

Subject Editor, *Annals of the Entomological Society of America* (2008)  
Subject Editor, *Biotropica* (2005 – present)  
National Institute of Health (2 panels)  
National Science Foundation (5 panels)  
National Science Foundation (68 proposals)  
United States Department of Agriculture (1 panel)  
United States Department of Agriculture (6 proposals)  
Czech Academy of Sciences (1 proposal)  
*Oecologia* (10 manuscripts)  
*Biotropica* (15 manuscripts reviewed)  
*Ecology* (15 manuscripts)  
*Ecology Letters* (9 manuscripts)  
Book chapters (6 books)  
*Ecological Applications* (3 manuscripts)  
*American Naturalist* (3 manuscripts)  
*Animal Behaviour* (2 manuscripts)  
DOE (2 proposals)  
*Journal of Tropical Ecology* (2 manuscripts)  
*Journal of the Lepidopterists' Society* (2 manuscripts)  
*Journal of Experimental Biology* (1 manuscript)  
*Ecological Monographs* (1 manuscript)  
*Naturwissenschaften* (1 manuscript)  
*Journal of Tropical Forest Science* (1 manuscript)  
*Functional Ecology* (1 manuscript)  
*Conservation Biology* (1 manuscript)  
*Canadian Journal of Zoology* (1 manuscript)  
*Ecological Entomology* (1 manuscript)

Environmental Entomology (1 manuscript)  
Ecología Austral (1 manuscript)  
Annals of Applied Biology (1 manuscript)  
Journal of Insect Science (4 manuscripts)  
Soil Biology & Biochemistry (2 manuscripts)  
Oikos (1 manuscript)  
Nature (4 manuscripts)  
Science (6 manuscripts)

**Other relevant activities:**

Resource Advisory Council, Bureau of Land Management  
Ecological Society of America, SEEDS (minority participation program) mentor and advisor  
Louisiana Alliance for Minority Participation (LAMP) mentor and advisor  
Accomplished rock climber and mountaineer, with over 50 first ascents  
Published poet

### *Activities since arriving at the University of Nevada, Reno*

I started my appointment as Associate Professor in July, 2008. Since arriving at UNR, I accomplished the following:

#### *Research at UNR*

- Transferred 2 NSF grants from Tulane University to UNR (two major grants remained at other institutions but are still active with Dyer as coPI).
- Received an NSF REU grant to employ 3 UNR undergraduate students.
- Submitted these pending grants: NSF LTREB (\$490,000), USDA (\$420,000), NSF REU (Chemistry, \$18,000), NCEAS (submitted through Wesleyan University with M. Singer as first PI), NSF PIRE (\$2.1M, submitted through Tulane University, since it was not selected by the internal UNR review).
- Prepared (for submission in July) 2 additional grants to NSF.
- Finished and submitted 20 papers, 10 of which are published or accepted (and in revision).
- Hired 3 postdocs: 1) Dr. James Miller, former curator of Lepidoptera at the American Museum of Natural History; 2) Dr. Harold Greeney, director of the Yanayacu Biological Station, Ecuador; 3) Dr. Lora Richards, former postdoctoral researcher working in Australia.
- Hired 3 undergraduate research assistants and directed research of 2 additional undergraduate research assistants.
- Recruited several new potential graduate students, one of whom will start a PhD program in Fall, 2009; the others will apply for the following year.
- Started a new collaborative efforts with Matt Forister (UNR, Biology), Alejandra Jaramillo (UM Colombia), and Jim Whitfield (University of Illinois), Peter Weisberg (UNR), Elizabeth Ammon and John Boone (Great Basin Bird Observatory).
- Continued all existing collaborations and kept grants at Tulane University active to facilitate these continued collaborations.
- Worked with UNR facilities services and architects to design new laboratory for chemical ecology research.
- Conducted research at the laboratories of Mike Singer (Wesleyan University), Deane Bowers (University of Colorado), and Jeff Chambers (Tulane University) because my laboratory will not be ready until late August.
- Presented the following talks:
  - Departmental seminars*
  - Southwest Research Station, 2008
  - Wesleyan University, 2008
  - CUNY Staten Island, 2008
  - University of Missouri Colombia, 2008
  - University of Illinois, Champaign Urbana, 2009
  - Chico State University, 2009
- **Contributed papers**
  - Ecological Society of America, Annual Meeting, Wisconsin, August, 2008
  - Entomological Society of America, Annual Meeting, Reno, Nevada, November, 2008
  - International Congress of Entomology, Durban, South Africa, July, 2008

#### *Teaching at UNR*

- Ecology (75 students); Biology 314
- Field Ecology (27 students); Biology 394
- Independent studies (1 student for Fall 2009)

*Service at UNR*

- College of Science Bylaws Committee
- Volunteered (but not selected) for several other university, college, and departmental committees
- Started a UNR online journal for undergraduate research (the journal will go online in Fall 2009; web space is reserved, 1 paper in review)
- Reviewer for the following journals/granting agencies:
  - National Science Foundation (2 proposals)
  - United States Department of Agriculture (1 proposal)
  - Oecologia (2 manuscripts)
  - Ecology (1 manuscript)
  - Ecology Letters (1 manuscript)
  - American Naturalist (1 manuscript)
  - Department of Energy (3 proposals)
  - Ecological Entomology (1 manuscript)
  - Nature (1 manuscript)
  - Science (1 manuscript)
- Associate Editor for the following journals:
  - Annals of the Entomological Society of America (6 Papers).
  - Biotropica

## TEACHING PHILOSOPHY, GOALS AND EXPERIENCE

### *Philosophy and General Goals*

My overall teaching goal is to teach students how to think critically about ecology and evolutionary biology and to enhance their ability and motivation to learn after finishing my course. Although I require a good deal of memorization in lower division courses, open-book essay exams and oral presentations are common in my upper-division courses. All the courses I teach stress the following aspects of critical thinking: problem solving, questioning paradigms, asking appropriate questions, communicating complex ideas, utilizing deductive and inductive reasoning, and integrating observational and quantitative skills. My teaching style includes a mix of standard lectures, group discussions, and interactions out of the classroom. I use modern technological advances such as interactive powerpoint presentations, posting important class information on the Internet, and using sophisticated equipment in laboratory courses when appropriate.

Evaluation of student performance is an important part of the teaching process. For introductory courses, I rely on standard techniques of written exams and quizzes, focusing mostly on essays and short answers but also utilizing multiple-choice questions for courses with more than 50 students. I also include small group discussions in lower division courses. For grading upper division courses I focus mostly on advanced written and oral assignments. Written assignments include composing publishable papers or critiques of existing literature. For oral assignments, students are required to elucidate complex issues in ecology and evolutionary biology via exercises such as critiques of primary literature, group discussions, structured debates, and responses to questions during lectures.

I view biology, chemistry, and statistics as experiential undertakings, and I strive to involve students in my research whenever it is appropriate. I always provide research opportunities to both graduate and undergraduate students via research assistantships and various research experience for undergraduate grants. In addition, I have made it a priority to recruit research students who are underrepresented in my fields of study (ecology, chemistry, and statistics).

### *Teaching Experience and Planned Courses*

Teaching has long been a part of my career goals, and my experiences in the classroom continue to reward my decision to teach at the university level. At UNR, I plan to continue teaching Ecology and Field Ecology (which I have taught at UNR) as well as Entomology, Advanced Statistics, Tropical Ecology, and specialized graduate courses. My considerable teaching experience will allow for many additional possibilities as the biology department evolves and teaching needs change. I have taught at several different universities and schools as a teacher, teaching assistant, lecturer, assistant and associate professor. The main courses I have taught at the university level (UC Santa Cruz, CSU Fort Collins, Mesa State College, Tulane University, UNR) include: *General Biology, Introductory Biochemistry, Introductory Biology, Biometry, Ecology, Ecological Methods, Quantitative Ecology, Entomology, Tropical Ecosystems, Plant-Animal Interactions, Global Change, Conservation Biology, Independent Studies, Advanced Biostatistics, Insects and Humans*, and *Honors Thesis*. I developed 8 new undergraduate courses at Mesa State College and 5 new graduate courses at Tulane University, and many of the courses that I teach are interdisciplinary.

## Statement of Research Interests and Future Research Goals

Work in my laboratory focuses on direct and indirect trophic interactions in complex biotic communities with emphases on global change, documenting the diversity of tritrophic interactions, and examining the effects of plant secondary compounds on insect herbivores and their natural enemies. The main source of funding for continuing my research will come from current grants (NSF, Earthwatch, DOE, National Geographic), pending grants (NSF, USDA), and future grants (NSF, NIH, USDA, National Geographic, Earthwatch, and the Organization for Tropical Studies). Researchers who are currently working in the laboratory at UNR include 3 postdoctoral researchers, 4 graduate students (2 are still at Tulane University), 3 field technicians in Costa Rica, 5 field technicians in Ecuador, and 5 undergraduate students. I plan to keep this mix of personnel in the laboratory as long as funding is available. Others who have been trained in my laboratory include 26 graduate students (6 have completed an MS and 5 have completed a PhD with me as major advisor, 12 others have completed a PhD with me as an active committee member), over 100 undergraduates, over 30 high school students, over 50 teachers, 6 postdoctoral researchers, 2 laboratory technicians, and several hundred volunteers.

I have experience working with students from diverse backgrounds and have demonstrated a commitment to providing research opportunities for underrepresented students. I am currently advising a student in the ESA SEEDS minority program, I have supervised and advised students in the Louisiana Alliance for Minority Participation program, and I published a paper with the SEEDS directors, examining reasons for lack of diversity in Ecology. Latin American faculty and students are an integral part of my research program, and I was the dissertation advisor for 2 Fulbright graduate students, one from Guatemala and the other from Suriname. I plan to continue this involvement over the next 20 years.

Publications from this work (in PDF format) are available at this webpage:  
<http://wolfweb.unr.edu/~ldyer/papers.htm>.

The major continuing research projects of my laboratory and work planned for the future are summarized below.

### *Conservation and applied ecology*

The primary conservation and applied interests in my laboratory are: 1) the role of ecological theory in managed ecosystems, 2) conservation of plant and insect diversity in tropical ecosystems, and 3) monitoring and protecting rare and threatened species in the United States. My current focus at UNR is to examine the causes and consequences of pinyon-juniper expansion in the west in collaboration with Peter Weisberg (UNR), John Boone, and Elizabeth Ammon (Great Basin Bird Observatory). Causes of this expansion include: over-grazing, fire exclusion, climate change, carbon dioxide fertilization, and response to historical deforestation; consequences include: loss of biodiversity and changes in trophic relationships between plants, birds, and insects, and changes in management strategies.

### *Diversity of interactions in tropical and temperate forests*

Over half of the described species of organisms in the world are directly involved in plant-herbivore-parasitoid interactions, yet very little is known about the actual diversity of these interactions in terrestrial ecosystems. We are examining parasitoid and herbivore diversity in forests in Louisiana, Arizona, Costa Rica, and Ecuador. Through an exhaustive collecting and rearing program, we will uncover patterns of interaction diversity that will help us answer basic and applied questions about parasitoids and herbivores on different host plants and in different plant communities. Natural history data and keys to immatures are continually entered into an online database (<http://www.caterpillars.org>). This project is part of major conservation and biodiversity inventory efforts in Ecuador and our laboratory and collaborators plan to continue this work over the coming decades.

### *Variation in tritrophic interactions due to climate change*

The primary goal of this research is to characterize variation in plant-herbivore-parasitoid interactions in natural and managed ecosystems distributed along temperature and precipitation gradients. We have initiated a long-term study (10 years), integrating research at multiple sites in North, Central, and South America that vary in temperature, precipitation and seasonality. The research along these natural gradients is enhanced by laboratory studies that mirror these gradients. With these correlative and experimental approaches, we will determine how plant chemistry, leaf phenology, caterpillar densities, herbivory, parasitism, and caterpillar and parasitoid species diversity are affected by climate and how they react to extreme climatic events, such as hurricanes or droughts, which are expected to increase in frequency with global temperature increases.

### *Phylogenetic cascades*

In collaboration with Matt Forister (UNR), Alejandra Jaramillo (University of Icesi, Columbia), Jim Whitfield (University of Illinois), and other collaborators, we are starting a new project to examine the following general question: Are patterns of close phylogenetic association restricted to pairs of interacting organisms (e.g. viruses and their hosts), or can such patterns extend across multiple taxa involved in ecologically specialized relationships? Using modern techniques in molecular systematics, ecology, and modeling, we plan to examine the hypothesis that congruent histories can span multiple trophic levels encompassing organisms not confined to strictly obligate, symbiotic or intracellular relationships (i.e., a “phylogenetic cascade”). Our study system is one that has been extensively studied by our laboratory and includes plants in the genus *Piper* (Piperaceae), caterpillars in the genus *Eois* (Geometridae) and a broad array of braconid parasitoids in different subfamilies.

### *Quantitative ecology*

Our laboratory and collaborators utilize mathematical modeling to complement our experimental and correlative research. For example, we are developing a model in a *Piper* ant plant system that examines population dynamics of herbivores, ants, and ant predators. Our correlative and experimental work provides parameter estimates for this model, and the model helps us put our results into a larger theoretical context. We are also very interested in statistical methods and experimental design in evolutionary biology and ecology. We will continue to study and utilize new multivariate methods, categorical data analyses, structural equation modeling, and meta-analysis. All graduate students in the laboratory are required to do a meta-analysis as the first chapter of their dissertation.

### *Use of ecological theory to guide biological control*

Current advances in ecology could provide useful guidelines for management of agricultural systems, plantations, and natural reserves. We use results from our research on tritrophic interactions to construct predictive models that can be used as guidelines for choosing appropriate natural enemies in biocontrol. We also test predictions with empirical data from our work in banana plantations and alfalfa fields. We plan to continue this work at UNR over the next few decades.

### *Chemical ecology*

We are examining the effects of plant allelochemicals on interactions between plants and arthropods in natural and managed ecosystems in Arizona, Louisiana, Colorado, Costa Rica and Ecuador. Results from our previous work indicated that specific amides and imides (plant secondary metabolites) in understory shrubs (*Piper* spp.) play important roles in determining the diversity of arthropods associated with these shrubs and their interactions. We are conducting long-term experiments, synthesis of secondary compounds, quantification of compounds, and field/laboratory assays to elucidate the ecological roles of these chemicals. Similarly, to test the roles of saponins in trophic relationships between alfalfa and

associated arthropods, we are conducting trophic cascades research in alfalfa fields, deserts, and forests in Nevada, California, Colorado, Arizona, and Louisiana.

*Antiparasitoid mechanisms in caterpillars and discovery of novel plant secondary compounds.*

Research in our laboratory contributes to closing the gap between the assumed function of larval traits and the demonstration that they are actually effective against natural enemies. We examine morphological, behavioral, and chemical defenses that caterpillars deploy against parasitoids and use various experimental approaches to test their effectiveness. For the chemical defenses, we have developed assays to detect active compounds in plants and caterpillars; once we have detected these defenses, we examine the effects of sequestered compounds on parasitoids. One major focus at UNR will be to follow up on our results showing that encapsulation is the best defense against most taxa of parasitoids and sequestered secondary metabolites are detrimental to the process of encapsulation in most caterpillar species.