Christina Alba, PhD

Denver Botanic Gardens
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RESEARCH EXPERTISE

Experimental design and sampling of plant populations
Plant identification
Evolutionary ecology of non-native plant invasions
Native population and community response to global change drivers (biological invasions, wildfire and drought)
Plant-herbivore interactions
Plant chemical and structural defenses

PROFESSIONAL APPOINTMENTS

Assistant Research Scientist, Denver Botanic Gardens (2018-present)
Document plant diversity and distributions in Colorado; integrate botanical collections with hypothesis-driven ecological research to better describe pattern and process in plant biodiversity

Affiliate Faculty, Department of Integrative Biology, University of Colorado Denver (2018-present)

Research Associate, Denver Botanic Gardens (2017-2018)
Document plant diversity and distributions in Colorado

Post-doctoral Researcher, University of Florida (2015-2017)
Effects of climate change and biological invasions on native longleaf pine communities of the southeastern U.S.

Post-doctoral Researcher, Czech Academy of Sciences, Institute of Botany (2011-2015)

- Assess the ecological and evolutionary mechanisms underlying invasion of *Verbascum thapsus* in North America
- Effects of wildfire and prescribed fire on native and non-native species performance

Scientific publishing professional (1999-2003; 2015-2017)
Financial coordinator, editorial assistant, and proofreader for scientific book and journal publishers (Westview Press, Geological Society of America)

EDUCATION

PhD, Ecology, Colorado State University (2011)
MS, Ecology, Colorado State University (2006)
BA, Creative Writing and Literature, Wheaton College, Massachusetts (1997)

PhD, Colorado State University, Graduate Degree Program in Ecology (2006-2011)

- Evolutionary ecology of plant invasion focusing on biogeographic comparisons and plant-insect interactions
- Ecological role of ants and vertebrate predators in shaping seed dispersal of non-native thistles
- Ecological and economic impacts of birds and mammals introduced to Europe

Master's degree, Colorado State University, Department of Biology (2004-2006)
Role of ecosystem engineers (prairie dogs and harvester ants) in shaping vegetation structure and function on the Colorado shortgrass steppe with a focus on herbivory, soil disturbance and patch dynamics.

TEACHING AND MENTORING EXPERIENCE

2016—Instructor, University of Florida (180 students; overall student rating 4.47/5 versus dept. mean of 3.96)
Integrated Principles of Biology I

Teaching assistant, Colorado State University (2004-2011; Award recipient for outstanding graduate teacher)
Plant Biology for Non-majors (fall 2004, spring 2010)
Plant Biology for Majors (spring 2004)
Biology of Organisms (2005 through 2007)
Introduction to Evolution Recitation (fall 2008, spring 2009)
Introduction to Evolution Lecture (fall 2010)
Ecology (Spring 2011)

My teaching responsibilities have included lecturing on pertinent conceptual material in large-classroom, small-classroom, and laboratory settings; integrating active learning both in the classroom using i-clicker and Top Hat questions and online using Blackboard and Canvas resources; writing and grading exams, quizzes, and assignments; and maintaining course websites and assigning student grades. I also helped design, implement, and evaluate a new evolution recitation curriculum at Colorado State University.

Graduate student mentor
I mentored PhD student Stacy Endriss (Colorado State University, defended in 2018) and master's student Julienne NeSmith (University of Florida, defended in 2017). Both have published parts or all of their research and Ms. NeSmith won the Ecological Society of America Student Poster Competition in 2017. I am currently advising graduate student Alissa Iverson through the Integrative Biology Department at the University of Colorado Denver.

PEER-REVIEWED PUBLICATIONS

Alba C, Fahey C, Flory SL. 2019. Global change stressors alter resource availability and shift plant interactions from facilitation to competition over time. *Ecology.* doi.org/10.1002/ecy.2859

NeSmith, JE, **Alba C,** and SL Flory. 2018. Experimental drought and plant invasion additively suppress primary pine species of southeastern US forests. *Forest Ecology and Management,* 411:158-165.

Flory SL, **Alba C,** Clay K, Holt R, and E. Goss. 2018. Emerging pathogens can suppress invaders and promote native species recovery. *Biological Invasions.* 20: 5.

Flory, SL, **Alba C,** Clay K, Holt R, and E. Goss. 2018. Long-term studies are needed to reveal the effects of pathogen accumulation on invaded plant communities. *Biological Invasions.* 20: 11.

Endriss SB, **Alba C,** Norton AP, Pyšek P, and RA Hufbauer. 2018. Breakdown of a geographic cline best explains high performance of introduced populations of a weedy invader. *Journal of Ecology,* 106:699-713.

Alba C, NeSmith J, Fahey C, Angelini C, and SL Flory. 2017. Methods for testing the interactive effects of drought and plant invasion on ecosystem structure and function using complementary common garden and field experiments. *Ecology and Evolution,* 7:1442-1452.

Alba C, Moravcová L, and P Pyšek. 2016. Geographic structuring and trans-generational maternal effects shape germination in native, but not introduced, populations of a widespread plant invader. *American Journal of Botany* 103:1-8.

Hulme PE, Pauchard A, Pyšek P, Vilà M, **Alba C**, Blackburn TM, Bullock JM, Chytrý M, Dawson W, Dunn A M, Essl F, Genovesi P, Maskell LC, Meyerson LA, Nuñez MA, Pergl J, Pescott OL, Pocock MJO, Richardson DM, Roy HE, Smart SM, Štajerová K, Stohlgren TJ, van Kleunen M & Winter M. 2015. Challenging the view that invasive non-native plants are not a significant threat to the floristic diversity of Great Britain. *Proceedings of the National Academy of Sciences of the United States of America* 112: E2988–E2989.

Alba C, Skálová H, McGregor KF, D'Antonio C, P Pyšek. 2015. Native and exotic species respond differently to wildfire and prescribed fire as revealed by meta-analysis. *Journal of Vegetation Science* 26:102-133.

Pyšek P, Manceur AM, **Alba C,** McGregor KF, Pergl J, Štajerová K, Chytrý M, Danihelka J, Kartesz J, Klimešová J, Lučanová M, Moravcová L, Nishino M, Sádlo J, Suda J, Tichý L & I Kühn. 2014. Naturalization of central European plants in North America: Species traits, habitats, propagule pressure, residence time. *Ecology* 96:145-157.

Alba C, Bowers MD, Blumenthal D, RA 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. DOI 10.1371/journal.pone.0104889.

Wilbur H, **Alba C**, Norton A, RA Hufbauer. 2013. The effect of insect herbivory on the growth and fitness of introduced *Verbascum thapsus* L. *Neobiota* 19:21-44.

Parker JP, Torchin ME, Hufbauer RA, Lemoine N, **Alba C,** et al. 2013. Do invasive species perform better in their new ranges? *Ecology* 94:985-994.

Kumschick S, Hufbauer RA, **Alba C,** and D Blumenthal. 2013. Evolution of fast-growing but more resistant phenotypes in introduced common mullein (*Verbascum thapsus*). *Journal of Ecology* 101:378-387.

Alba C, Prioreschi R, and C Quintero. 2013. Population and leaf-level variation of iridoid glycosides in the invasive weed *Verbascum thapsus* L. (common mullein): Implications for herbivory by generalist insects. *Chemoecology* 23:83-92.

Alba C and RA Hufbauer. 2012. Exploring the potential for climatic factors, herbivory, and co-occurring vegetation to shape performance in native and introduced populations of *Verbascum thapsus*. *Biological Invasions* 14:2505-2518.

Alba C, Bowers MD, and RA Hufbauer. 2012. Combining optimal defense theory and the evolutionary dilemma model to refine predictions regarding plant invasion. *Ecology* 93:1912-1921.

Kumschick S, **Alba C,** Hufbauer RA and W Nentwig. 2011. Weak or strong invaders? A comparison of impact between the native and invaded area of mammals and birds alien to Europe. *Diversity and Distributions* 17:663-672.

Alba C, Bowers MD, Blumenthal DM and RA Hufbauer. 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.

Alba-Lynn C and S Henk. 2010. Potential for ants and vertebrate predators to shape seed-dispersal dynamics of the invasive thistles *Cirsium arvense* and *Carduus nutans* in their introduced range (North America). *Plant Ecology* 210:291-301.

Alba-Lynn C and JK Detling. 2008. Interactive disturbance effects of two disparate ecosystem engineers in North American shortgrass steppe. *Oecologia* 157:269-278.

Book Chapters

Alba C. Northern Short Grasslands. 2013. In: Rowarth RW ed. Biomes and Ecosystems: An Encyclopedia. Salem Press.

Alba C. Temperate Grasslands. 2013. In: Rowarth RW ed. Biomes and Ecosystems: An Encyclopedia.

Salem Press.

IN REVISION OR REVIEW

Alba C, Levy R, and R. Hufft. Combining botanical collections and ecological data to better describe plant community diversity.

Lucky A, **Alba C*,** Fahey C, Somarriba G, Dunbar M, Inman W, Flory SL, and C. Angelini. Plant invasion and drought interactively determine arthropod functional and taxonomic diversity. *Co-first author.

TECHNICAL REPORTS (available upon request)

Alba C. 2017. Botanical survey of a privately owned Forest Stewardship Program Property, Douglas County, CO. Prepared for private landowners.

Alba C. 2018. High Line Canal 2018 Botanical Survey. Prepared for the High Line Canal Conservancy. Available at https://highlinecanal.org/resources/

Schnacke K, and **C Alba.** 2019. High Line Canal outreach and education: Plant bioblitz report. Prepared for the High Line Canal Conservancy.

Alba C and J Wingate. 2019. May Farms Ranch Botanical Survey. Prepared for private landowners.

Alba C and J Wingate. 2020. Sandstone Ranch Botanical Survey. Prepared for Douglas County Open Space.

PRESENTATIONS

"Native trees and shrubs of Colorado." Colorado Native Plant Society Webinar, 2020

"Quantifying plant diversity along an urban greenway: A unique approach combining botanical collections with ecological transects." Colorado Native Plant Society Denver-Metro Chapter Meeting, 2020.

"Quantifying plant diversity along an urban greenway: A unique approach combining botanical collections with ecological transects." University of Colorado Denver Seminar Series, 2020.

"The High Line Canal: What greens this greenway?" DU Panel Discussion on biodiversity, DU Nature Challenge 2019.

"Using botanical collections to find uncommon species and spark new research hypotheses." iDigBio Data Dialogues Panel, Ecological Society of America Annual Meeting, 2019

"Describing plant biodiversity: Botanical collections and quantitative ecological data richly complement each other." Ecological Society of America Annual Meeting, 2019

"Describing plant biodiversity: Botanical collections and quantitative ecological data richly complement each other." Botanical society of America Annual Meeting, 2019

"We're all outstanding in our fields: Combining botanical collections and ecological data to improve knowledge of plant biodiversity." Botanical Society of America Annual Meeting, 2018

"Increasing the value of botanical collections for understanding grassland biodiversity in Colorado." Great Plains Grassland Summit, Denver, CO, 2018

"Using botanical collections to explore Eastern Plains grasslands." Public seminar, Eads, CO, 2018.

"Science, outreach, and partnerships at Denver Botanic Gardens." Guest lecture for Denver Zoo graduate students, 2017.

"Non-native invasive grass facilitates native pine trees under drought conditions." Ecological Society of America Annual Meeting, 2016

"Response of Florida longleaf pine communities to interactive stress of drought and plant invasions." Invited seminar, University of Colorado, Denver, 2016.

"Site conditions mediate efficacy of invasive grass removal treatments and the response of resident plant communities." Florida Exotic Pest Plant Council Annual Meeting, 2016.

"Causes and consequences of plant invasions. The role of evolutionary processes, fire and drought." Agronomy Department Seminar Series, University of Florida, 2015

"Do native and exotic species differ in how they perform following wildfire? Revealing patterns and mechanisms via analysis of a global database." Neobiota Annual Meeting, 2014

"Leaf traits associated with rapid resource acquisition and growth are greater in native than introduced genotypes of an invasive weed" 4th International Symposium on Weeds and Invasive Plants, 2014.

"Wildfires and prescribed fires differ in their effects on native and introduced species: A meta-analysis" Annual Meeting, 2013.

"Not all leaves are created equal: Considering optimal defense and the "evolutionary dilemma" in the context of invasions" Neobiota Annual Meeting, 2012

"The usefulness of biogeographic comparisons for prioritizing experimental work on plant invasions: An example with *Verbascum thapsus*" Ecological Society of America Annual Meeting, 2011

"Pattern before process: What can biogeographic comparisons tell us about plant invasions?" (2nd place winner), Front Range Student Ecology Symposium, 2011

"A biogeographic comparison of the ecology of *Verbascum thapsus* (common mullein) with particular emphasis on patterns of herbivore attack" Denver Museum of Natural History Research Symposium, 2010

"The evolutionary ecology of *Verbascum thapsus* (common mullein) invasion in North America" Global Invasions Network Annual Meeting, Panama City, Panama, 2010

"Ontogenetic variation in herbivore defenses of the introduced weed *Verbascum thapsus* (common mullein)" Ecological Society of America Annual Meeting, 2010
"*Verbascum thapsus* invasion: Is there evidence for enemy release?" CAB International, Delémont Switzerland, 2010

"Ontogenetic change in herbivore defenses in the introduced weed *Verbascum thapsus*" Poster presentation (3rd place winner), Front Range Student Ecology Symposium at CSU, 2010

"Growth and herbivore defense characteristics in native and introduced populations of *Verbascum thapsus* (common mullein)" Department of Bioagricultural Sciences and Pest Management Seminar Series, Colorado State University, 2009

"Growth and defense characteristics of the introduced weed *Verbascum thapsus* (common mullein)" Front Range Student Ecology Symposium at Colorado State University, 2009

"Potential for native ants to disperse seeds of the invasive thistles *Cirsium arvense* and *Carduus nutans* in Colorado, USA" Poster presentation (1st place winner), Entomological Society of America Annual Meeting, 2008

"Effects of natural disturbance by black-tailed prairie dogs (*Cynomys ludovicianus*) on exotic plant invasion in urban and rural plant communities" Poster presentation, Ecological Society of America Annual Meeting, 2008

"Prairie dogs and harvester ants as disturbance agents on the Colorado shortgrass steppe: Implications for habitat heterogeneity" Ecological Society of America Annual Meeting, 2006

"Habitat alteration by black-tailed prairie dogs influences associated insect species" Poster presentation, Shortgrass Steppe Long-Term Ecological Research Site All Scientists Meeting, 2006

"Prairie dogs and harvester ants as disturbance agents on the Colorado shortgrass steppe: Implications for habitat heterogeneity" Poster presentation, CSU Front Range Student Ecology Symposium, 2005

PROFESSIONAL SERVICE

Associate Editor:
Biological Invasions (current) and Tropical Ecology (past editor)

Reviewer for:
Acta Oecologia, American Midland Naturalist, American Journal of Botany, Applied Vegetation Science, Biological Invasions, Ecological Applications, Ecosphere, Ecological Restoration, Global Ecology and Biogeography, Flora, Functional Ecology, Journal of Biogeography, Journal of Ecology, Oecologia, Oikos, Plants, Perspectives in Plant Ecology, Evolution and Systematics, Plant Ecology, Plant and Soil, Plants, PLoS One, Nature Climate Change, Nature Communications, National Science Foundation

Board Member, Colorado Native Plant Society (2017-present)
Noxious Weed Advisory Committee, Colorado Department of Agriculture (2020-present)
Faculty Search Committee Member, Evolutionary Ecologist, University of Colorado, Denver, 2019

Additional service:
Mentor, Ecological Research Experience for Undergraduates at Colorado State University (2008)
Coordinating Committee, Front Range Student Ecology Symposium, CSU (2007-2009)
Graduate Student Representative to Graduate Degree Program in Ecology ExComm, CSU (2007)
Graduate Student Representative to Biology Dept. Faculty, CSU (2006-2007)
Vice President, Colloquium in the Life Sciences, CSU (2005-2006)

HONORS/AWARDS

Robert P. McIntosh Award for Best Recent Paper in Vegetation Ecology, Ecological Society of America (2020)
2nd place, Front Range Student Ecology Symposium, Best Oral Presentation (2011)
Outstanding Graduate Student in Pest Ecology, Colorado State University, $520.00 (2010)
3rd place, Student Poster Competition at the Front Range Student Ecology Symposium (2010)
Recipient, Graduate Student Excellence in Teaching Award, Department of Biology at CSU (2010)
Nominee, Graduate Student Excellence in Teaching Award, College of Natural Sciences at CSU (2010)
Outstanding Graduate Student in Pest Ecology, Colorado State University, $844.00 (2009)
Outstanding Graduate Student in Pest Ecology, Colorado State University, $600.00 (2008)
1st place, President's Prize, Entomological Society of America Annual Meeting (2008)
Oscar and Isabel Anderson Undergraduate Scholarship for academic excellence, $1000.00 (2003)

GRANTS

High Line Canal Conservancy, Effect of Green Stormwater Infrastructure on Canal Vegetation and Soils, $15,095.00 (2019)
Colorado State University, Graduate Degree Program in Ecology Travel Award, $585 (2011)
Colorado State University, Graduate Degree Program in Ecology Travel Award, $375 (2010)
Denver Museum of Nature and Science, Wattis Foundation Internship, $700 (2010)
Colorado Native Plant Society, John W. Marr Fund, $670 (2009)
Colorado State University, Department of Biology Travel Award, $275 (2009–2010)

Colorado Graduate Grant, Colorado State University, $1250 (2008)
SERDP Travel Award to Ecological Society of America Annual Meeting, $500 (2008)
Pashby Scholarship, Colorado State University, $1000 (2008–2009)
Harold David Harrington Graduate Fellowship, Colorado State University, $1650 (2008)
Sigma-Xi Grants-in-Aid-of-Research, $805 (2007)
William M. Brown Professional Development Award, $500 (2007)
Colorado State University, Department of Biology Travel Award, $285 (2007–2008)
Colorado Native Plant Society, John W. Marr Fund, $500 (2005)
Colorado State University Recruitment Scholarship, $750 (2004)