
Christopher E. Buddenhagen

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Education

2016, Doctor of Philosophy, Botany, Florida State University, Tallahassee, FL. USA.

1995, Master of Science, Botany, The University of Auckland, Auckland, New Zealand

1993, Bachelor of Science, Biology, The University of Auckland, Auckland, New Zealand

Work Experience

08/2016 – present, Post-Doctoral Associate, University of Florida, Department of Plant Pathology (\$48,000 annually)

-Plant disease spread modeling

06/2011 – 05/2016, Herbarium Curator, Florida State University (\$23,000 half-time)

-Biodiversity and invasive species reporting

08/2010 – 06/2016, Teaching Assistant, Florida State University (\$23,000 half-time)

04/2009 – 08/2010, Project Manager-Plant Ecologist SWCA Environmental Consultants Hawaii (\$70,000 annually)

-invasive plant strategy and vegetation management protocols

12/2006 – 04/2009, Hawaii Invasive Species Council Coordinator, Research Corp. of Hawaii/Department of Land and Natural Resources (\$55,000 annually)

-budget management \$2-4 million

-interagency coordination

-hiring

-contract management

12/2005 – 12/2006, Field Operations Supervisor, Puu Kukui Preserve, Maui Land and Pineapple Company, Hawaii (\$48,000 annually)

-animal and plant control

-biodiversity monitoring

08/2001 – 10/2005, Research Scientist, Charles Darwin Research Station, Galapagos, Ecuador (\$24,000 annually)

-large staff 5-15

-invasive plant management research

-publications

-reporting to funding agencies

-GIS

08/1997 – 04/2001, Weed Ecologist/Botanist, Department of Conservation, New Zealand (\$43,000 annually)

-national monitoring protocol for invasive plants

-national invasive plant database

-native plant (rare species) monitoring

-wilding pine and broom management

-discussions about Regional Pest Management Strategies

-contribution to DOC invasive species management strategy

Research Experience

August 2016 – Present, Post-Doctoral Researcher, K.A. Garrett's Lab, University of Florida, Systems analysis of multi-layered networks to study epidemiology of plant disease in agricultural and natural ecosystems.

June 2011 – December 2016, Florida State University, A.R. Mast's Lab, Phylogenomics in the angiosperms and the cosmopolitan beaksedges (Rhynchosporae).

January 2006 – April 2009, Hawaii Invasive Species Council, Biofuel risk assessments, invasive species management.

August 2001 – November 2005, Charles Darwin Research Station, Applied invasive plant research in Galapagos.

August 1997 – May 2001, Department of Conservation, biodiversity (plants) protection and invasive species management.

February 1993 – February 1995, University of Auckland, John Ogden's Lab, Invasive animal impacts in *Dysoxylum spectabile* forests in New Zealand.

Teaching Experience

Teaching Assistant

2010-2016 Field Botany 1 semester, Plant Biology Lab 2 semesters, Biological Science Lab II (non-majors) 2 semesters, Evolution 1 semester.

Guest Lecturer

2016 Fall – UF – PLP4905/6905, Networks in Agricultural Systems with Dr. Karen Garrett
Presented lecture "Bayesian network analysis"

Grants and Awards

2014 – FSU's Robert K. Godfrey Endowment Award for Botany \$700: Phylogenomics and systematics of Rhynchosporae (Cyperaceae).

2013 – Doctoral Dissertation Improvement Grant National Science Foundation \$19,110: "Extending anchored phylogenomics into plants with a case study of beaksedge (tribe Rhynchosporae; Cyperaceae) diversification in the New World."

2012 – Florida Native Plant Society \$1500: "Genetic resources for identifying beaksedges (Rhynchospora) and understanding their diversity in Florida and the Coastal Plain"

2011 – FSU's Robert K. Godfrey Endowment Award for Botany \$700 Phylogeography, taxonomy and character evolution in Rhynchosporae (Cyperaceae).

2009 – Contracted to write a Global Environmental Facility a proposal for invasive species capacity building for South Pacific Regional Environment Programme (SPREP) & UNEP: \$50,000 Participants were governments from Tonga, Cook Islands, Samoa, Niue, PNG, Kiribati, Palau, Federated States of Micronesia, Solomon Islands, Marshall Islands and Vanuatu.

2000 – Waitakere City Council, Auckland, New Zealand: Contracted to write a Weed Strategy for the Waitakere City Council (\$5,000).

1995 – Auckland Regional Council \$35,000: Setting up a monitoring program to detect the response of forests to Australian brush tailed possum control.

1994 – Northland Regional Council, Pest Management Scholarship, Possum Impacts and Management in Kohekohe Forests (\$5,000)

Professional Activity and Service

Professional Activity and Service

2014 – Lobbied members of Congress in Washington DC to improve policies related to government sponsored biofuel and invasive species research under the National Wildlife Federation and the National Environmental Coalition on Invasive Species.

Professional Society Membership

The IUCN Invasive Species Specialist Group since 1999.

Peer Reviews Completed

PLOS ONE (topic: biofuels); *The Wilson Journal of Ornithology* (topic: invasive species); *Environmental Science & Policy* (topic: invasive species); *Pacific Science* (topic: invasive species); *Biodiversity and Conservation* (topic: invasive species); *Plant Ecology* (topic: invasive species); *Environmental Management* (topic: invasive species).

Publications and Reports

Peer Reviewed Journal Articles

1. Ribeiro T, **Buddenhagen C**, Thomas W, Souza G, Pedrosa-Harand A. 2017. Are holocentrics doomed to change? Limited chromosome number variation in Rhynchospora Vahl (Cyperaceae). *Protoplasma*, in press. DOI: 10.1007/s00709-017-1154-4
2. Christopher **Buddenhagen***, Hernandez Nopsa, John*, Kelsey Andersen, Jorge Andrade-Piedra, Gregory Forbes, Peter Kromann, Sara Thomas-Sharma, Pilar Useche, and Karen Garrett. 2017. "Pathogen Mitigation in an Ecuadorian Potato Seed System: Insights from Network Analysis." *bioRxiv*, February. doi:10.1101/107367. [*contributed equally] Accepted in special epidemiological issue of *Phytopathology*.
3. **Buddenhagen**, Christopher E, W. Wayt Thomas, and Austin R. Mast. 2017. "A First Look at Diversification of Beaksedges (Tribe Rhynchosporae; Cyperaceae) in Habitat, Pollination, and Photosynthetic Features," *Memoirs New York Botanical Garden*, 118: 111–24.

4. Gordon, D.R., Flory, S.L., Lieurance, D., Hulme, P.E., **Buddenhagen**, C., Caton, B., Champion, P.D., Culley, T.M., Daehler, C., Essl, F. and Hill, J.E., 2016. Weed risk assessments are an effective component of invasion risk management. *Invasive Plant Science and Management*, 9(1), pp.81-83.
5. **Buddenhagen** C, Tye A. 2015. Lessons from successful plant eradications in Galapagos: commitment is crucial. *Biological Invasions* 17(10): 2893–2912.
6. Chimera, C. G., **Buddenhagen**, C. E., & Clifford, P. M. (2010). Biofuels: the risks and dangers of introducing invasive species. *Biofuels*, 1(5), 785-796.
7. Gordon, D. R., B. Mitterdorfer, P. C. Pheloung, S. Ansari, C. **Buddenhagen**, C. Chimera, C. C. Daehler, W. Dawson, J. S. Denslow, A. LaRosa, T. Nishida, D. A. Onderdonk, F. D. Panetta, P. Pysek, R. P. Randall, D. M. Richardson, N. Tshidada, J. G. Virtue, and P. A. Williams. 2010. Guidance for addressing the Australian Weed Risk Assessment questions. *Plant Protection Quarterly* 25:56-74.
8. Guézou, A., M. Trueman, C. E. **Buddenhagen**, S. Chamorro, A. M. Guerrero, P. Pozo, and R. Atkinson. 2010. An Extensive Alien Plant Inventory from the Inhabited Areas of Galapagos. *PLoS ONE* 5:e10276.
9. **Buddenhagen** C.E., Chimera C., Clifford P. 2009. Assessing Biofuel Crop Invasiveness: A Case Study. *PLoS ONE* 4(4): e5261. doi:10.1371/ journal.pone.0005261
10. Guerrero, A. M., P. Pozo, S. Chamorro, A. Guezou, and C. E. **Buddenhagen**. 2008 Baseline data for identifying potentially invasive plants in Puerto Ayora, Santa Cruz Island, Galápagos. *Pacific Conservation Biology*. 14(2):93-107
11. Guezou, A., P. Pozo, and C. **Buddenhagen**. 2007. Preventing Establishment: An Inventory of Introduced Plants in Puerto Villamil, Isabela Island, Galapagos. *PLoS ONE* 2:e1042
12. Renteria, J.R. & C. **Buddenhagen**. 2006 Invasive plants in the *Scalesia pedunculata* forest at Los Gemelos, Santa Cruz, Galapagos. *Galapagos Research* 64:31-35
13. **Buddenhagen**, C. 2006 The successful eradication of two blackberry species *Rubus megalococcus* and *R. adenotrichos* (Rosaceae) from Santa Cruz Island, Galapagos, Ecuador. *Pacific Conservation Biology* 12: 272-278
14. **Buddenhagen**, C. & Jewell, K.J. 2006. Invasive plant seed viability after processing by some endemic Galapagos birds. *Ornitologia Neotropical* 17:73-80.
15. **Buddenhagen**, C.E. & Yáñez, A.P. 2005. The cost of red quinine *Cinchona pubescens* Vahl. control on Santa Cruz Island, Galapagos, Ecuador. *Galapagos Research* 63:32-36
16. **Buddenhagen**, C.E., J. L. Rentería, M. Gardener, S. R. Wilkinson, M. Soria, P. Yáñez, A. Tye, and R. Valle. 2004. The Control of a Highly Invasive Tree *Cinchona pubescens* in Galapagos. *Weed Technology* 18:1194-1202.
17. **Buddenhagen**, C.E. & Ogden J. 2003. Growth and survival of *Dysoxylum spectabile* (Meliaceae) seedlings in canopy gaps. *New Zealand Journal of Botany* 41: 179-183.

Peer Reviewed Book Chapters

18. Gardener, Mark R., Mandy Trueman, Chris **Buddenhagen**, Ruben Heleno, Heinke Jäger, Rachel Atkinson, and Alan Tye. 2013. "A Pragmatic Approach to the Management of Plant Invasions in Galapagos." In *Plant Invasions in Protected Areas*, edited by Llewellyn C. Foxcroft, Petr Pyšek, David M. Richardson, and Piero Genovesi, 7:349–74. *Invading Nature - Springer Series in Invasion Ecology*. Springer Netherlands. http://dx.doi.org/10.1007/978-94-007-7750-7_16.

Publications in Review (available upon request)

1. **Buddenhagen**, C.*, Lemmon, A.R.*, Lemmon, E.M., Bruhl, J., Cappa, J., Clement, W.L., Donoghue, M., Edwards, E.J., Hipp, A.L., Kortyna, M., Mitchell, N., Moore, A., Prychid, C.J., Segovia-Salcedo, M.C., Simmons, M.P., Soltis, P.S., Wanke, S., Mast, A., 2016. Anchored Phylogenomics of Angiosperms I: Assessing the Robustness of Phylogenetic Estimates. *bioRxiv*. doi:10.1101/086298 [*contributed equally]

Publications in Preparation (available upon request)

2. Andersen, Kelsey, Christopher **Buddenhagen**, Paul Rachkara, Richard Gibson, Stephen Kalule, David Phillips, and Karen Garrett. 2017. "Analyzing Key Nodes and Epidemic Risk in Seed Networks: Sweetpotato in Northern Uganda." *bioRxiv*, February. doi:10.1101/107359.
3. Christopher E. **Buddenhagen**, W. Wayt Thomas, Alan Lemmon, Emily Lemmon, and Austin R. Mast. Insights into beaksedge diversification (tribe Rhynchosporae; Cyperaceae) from anchored phylogenomics.

Peer Reviewed Reports and Dissertations

1. **Buddenhagen**, C.E. 2016. "A view of Rhynchosporae (Cyperaceae) diversification before and after the application of anchored phylogenomics across the angiosperms." Doctoral Dissertation.
2. **Buddenhagen**, C.E. 2015. *Buddleja asiatica* (dog tail) for the CABI Invasive Species Compendium <http://www.cabi.org/isc/datasheet/10317>
3. **Buddenhagen**, C.E. 2015. *Carex kobomugi* (Asiatic sand sedge) for the CABI Invasive Species Compendium <http://www.cabi.org/isc/datasheet/112985>
4. **Buddenhagen**, C.E. 2015. *Cinnamomum burmanni* (padang cassia) for the CABI Invasive Species Compendium <http://www.cabi.org/isc/datasheet/13516>
5. **Buddenhagen**, C.E. 2014. *Christella dentata* (soft fern) for the CABI Invasive Species Compendium <http://www.cabi.org/isc/datasheet/113279>
6. **Buddenhagen**, C.E. 2013. *Cyclosorus parasiticus* (parasitic maiden fern) for the CABI Invasive Species Compendium <http://www.cabi.org/isc/datasheet/120368>
7. **Buddenhagen**, C.E. 2013. *Desmodium incanum* (creeping beggerweed) for the CABI Invasive Species Compendium <http://www.cabi.org/isc/datasheet/109200>
8. **Buddenhagen**, C.E. 2014. *Passiflora edulis* (passionfruit) for the CABI Invasive Species Compendium <http://www.cabi.org/isc/datasheet/38799>
9. **Buddenhagen**, C.E. 2014. *Solanum capsicoides* (cockroach berry) for the CABI Invasive Species Compendium <http://www.cabi.org/isc/datasheet/110315>
10. **Buddenhagen**, C.E. 2013. *Setaria parviflora* (knotroot foxtail) for the CABI Invasive Species Compendium <http://www.cabi.org/isc/datasheet/49768>
11. **Buddenhagen**, C.E. 1998. Broom control monitoring at Tongariro National Park. *Conservation Advisory Science Notes*: 300:1-10. Department of Conservation, Wellington, New Zealand.
12. **Buddenhagen**, C.E. 1995. "The effects of possums and other introduced herbivores on *Dysoxylum spectabile* (kohekohe) forests." MSc. Dissertation
13. Ogden J, and **Buddenhagen** C. 1994. Long term forest dynamics and the influence of possums and goats on kohekohe (*Dysoxylum spectabile*) forest in the Kauaeranga Valley, Coromandel Peninsula.- some preliminary results. In O' Donnell CFJ, ed. Possums as Conservation Pests. *Proceedings of a workshop on possums as conservation pests: Department of Conservation*, Wellington, New Zealand.

Non-Peer Reviewed Reports

14. **Buddenhagen**, Christopher E, Kelsey F Andersen, *James C Fulton*, and Karen A Garrett. 2017. "Survey Methods for Seed System Network Analysis." PeerJ Preprints 5 (February): e2806v1. doi:10.7287/peerj.preprints.2806v1.
15. Rogg, H., **Buddenhagen**, C. & Causton, C. 2003. Experiences and limitations with pest risk analysis in the Galapagos Islands. Pg 117-126. In: *Identification of risks and management of invasive alien species using the IPPC framework*. Proceedings of a workshop in Braunschweig, Germany; 22-26 September 2003 316 pg FAO. <http://ftp.fao.org/docrep/fao/008/y5968e/y5968e00.pdf>
16. Timmins, S. M., S. J. Owen, & **Buddenhagen**, C.E. 2000. New Zealand-a weedy paradise. *Wildland Weeds* (Winter edition): 8-12.
17. **Buddenhagen** C.E., Timmins SM, Owen SJ, Champion PD, Nelson W, and Reid VA. 1998. An Overview of weed impacts and trends. Pg 11-21. In: Owen SJ, ed. Department of Conservation Strategic Plan for Managing Invasive Weeds. Department of Conservation, Wellington, New Zealand.

Presentations

National Oral Presentations

1. Chris **Buddenhagen**, Alan Lemmon, Emily Lemmon, Austin Mast 2014. Anchored Phylogenomics in Angiosperms: Maximizing Data Compatibility Through Coordinated Locus Selection. Evolution June. Raleigh, North Carolina (presentation)
2. Christopher **Buddenhagen**, Austin Mast, W. Wayt Thomas 2013. Biogeography, Habitat and Diversification: Insights from a Chronogram for the Tribe Rhynchosporae (The Beaksedges; Cyperaceae). MONOCOTS V: 5th International Conference on Comparative Biology of Monocotyledons, New York Botanical Garden, July 7-13, 2013 (presentation)
3. Chris **Buddenhagen** 2007. How much money is spent on invasive species management in Hawaii? Hawaii Conservation Conference, Honolulu, Hawaii. (presentation).
4. Jose Luis Escandon and Chris **Buddenhagen** 2003. Erradicación. ¿La primera opción para proteger la

biodiversidad de Galápagos? II Congreso de Conservación de La Biodiversidad En Los Andes y La Amazonia v Congreso Ecuatoriano De Botánica, Loja Ecuador (presentation)

5. Susan Timmins and Chris **Buddenhagen**. 1999. How to win at weeds. Manaaki Whenua Conference, Wellington, New Zealand, 21-23 April 1999 (presentation)
6. Chris **Buddenhagen** 2003. Weed Control in Galapagos. "Biosecurity at the Centre of New Zealand" Conference in Nelson, New Zealand. (presentation)

Regional Presentations

7. **Buddenhagen**, Chris. 2017. Network analysis of agricultural seed systems. Roots, tubers & bananas workshop, Wageningen. May 7-13. (invited speaker and R workshop).
8. **Buddenhagen**, Chris. 2016. Bayesian Networks for Management Performance Mapping. Roots, tubers & bananas workshop, Gainesville. Dec 13-15. (presentation)
9. Chris **Buddenhagen**, Wayt Thomas, Austin Mast 2015. Diversification of the beaksedges (Rhynchospora; Cyperaceae). Florida Native Plant Society. Tallahassee Florida, May 2015. (presentation)
10. Chuck Chimera and Chris **Buddenhagen** 2008. Biofuels: the good, the bad and the ugly. Hawaii Conservation Conference, Honolulu, Hawaii. (presentation)
11. Chris E. **Buddenhagen**, Greg Hansen, Randy Bartlett 2006. Creating Pig Free Zones Mauka to Makai in The Pu'u Kukui Watershed Preserve. Hawaii Conservation Conference, Honolulu, Hawaii. (presentation)
12. Chris **Buddenhagen** and Julie Geritzlehner 1999. Monitoring Weed Control Operations: Results, Outcomes and Decisions Hawaii Conservation Conference, Honolulu HI. (presentation).

National Poster Presentations

1. Christopher **Buddenhagen***, Hernandez Nopsa, John*, Kelsey Andersen, Jorge Andrade-Piedra, Gregory Forbes, Peter Kromann, Sara Thomas-Sharma, Pilar Useche, and Karen Garrett. 2017. "Pathogen Mitigation in an Ecuadorian Potato Seed System: Insights from Network Analysis." American Phytopathological Society meeting. (poster)
2. Chris **Buddenhagen**, Austin Mast, Wayt Thomas 2012. Insights into the formation of savanna habitat in the New World tropics and subtropics from the chronogram of the tribe Rhynchosporaeae (the beaksedges; Cyperaceae). Botany Society Conference July 2012 (poster)
3. Patricio Yáñez, Nelson García and Chris **Buddenhagen** 2004 14th Australian Weed Conference. Weed control and restoration around the El Junco Lagoon, San Cristóbal, Galápagos-Ecuador. (poster)

Regional Poster Presentations

4. **Buddenhagen**, Chris; Fulton, James; Kromann, Peter; Andrade-Piedra, Jorge; Garrett, Karen. Evaluating Management Outcomes in Ecuadorian Potato Seed Systems. 2017. Emerging Pathogens Institute Research Day, University of Florida. (poster)
5. **Buddenhagen**, Chris; Fulton, James; Kromann, Peter; Andrade-Piedra, Jorge; Garrett, Karen. 2016. Mapping Management Outcomes to Support Agricultural Decision-Making: Ecuadorian Potato Seed Systems. Institute for Sustainable Food Systems Open House, University of Florida. (poster)

References

Name	Employer	Title	Phone	Email
Dr. Karen Garrett	University of Florida	Professor	785.317.3117	karengarrett@ufl.edu
Dr. Austin Mast (*)	Florida State University	Professor	850.264.2621	amast@bio.fsu.edu
Dr. David Duffy (*)	University of Hawaii	Professor	808.956.8218	dduffy@hawaii.edu
Dr. John Ogden	University of Auckland	Retired		johnogden@farmside.co.nz
Dr. Alan Tye (*)	IUCN (Mauritius)		+357 96 754709	alantye@gmail.com
Dr. Gil Nelson (*)	Florida State University	Assistant Professor	850.766.2649	gnelson@bio.fsu.edu
Dr. Alan Lemmon (*)	Florida State University	Associate Professor	850.445.4393	alemmon@evotutor.org

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Dr. Wayt Thomas	New York Botanical Garden	Elizabeth G. Britton Curator of Botany	718.817.8625	wthomas@nybg.org