**Curriculum Vitae**

Thomas R. Walla Department of Biology Colorado Mesa University

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**EDUCATION:** B.A. Economics, John Muir College, University of California, San Diego (1991).

Ph.D. Department of Biology, University of Oregon, Eugene OR (2000).

**LANGUAGES:** Fluent written and spoken Spanish.

**EMPLOYMENT:**

- 2011- present Professor of Biology, Colorado Mesa University
- 2006-2011 Associate Professor of Biology, Colorado Mesa University
- 2001 - 2006: Assistant Professor of Biology, Colorado Mesa University
- 2000-2001 Instructor, University of Oregon

**TEACHING EXPERIENCE:**

Course Instructor: Plant-Animal Interactions 406; Advanced Ecological Methods 405; Advanced Ecological Methods Lab 405L; Insect Biology 331; Insect Biology Lab 331L; General Human Biology 101; General Human Biology Lab 101L; Ecology and Evolution 208 and Lab: Tropical Ecosystems 415; Ecology 370; Genetics and Ecology Lab 264L; Genetics and Evolution Lab 261; Forest Biology Lab 307L; General Human Biology 101 Online
Children's Environmental Trust Rainforest Ecology Workshop (K-12).

Earthwatch Research Leader: Led three citizen science expeditions (2011, 2012 ,2013) to the rainforest of Ecuador to collect caterpillars as part of Caterpillars and Climate Change project.

International Instruction: Tropical Field Biology 407. Designed and instructed a three-week summer field course in Ecuador 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2012, 2014, 2016 for Colorado Mesa University

**PROFESSIONAL AFFILIATIONS:**

**President:** Population Biology Foundation;

**Research Associate:** Yanayacu Biological Station, Ecuador; Museo Ecuatoriano de Ciencias Naturales

**AWARDS:** Exemplary Faculty Award Colorado Mesa Univeristy 2010, 2011, 2013

**PEER REVIED JOURNAL PUBLICATIONS**

Walla, TR., and Greeney, HF. 2012 Under cover of darkness, caterpillars take flight: The immature stages and feeding ecology of the Glasswinged Butterfly, *Oleria baezana* (Ithomiinae) in Eastern Ecuador. Journal of Insect Science. 12: 106.

Jarle Tufto, Russell Lande, Thor-Harald Ringsby, Steinar Engen, Bernt-Erik Sæther, Thomas R. Walla and Philip J. DeVries 2012. Estimating Brownian motion dispersal rate, longevity and population density from spatially explicit mark-recapture data on tropical butterflies. Journal of Animal Ecology vol 81 Issue 4 pgs 756-769.

Rodriguez-Casteneda, Genoveva; Dyer, Lee; Brehm, Gunnar; Connahs, Heidi; Forkner, Rebecca; Walla, Thomas R. 2010. Tropical Forests Are Not Flat *Ecology Letters*. Volume 13, Iss. 11. 1348-1357.

Greeney, H. Walla, T. Jahner, J. Berger R. 2010. Shelter building behavior of *Pyrrhopyge papius* (Lepidoptera: Hesperiidae) and the use of the Mayfield method for estimating survivorship of shelter-building Lepidopteran larvae. *Zoologia* Vol. 27 (6): 867-872.

Greeney, H., Penz, C., DeVries, P. Walla, T. 2010. A possible function of the spatulate setae surrounding the papillae anales of Sarota butterflies. (Riodinidae: Helicopini). *Journal of the Lepidopterists' Society* Vol. 64 Number 4 2010.

Greeney, H. F., Walla, T.R., and Lynch, R.L. 2010. Architectural changes in larval leaf structures of Noctuana haematospila (Lepidoptera: Hesperiidae) between host plant species with different leaf thicknesses. *Zoologia*. Vol. 27 no. 1.

Jost, LJ., DeVries, PJ., Walla, TR., Greeney, HF., Chao, A., Ricotta, C. 2010. Partitioning diversity for conservation analyses. *Diversity and Distributions* Vol. 16 Issue 1, pp. 65-76.

Greeney, H.F., Dyer, L.A., DeVries, P.J., Walla, T.R., Salazar, L., Simbana, V.W., Salgaje, L. 2010. Early stages and natural history of *Perisama oppellii* (Latreille, 1811) (Nymphalidae, Lepidoptera) in eastern Ecuador. *Kempffiana* 6: 16-30.

Greeney, H. F., T. W. Pyrcz, L. A. Dyer, M. Sanchez Z., & T. R. Walla. 2010. The early stages and natural history of *Corades medeba* Hewitson, 1850 in eastern Ecuador (Lepidoptera, Nymphalidae, Satyrinae, Pronophilina). Tropical Lepidoptera 19: 10-15.

Dyer, L.A., Walla, T.R., Greeney, H.F., Stireman III, J.O., Hazen, R.F. 2010. Diversity of interactions: a metric for studies of biodiversity. *Biotropica.* 42: 281-289.

Greeney, H.F, DeVries, P.J., Penz C.M., Granizo, R.B., Connahs, H, Stireman III, J.O., Walla, T.R., Dyer, L.A., 2009. The early stages and natural history of *Antirrhea adoptive porphyrosticta* (Watkins, 1928) in eastern Ecuador (Lepidoptera: Nymphalidae: Morphinae). *Journal of Insect Biology* Vol. 9, Article 26.

Connahs, H., Rodriguez-Castañeda, G., Walters, T., Walla, T.R. & Dyer, L.A. 2009. Geographic variation in host-specificity and parasitoid pressure of an herbivore (Geometridae) associated with the tropical genus *Piper* (Piperaceae). *Journal of Insect Science* Vol 9. Article 28**.**

Walla, T.R., Engen, S., De Vries, P.J. and Lande. R. 2004. Modeling vertical beta diversity in tropical butterfly communities. *Oikos* 107: 610-618.

Engen,S., Walla T.W., DeVries, P.J. 2002. Analyzing spatial structure of communities by the two-dimensional Poisson lognormal species abundance model. *American Naturalist*.

DeVries, P.J. & T.R. Walla. 2001. Long-term spatial and temporal species diversity in a neotropical fruit-feeding nymphalid butterfly community. *Biol. J. Lin. Soc*. 74: p.1-15

Lande, R., DeVries, P.J. & T.R. Walla. 2000. When species accumulation curves intersect: ranking diversity using small samples. *Oikos* 89:601-605.

DeVries, P.J., C.M. Penz and T.R. Walla. 1999. The biology of *Batesia hypochlora* from an Ecuadorian rainforest (Lepidoptera, Nymphalidae). *Tropical Lepidoptera* 10: 43-46.

DeVries, P.J., T. Walla & H. Greeney. 1999. Species diversity in spatial and temporal dimensions of fruit-feeding butterflies from two Ecuadorian rainforests. *Biol. J. Lin. Soc*.. 68: 333-353.

Greeney, HF, M Lysinger, TR Walla, & J Clark 1998. First description of the nest and egg of the Tanager Finch (*Orreothraupis arremenops*) with additional notes on behavior. Ornitologia Neotropical 9: 205-207

Websites

Dyer, L.A., Miller, J.S., Rab Green, S.B., Gentry, G.L., Greeney, H.F., and T.W. Walla. (2014). Caterpillars and parasitoids of the Eastern Andes in Ecuador. http://www.caterpillars.org.

## GRANT AWARDS

**Summary:**

National Science Foundation Grant: Caterpillars and Parasitoids of the Eastern Andes in Ecuador. Funded with two renewals for a total of 9 years of funding totaling approximately $300,000.

Research Experience for Undergraduates Supplemental funding awards for 9 students at approx $7,000 each.

Fulbright Scholar Award 2009

Biggs-Zollner Faculty Enrichment Grant (2002), Colorado Mesa University Academic Enrichment Fund (2002,2003, 2004) Professional Presentation Fund (2003), CMU Professional Development Funds (2009)

### Specific Grants Awarded

2010 - 2013 Caterpillars and Parasitoids of the Ecuadorian Andes (Collaborative) 3rd Renewal Authors: Lead PI: Lee Dyer (University of Nevada Reno), Co-PI's: Walla, T (Mesa State), Shaw S (University of Wyoming), Whitfield J. (University of Illinois Champagne), Stireman J. (Wright State University) Forister, M. (University of Nevada, Reno)Source: National Science Foundation DEB Biological Surveys and Inventories Funded June 2010- June 2013. $171,000

Funded: 2013, 2012, 2011, 2010, 2009. 2008. 2007, 2006, 2005, Various Research Experience for Undergraduates Supplemental Funding proposals for approximately $8000 each Author: Walla, T Source: Supplemental Research Experience for Undergraduates National Science Foundation

2010: Dissecting Microscope with Leica Automontage Imaging SystemAuthors: Lead PI: McQuade, K. Co-PI's: Walla, TW., Palmer, AP. Source: National Science Foundation Equipment Grant Funded: $45,000

2010: Teaching dissecting microscope with digital video imagery. Authors: Lead PI: Walla TW, Co-PI's: Palmer, McQuade, McCallister, Becktell. Source: Colorado Mesa University Professional Devlopment Fund Funded: $3000

2007: Strategic Planning Goals Grant: Developing online teaching strategies. Source: Mesa State College Author: Walla, T. Funded June 2007 $2,800.00

2007-2010 Caterpillars and Parasitoids of the Ecuadorian Andes (Collaborative).Authors: Lead PI: Lee Dyer (University of Nevada Reno), Co-PI's: Walla, T (Mesa State College), Shaw S (University of Wyoming), Whitfield J. (University of Illinois Champagne), Stireman J. (Wright State University)Source: National Science Foundation Biological Surveys and Inventories Funded 2007: $98,000.00

2004: Caterpillars and Parasitoids of the Ecuadorian Andes (Collaborative).Authors: Lead PI: Lee Dyer (University of Nevada Reno), Co-PI's: Walla, T (Mesa State College), Shaw S (University of Wyoming), Whitfield J. (University of Illinois Champagne), Stireman J. (Wright State University) Source: National Science Foundation Biological Surveys and Inventories Funded: June 2004- June 2007 $43,000

2004: Academic Enrichment Fund: Invited Scientists to Enrich Tropical Field Biology 407 Author: Walla, T.Source: Mesa State College Academic Enrichment Fund.Funded 2004: $1000

2003: Academic Enrichment Fund: Invited Scientists to Enrich Tropical Field Biology 407. Author: Walla, T. Source: Mesa State College Academic Enrichment Fund. Funded 2003: $1000

2003: Undergraduate Research and Education Workshop of the First Annual Ecuador Cloud Forest Tropical Research and Education ConferenceAuthor: Walla, T. Source: Mesa State College Professional Presentation Funds. Funded 2003: $1,180.00

2003: C-RUI: Plant-herbivore interactions in Montane and Lowland Neo-tropical Rainforests.Source: National Science Foundation Collaborative Research at Undergraduate Institutions. Amount Requested: $463,400.00 Rejected: June 2003.

**Sabbaticals**

Sept 2008- May 2009: Research on Diversity Metrics and Caterpillars and Parasitoids of the Eastern Andes in Ecuador.

Fulbright Scholar Award

2008-2009: Collaborative Advances in Diversity Measures and Museum Curation: This project developed collaborations with museum personnel and students at the Museo de Ciencias Naturales in Quito, Ecuador.

## SUPERVISION OF UNDERGRADUATE RESEARCH STUDENTS

2014

BIOL 387: Structured Research Leah Temple: The role of elevation and temperature driving developmental plasticity in larval lepidoptera in Eastern Ecuador.

BIOL 387: Structured Research Sam Jessen (2cr) : Lepidoptera specimen mounting, curation and databasing

2013

BIOl 387: Structured Research Jade Moret (5cr) Investigation of host plant switching in larval lepidoptera in a Montane forest of Ecuador.

BIOl 387: Structured Research Kelsie Antonelli (5cr) Investigation of the role of elevation in determining host plant switching ability in larval lepidoptera in Eastern Ecuador.

BIOl 387: Structured Research Tyler Hutchinson (3cr) Lepidoptera taxonomic sampling and speciment curation in a montane rainforest of Ecuador

BIOl 387: Structured Research Elijah Neymark (2cr) Lepidoptera taxonomic sampling and speciment curation in a montane rainforest of Ecuador

BIOL 387: Structured Research Alicia Crespin (summer) : The effects of elevation on larval development rates in Eastern Ecuador.

2012

BIOL 387: Structured Research Alicia Crespin (summer) : The effects of elevation on larval development rates in Eastern Ecuador.

BIOL 387: Structured Research Jessica Hartney (3cr) : Developing a photographic guide to moth families common at the night light in Montane Ecuador.

BIOL 387: Structured Research Ashley Lucks (1cr) : Insect specimen mounting, curation and databasing

BIOL 387: Structured Research Saray Lira (2cr) : Lepidoptera specimen mounting, curation and databasing

BIOL 387: Structured Research Kelsie Betz (4cr) : Lepidoptera specimen mounting, curation and databasing

2011

BIOL 387: Structured Research: Katherine Sams (2cr) : Digitization of tropical butterfly collection and posting to Encyclopedia of Life website.

BIOL 487: Advanced Research: Jessica Hogue (4cr): Summer REU in Ecuador collecting and rearing *Eois* caterpillars to test patterns of ecological speciation and population genetic structure in a tri-trophic plant-caterpillar-parasitoid system.

BIOL 487: Advanced Research: Emily Breiner (2 cr): Testing hypothesis regarding elevation and caterpillar development time based on literature reviews.

2010

BIOL 487: Advanced Research: Brittney McKelvey (3cr) Describing the natural history of caterpillars in an Ecuadorian cloud forest.

BIOL 487: Advanced Research: Katharine Williams (3 cr). Describing the natural history of caterpillars in an Ecuadorian cloud forest.

BIOL 387: Structured Research: Jessica Hogue (6cr). Morphospecies description and diversity analysis of a *Chusquea* feeding geometrid caterpillar community.

BIOL 387: Structured Research: Emily Breiner (6cr). Morphospecies description and diversity analysis of a *Chusquea* feeding geometrid caterpillar community

2009

BIOL 387: Structured Research: Brittany McKelvey (6cr) Describing the natural history of caterpillars in an Ecuadorian cloud forest. 5 month REU funded field experience.

BIOL 387: Structured Research: Katharine Williams (6cr): Describing the natural history of caterpillars in an Ecuadorian cloud forest. 5 month REU funded field experience.

2008

BIOL 387: Structured Research: Josh Jahner: 6 credits: Measuring mortality in hesperiid caterpillars in an Ecuadorian cloud forest.

2007

BIOL 387: Structured Research: 2 students: 2 cr each: Digitization of lepidoptera collections for online publication.

BIOL 487: Advanced Research: 1 student: 3 cr. Building photographic keys for entomology students.

2006

BIOL 387: Structured Research: 7 students: approx 2 credits each: Identification and databasing of fruit-feeding nymphalid butterflies from a neo-tropical forest, theoretical approach to testing neutral models in tropical butterfly communities, entomological curation.

BIOL 487: Advanced Research: 3 students: 3 credits each. Entomological curation by Patti Susman. Drafting of Eois host specificity research by Toni Walters.

2004

BIOL 387: 5 students: approx 2 credits each: Projects included diversity analysis, alpha taxonomy of butterfly samples from the upper Amazon, databasing, web site construction

BIOL 387: 4 Students: approx 2 credits each: Projects included diversity analysis, alpha taxonomy of butterfly samples from the upper Amazon, databasing, web site construction

2003

Student post baccalaureate internship: Mac Lewis one year in the upper Amazon sampling Nymphalid butterflies and guiding natural history tours.

BIOL 387 Structured Research: 1 student 6 credits: Toni Walters: Host plant specificity of *Eois* caterpillars in Ecuador.

2002

Student post baccalaureate internship: Ryan Bixenmann one year in the upper Amazon sampling Nymphalid butterflies and guiding natural history tours.

My background and training include a broad interest in community ecology, population dynamics, measurement of biological diversity, conservation biology and species interactions. I am particularly interested understanding species diversification and population structure in tropical habitats, which has motivated a research program focused on Neo-tropical communities. Through much my work I have enjoyed fruitful collaborations with ecologists, theoreticians, and mathematical modelers that have resulted in the development of novel perspectives and analysis methods directed at understanding the organization of complex communities.

The involvement of undergraduate students is an essential component of my research. Much of my work is performed through teaching and providing experience to bright young students willing to learn about ecology in the tropics. I have worked extensively to generate funding opportunities for undergraduates as well as structured independent projects students can perform in the field with minimal supervision. As a result more than 10 students have been fully funded to spend the summer working on caterpillars in Ecuador and the experiences have been priceless.

My current work focuses on measuring species interactions and diversity on the eastern slope of the Andes mountains in Ecuador. This region of the upper Amazon basin contains the greatest diversity of insects on the planet and is a logical focal point for measuring diversity. As part of a collaborative effort involving scientists from more than five universities, I have sought to measure the diversity of interactions in plant-caterpillar-parasitoid systems at different elevations in the upper Amazon. This work involves working with indigenous people to rear caterpillars on their host plants and record their life stages and interactions with other species. As part of this project my collaborators have described more than 100 new species of insects and discovered what may end up being thousands of previously unrecorded interactions. My work has helped develop new quantitative approaches to the measurement of interaction diversity using species diversity indices. In addition, my students and I have documented reaction norms for caterpillar growth rates as they vary with elevation showing that climate change may have larger than expected effects on caterpillar population and consequently herbivory rates. This project, titled “Caterpillars and Parasitoids of the Eastern Andes in Ecuador” is one of the most extensive investigations of species interactions ever performed in the Amazon region.

My research is motivated by an interest in the organization and stability of communities and the interactions between populations and their environment. There are several questions that are of particular interest to me. What factors are important to the maintenance of biological diversity in different habitat types? What are the most meaningful temporal and spatial scales for measuring diversity? To what degree do populations fluctuate in nature and how does this vary among species and habitats? What are the effects of species interactions such as mutualisms on the stability and diversity of communities?

I have also worked to continue investigations of species diversity of adult Lepidoptera in the hyper diverse upper Amazon basin. To address some of these questions I have worked with P.J. DeVries to perform a 10 year spatially and temporally explicit monitoring program in Ecuador to measure diversity and relative abundance in a species rich butterfly community. In this study, the use of fruit-baited traps in the canopy and the understory have provided the most detailed information ever collected from a tropical butterfly fauna. This research program has provided novel insight for understanding the effects of disturbance and habitat type on observed species diversity and continues to provide a base of information for future comparisons as new studies are performed.

In my work on the Ecuadorian butterfly fauna I have also sought to explore the importance of temporal and spatial sampling scale for measuring diversity and understanding community dynamics. This work has also included an interest in understanding how microhabitat specialization is related to the long term variability of populations. These investigations have involved the use of several methods to evaluate the importance of vertical structure (canopy vs. understory) in butterfly communities, and the relationship between flight height and population variability. Through collaboration I have extended this work to include investigation of the effects of disturbance on vertical structure across several neo-tropical study sites.