

## **KEN KEEFOVER-RING PH.D.**

**POSTDOCTORAL RESEARCH ASSOCIATE**

**UMEÅ PLANT SCIENCE CENTRE**

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### **EDUCATION**

- Ph.D., Department of Ecology and Evolutionary Biology (EEB), University of Colorado, Boulder, CO, - May 2008 - Advisor: Prof. Yan B. Linhart
- Master of Arts, Department of Environmental, Population, and Organismic Biology, University of Colorado, Boulder, CO - May 2001 - Advisor: Prof. Yan B. Linhart
- Bachelor of Science, Department of Chemistry, Arizona State University, Tempe, AZ - December 1989
- Bachelor of Science, Double Major from Departments of Biochemistry and Biology, Minor from Department of Chemistry, Colorado State University, Fort Collins, CO - August 1987

### **TEACHING EXPERIENCE**

- May 25, 2011 - Instructor - Pollination and Herbivory - Umeå Plant Science Centre Ph.D. Zoology and Plant Physiology course
- May 18, 2011 - Instructor - Tree Resistance to Natural Enemies: Physiology, Ecology and Management - Swedish Agricultural University Ph.D. course, Alnarp, Sweden
- November 17, 2010 - Designed and led two day course - Introduction to Reversed Phase HPLC - Umeå Plant Science Centre
- Spring 2007 - Teaching assistant for biometry - EEB Dept., University of Colorado
- Fall 2006 - Teaching assistant for ecology - EEB Dept., University of Colorado
- Fall 2005 - Teaching assistant for conservation biology - EEB Dept., University of Colorado
- Fall 2004 - Teaching assistant for genetics - EEB Dept., University of Colorado

### **RESEARCH EXPERIENCE**

- Oct 2010 to present - Postdoctoral Research Associate to Dr. Benedicte Albrechtsen, Umeå Plant Science Centre, Dept. of Plant Physiology, University of Umeå, Umeå, Sweden. Phenolic glycoside chemistry of *Populus tremula* and *Salix sp.* in Sweden.
- July 2008 to present (currently part-time) - Postdoctoral Research Associate to Prof. Richard Lindroth, Dept. of Entomology - University of Wisconsin, Madison, WI - Chemical ecology of *Populus tremuloides* and yellow monkeyflower, *Mimulus guttatus*.
- July 2010 to Aug 2010 - Postdoctoral Research Associate to Prof. Johanne Burnet - Dept. of Entomology, University of Wisconsin, Madison, WI - Floral volatiles of Colorado columbine, *Aquilegia caerulea*.
- January 2008 to June 2008 - Research Assistant to Prof. Deane Bowers, EEB Dept., University of Colorado, Boulder, CO - Compound isolation. Development of HPLC and GC-MS methods for iridoid glycosides. Lab equipment repair and maintenance.
- August 2006 to December 2006 - Research Assistant for the University of Colorado Museum entomology collection. Curation and databasing of large grasshopper collection.

- November 2001 to August 2005 - Research Assistant to Prof. Yan Linhart, EEB Dept., University of Colorado, Boulder, CO – Coordination and execution of field, lab, and greenhouse work for an NSF grant concerning herbivory and competition in common thyme, *Thymus vulgaris* in Montpellier, France and Boulder, CO.
- June 2002 to May 2008 - Studied the chemical ecology of *Thymus vulgaris* in southern France and *Monarda fistulosa* and *M. pectinata* in Colorado.
- August 1998 to May 2001 - Master of Arts research - Field and lab work studying the terpenoid chemistry of ponderosa pine cones and a suite of specialist herbivores.
- September 1986 to August 1987 - Research assistant to Dr. Winslow Caughey, Department of Biochemistry, Colorado State University, Fort Collins, CO - Protein isolation and general lab work.

#### PROFESSIONAL WORK EXPERIENCE

- March 1999 to November 2001 - Analytical protein chemist for Baxter Hemoglobin Therapeutics, Boulder, CO - HPLC method development for quality control (QC) and stability testing of recombinant hemoglobin.
- November 1994 to July 1998 - Analytical chemist for Geneva Pharmaceuticals, Broomfield, CO - HPLC and GC method development for QC testing of small molecule pharmaceuticals.
- December 1987 to October 1993 – Aircraft interior development chemist for ICI/Fiberite, Tempe, AZ - Development of lightweight fire resistant composites for commercial aircraft. Resin formulation, and flammability and mechanical testing.

#### PEER-REVIEWED PUBLICATIONS

**Keefover-Ring, K.** In review. Making scents of defense: Larval fecal shield terpenes and herbivore-caused volatiles reflect aromatic host plant chemistry. *Journal of Chemical Ecology*

**Keefover-Ring, K.** and Y.B. Linhart. 2010. Variable chemistry and herbivory of ponderosa pine cones. *International Journal of Plant Sciences* 171(3): 293-302

**Keefover-Ring, K.**, J.D. Thompson, and Y.B. Linhart. 2009. Beyond six scents: Defining a seventh *Thymus vulgaris* chemotype new to southern France by ethanol extraction. *Flavour and Fragrance Journal* 24: 117-122

Groendahl, E., B.K. Ehlers, and **K. Keefover-Ring**. 2008. New *cis*-sabinene hydrate chemotype detected in large thyme (*Thymus pulegioides* L.) growing wild in Denmark. *Journal of Essential Oil Research* 20: 40-41

Thompson, J.D., P. Gauthier, J. Amiot, B.K. Ehlers, C. Collin, J. Fossat, V. Barrios, F. Arnaud-Miramont, **K. Keefover-Ring**, and Y.B. Linhart. 2007. Ongoing adaptation to Mediterranean climate extremes in a chemically polymorphic plant. *Ecological Monographs* 77(3): 421-439

Linhart, Y.B., **K. Keefover-Ring**, K.A. Mooney, B. Breland, and J.D. Thompson. 2005. A chemical polymorphism in a multi-trophic setting: Thyme monoterpene composition and food web structure. *American Naturalist* 166(4): 517-529

**MANUSCRIPTS IN PREPARATION**

**Keefover-Ring, K.**, J.D. Thompson, and Y.B. Linhart. Saving thyme in a bottle: Floral and foliar volatiles of *Thymus vulgaris*. (For Journal of Chemical Ecology)

**Keefover-Ring, K.**, J.D. Thompson, and Y.B. Linhart. Scents and sensibilities: The role of pollination in thyme essential oil polymorphism. (For Ecology)

**Keefover-Ring, K.** Beetle versus bergamot: Insights into the chemical arms race. (For Biochemical Systematics and Ecology)

**Keefover-Ring, K.**, K. Rupert-Nason, A.E. Bennett, and R.L. Lindroth. Responses of trembling aspen to simulated browsing and application of ungulate saliva. (For Oecologia)

Holeski, L. M., **K. Keefover-Ring**, Z.T. HarnEnz, M.D. Bowers, and R.L. Lindroth. Patterns of variation in phytochemical defenses of *Mimulus guttatus*. (For Journal of Evolutionary Biology)

**GRANTS AND AWARDS**

- Carl Tryggers Research Fellowship, Sweden - 2010 - \$69,300
- Bourse Chateaubriand International Fellowship, France \$15,600 - Fall 2008 - Declined
- University of Colorado EEB Departmental Graduate Fellowship - Fall 2007 - \$12,000
- NSF Doctoral Dissertation Improvement Grant - 2006 - \$7,921
- University of Colorado EEB Departmental Grant - 2006 - \$500
- Sigma Xi Research Grant - 2006 - \$700
- John Marr Fund - 2006 - \$1,000
- University of Colorado EEB Departmental Grant - 2005 - \$1,435
- Colorado Native Plant Society. 2003. \$325
- Walker Van Riper Fund, University of Colorado Museum - 2003 - \$761
- Colorado Mountain Club Foundation - 1999 - \$600
- US Patent #5,418,050 - 1995 - **Keefover-Ring, K.**, G.T. Geisendorfer, and H.A. Yap, Light-weight impact resistant polyaramid fiber fire/heat barrier laminates for commercial aircraft cargo bays. ICI/Fiberite Composites Inc.

**INVITED PEER REVIEWS**

- Annals of Botany
- Insect Biochemistry and Molecular Biology
- International Journal of Molecular Sciences
- NSF
- Oecologia
- Plant and Soil
- Plant Foods for Human Nutrition

**PRESENTATIONS**Posters

- Salicinoids in *Populus tremula* and Herbivore Resistance - Swedish Foundation for Strategic Research (SSF) programme conference: Strategic areas in the life sciences - October 4-5, 2011 - Johannesbergs Castle, Sweden

- Identity and Natural Variation of Secondary Compounds in Yellow Monkeyflower, *Mimulus guttatus* - Gordon Conference on Plant-Herbivore Interaction - February 21-26, 2010 - Galveston, TX
- Flaunting Fragrant Frass: The Chemical Ecology of *Physonota unipunctata* and its Host Plant *Monarda fistulosa* - Gordon Conference on Plant-Herbivore Interaction - February 18-23, 2007 - Ventura, CA
- Geographic, Temporal and Anatomic Variation in Monoterpene Chemistry of *Monarda fistulosa* in Colorado - Gordon Conference on Plant-Herbivore Interaction - February 29 to March 5, 2004 - Ventura, CA

### Oral presentations

#### **2011**

- Responses of Trembling Aspen to Simulated Browsing and Application of Ungulate Saliva - Ecological Society of America 96<sup>th</sup> annual meeting - August 9, 2011 - Austin, TX  
<http://eco.confex.com/eco/2011/webprogram/Paper32230.html>

#### **2010**

- Scents and Sensibilities: The Role of Pollination in Thyme Essential Oil Polymorphism Invited talk to the University of Hawaii at Manoa - November 12, 2010 - Honolulu, HI
- Scents and Sensibilities: The Role of Pollination in Thyme Essential Oil Polymorphism Invited talk to the University of California at Irvine - April 30, 2010 - Irvine, CA

#### **2008**

- One Chemistry, Two Continents: Maintenance and Function of Chemical Polymorphism in the Mint Family - Evolution Seminar Series - October 16, 2008 - University of Wisconsin at Madison

#### **2007**

- Chemical Warfare in Colorado: Beetles versus Bergamot - Invited talk to the Colorado Native Plant Society 2007 annual conference - September 8, 2008 - Boulder, CO
- One Chemistry, Two Continents: Maintenance and Function of Chemical Polymorphism in the Mint Family - Public presentation of Ph.D. dissertation research - September 7, 2008 - University of Colorado at Boulder
- Chemical Warfare in Colorado: Beetles versus Bergamot - Invited talk to Café Botanique at the Denver Botanical Gardens - July 5, 2007 - Denver, CO
- The Other Chemicals: Plant Secondary Compounds - Invited talk to Nutritional Ecology - April 13, 2007 - University of Colorado at Boulder

#### **2006**

- A Chemical Polymorphism in Thyme and Space - Invited talk to University of Colorado Biology Club - December 7, 2006

#### **2005**

- The Terpenes - Invited talk to graduate seminar in chemical ecology - September 19, 2005 - University of Colorado at Boulder
- Flaunting Fragrant Frass: *Physonota unipunctata* (Chrysomelidae) fecal shield and host plant chemistry - Guild of Rocky Mountain Ecology and Evolutionary Biologists (GREEBS) - September 18, 2005 - University of Colorado Mountain Research Station
- Variation in Plant Secondary Chemistry - University of Colorado EEB Dept. Brown Bag Series - September 16, 2005

#### **2004**

- The Chemical Ecology of Monarda on Open Space and Mountain Parks (OSMP) Lands and Beyond - Invited talk to City of Boulder OSMP - December 15, 2004 - Boulder, CO
- Quest for the Holy Geraniol - University of Colorado EEB Dept. Brown Bag Series - November 17, 2004

- Plants Terpenes: The Spice of Life - Invited talk to EBIO 2590 Plants and Society - September 29, 2004 - University of Colorado at Boulder
- Plants Making Scents: Labiate Volatile Emissions and Pollination - GREESBS - September 2004 - University of Colorado Mountain Research Station
- Terpene Polymorphisms in Mints - EBIO 2070 Genetics - Fall 2004 - University of Colorado at Boulder

**2003**

- Monoterpene Chemistry of *Monarda* in Colorado - University of Colorado EEB Dept. Brown Bag Series - November 10, 2003
- Chemotype Distribution of *Monarda fistulosa* in Colorado - Guild of Rocky Mountain Population Biologists (GRMBPS) - September 20, 2003 - University of Colorado Mountain Research Station

**2002**

- Variation in Chemistry and Herbivory of Ponderosa Pine Seed Cones in Colorado - Ecological Society of America 87<sup>th</sup> annual meeting - August 7, 2002 - Tucson, AZ
- Monoterpene Polymorphism in *Monarda fistulosa* - Plant Animal Interaction group - November 25, 2002 - University of Colorado at Boulder
- Evolution of Terpene Synthases - Evolutionary biology course - April 23, 2002 - University of Colorado at Boulder

**SERVICE WORK**

- July 2005 to October 2009 - Board of Directors member for Prairie Preservation Alliance - A Broomfield, CO based non-profit advocating for prairie protection in Colorado.
- November 1994 to January 2004 - Served on the Board of Directors for Sinapu - A Boulder, CO based non-profit dedicated to the protection and restoration of native carnivores in the Southern Rockies.

**RECOMMENDER CONTACT INFORMATION**

Dr. Yan B. Linhart  
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El Cerrito, CA 94530 U.S.A.  
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Boulder, CO, 80309 U.S.A.  
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