Contents

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Foreword

Edward O. Wilson

This book devoted to the many dimensions of ant ecology has been delivered at the right time. The number of biologists who include ants in their research, especially in ecology and sociobiology, and thus the overall capability of research, is rising swiftly. So is the number of myrmecologists, those who study ants as their primary objective. So numerous have these researchers become, and such is the high overall quality of their work, that myrmecology is poised to take its place among such more immediately recognizable taxon-defined disciplines as ornithology, herpetology, and nematology. Myrmecology can be properly regarded as a part of entomology, but is no longer subordinate to it.

When I began my own studies on ants as a teenager, in 1946, there were fewer than a dozen myrmecologists in the United States actively publishing, not including narrowly focused economic entomologists. There were two in South America, and several more each in Europe, Australia, and Asia. Today the number worldwide is in the hundreds, and rising steeply. As the surviving myrmecologist with the longest continuous track record of research (65 years), I have recently, at last stopped trying to keep up with all of the literature. If I and a few other old timers can be said to have been carrying the torch of myrmecology, I am happy to have it wrested from our grasp and hurried forward.

There are compelling additional reasons why the discipline should continue to grow and take its place among the prominent biological sciences. Ants make up most of the insect biomass, and they weigh more than all the land vertebrates combined save human beings. In part they have accomplished this feat by elaborate symbioses, including, variously among species sapsucker herds, ant-plant associations, arboreal ant gardens, elaiosome-mediated seed dispersal, and fungus gardens. In some species, most notably the *Oecophylla* weaver ants and leafcutter garden ants, we find the most elaborate nonhuman systems of communication and division of labor. Their systems are rivaled only by those of the apine bees and macrotermitine mound-building termites.

The communication systems have shown us to what degree it is possible for pheromone communication to evolve, and what its ultimate limitations may be, on this or perhaps any other planet. By studying self-organization as simple colonies evolve into superorganisms, myrmecologists have made important advances in defining the process of group selection. They have disclosed some of the true nature of emergent traits during the emergence of new levels of biological organizations.

Yet while the scientific natural history of ants has grown to maturity during the past two centuries of research, telling us much about basic habits and the life cycles of hundreds of species, and while the past half century has added a great deal of information about how ant colonies are put together, myrmecologists have only begun to explore the ecology of ants. We understand little of the environmental factors that shaped the social adaptations of these insects, how assemblages of species have evolved as an evolutionary product. We have only begun to explore the full impact of ants on the natural ecosystems of the planet and those they share with humanity.

The authors of the present volume have made an important contribution by summarizing much of what we have learned about the ecology of ants and by suggesting the shape of what is to come.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Preface

From scorching, barren deserts to humid tropical forests, from deep in the soil to high in the tree canopies, ants are everywhere! Their near-ubiquitous occurrence on every continent except Antarctica, combined with their enormous abundance and high diversity make ants deserved of special attention.

Ants are one of the few insect groups that can be reliably identified to family by just about anyone, regardless of age or background. They are the wise and hard-working creatures of biblical and fable lore, the endearing underdogs of Hollywood animation to some (and exaggerated villains of B-grade films to others), the unwitting victims of children with magnifying glasses, and the unwanted guests of picnics. Politicians, economists, and traffic planners are among the non-biologists who have mined ant society structure for potential application to human behaviour. Understanding of ant behaviour and collective intelligence has contributed to advances in robot development, computer science, telecommunication networks, and the stock market.

To myrmecologists – those who study ants – ants are the 'premier soil turners, channelers of energy, and dominatrices of the insect fauna' (Hölldobler and Wilson 1990). Indeed, it would be difficult to overstate the importance of ants in the functioning of terrestrial ecosystems. Estimated to number between 25,000 and 30,000 species, currently just more than 12,500 ant species are described, accounting for less than 1% of all described insect species (Bolton *et al*. 2006; May 1988). Despite their relatively small contribution to overall global biodiversity, they are omnipresent in virtually every terrestrial habitat. The estimated 10,000 trillion individual ants alive at any one time weigh about as much as all human beings combined (Hölldobler and Wilson 1994). Sustaining and sheltering their sheer numbers dictates that ants engage in a variety of ecological roles: competitors, predators, prey, scavengers, mutualists, gardeners, and soil engineers.

In their need for food and shelter, they are like any other organism on the planet. But as eusocial organisms, ants have evolved to partition reproduction and resource acquisition among different individuals. This division of labour has dramatic consequences for the ecology of ants. With the exception of colony-founding events, queens stay in protected nest enclaves with the sole purpose of producing eggs. The workers are responsible for foraging, maintaining and defending the colony, and only very rarely reproduce. Since a single worker is only one of many that undertakes these tasks and does not represent a reproductive unit, its survival is not integral to the longevity of the colony. These observations were once thought 'fatal to' the theory of natural selection (Darwin 1859); how could worker ants evolve if they are incapable of reproducing? Recasting ants as 'superorganisms', and framing their social organization within the context of kin selection, where natural selection acts on the colony, and workers maximize colony efficiency in the absence of 'interindividual conflict for reproductive privilege', resolves this natural selection conundrum and goes a long way towards explaining why eusocial insects have been so successful: organized groups outcompete individuals, and larger groups outcompete smaller ones of the same species (Hölldobler and Wilson 2008).

Thus, in ecology the importance of ants is reflected by their ubiquity and the great number of interactions in which they are capable of participating within an ecological community. As such, the study of ants has led to significant advances in our understanding of insect evolution, global diversity patterns, competitive interactions, mutualisms, ecosystem responses to change, and biological invasions. But ants are also important to study and

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

understand because they are different; their status as superorganisms places them at a level of organization between individuals and ecosystems (Hölldobler and Wilson 2008). Their social structure provides a rich ground for exploring how division of labour affects the acquisition of resources, foraging and defensive behaviours, and coevolution with the flora and fauna with which they interact. In turn, how elements of their social structure, such as colony founding, caste differentiation, and nestmate recognition, are influenced by their environment deserves investigation.

Why *Ant Ecology?*

Several excellent texts have described the social organization and evolution of social insect societies (e.g., Bourke and Franks 1995; Crozier and Pamilo 1996; Gordon 1999; Hölldobler and Wilson 1990). Our purpose in compiling this book was fourfold: to complement and build on these fundamental works, to highlight the contributions of myrmecology to ecology more broadly, to synthesize the current state of knowledge, and to add to the growing body of work that seeks to promote interest in insects both among ecologists and in the world of conservation. We also seek to inspire current and future myrmecologists to seize the opportunities presented by the gaps in research that are identified throughout the book. We hope that this volume will appeal to community and behavioural ecologists, population biologists, macroecologists, evolutionary biologists, as well as those involved with conservation and natural resource management.

Ecology is not a linearly structured science; it is as complex and interconnected as the world that it seeks to understand. Ant ecology is no different. Thus, although we have organized the book into four parts: Global Ant Diversity and Conservation, Community Dynamics, Population Ecology, and Invasive Ants, the boundaries between them blur and blend. Each section begins with a brief introduction that identifies common themes and defines terms applicable to the subsequent four chapters. The first three sections provide a firm foundation in ant ecology, while the fourth applies this foundation to the problem of ant invasions. Interspersed throughout the book are short boxes that further explain important techniques, terms, or methods, or highlight an interesting discovery, debate, or application relevant to the chapter. A notable strength of the book is that it draws on the knowledge and experience of so many myrmecologists and ecologists; 53 authors and 55 reviewers from around the world have contributed their ideas, time, and energy to the pages that follow.

Acknowledgements

Ant Ecology was conceived in boundless enthusiasm at the seaside café Chocolate Fish in Wellington, New Zealand, on 30 August 2006. Since then many individuals have helped and supported us through the process of turning our ambitious proposal into this tangible volume.

We are extremely grateful to Ian Sherman, Helen Eaton, and Elmandi Du Toit from Oxford University Press for providing guidance, advice, and feedback at crucial times and for always being so encouraging of this project. Thank you for putting this book on your portfolio for 2009.

We are most indebted to our authors, who joined us in this journey and remained committed and patient with us throughout. Edited volumes such as this benefit from the variety of perspectives brought to the project by each author, and the creativity of each contributor in describing his or her own part of this amazing scientific discipline. Many authors contributed to the terms and definitions in the glossary, and we thank them for their diligence.

The dazzling array of weird and wonderful ants and their fascinating biologies are brought to life through images supplied by Alex Wild. We sincerely thank you for such superb photographs. We thank Andrew Mercer for providing the domain (www.funkyant.com) that hosted all the *Ant Ecology* emails, and Pat Lach for her incredible patience and hard work in compiling the reference list. We are very grateful to Adam Beaumont, Dan Borg, Stephanie Chapple, Natalie Funtera, Jeremy Gibson, Courtney Johnson, Emily McGuire, Mike Parr, and Amber Tritt who put in some long hours proofreading, commenting on chapters and text boxes, and providing us with non-myrmecologists' perspectives on it all.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Each chapter and box was improved with comments from multiple peer reviews. We are indebted to the following colleagues for their constructive feedback: Donat Agosti, Craig Allen, Leeanne Alonso, Inge Armbrecht, Alan Andersen, Nico Blüthgen, Barry Bolton, Koos Boomsma, Raphael Boulay, Seán Brady, Chris Burwell, Steven Chown, Cameron Currie, Robert Cowie, Jacques Delabie, Claire Detrain, Anna Dornhaus, Bart Drees, Karl Evans, Don Feener, Patricia Folgarait, Deborah Gordon, Aaron Gove, Wulfila Gronenberg, Richard Harris, Jürgen Heinze, Joan Herbers, Bob Johnson, Adam Kay, David Keith, Laurent Keller, Paul Krushelnycky, Phil Lester, Jack Longino, Jonathan Majer, Melodie McGeoch, Lloyd Morrison, Tim New, Dennis O 'Dowd, Paulo Oliveira, Jes Pedersen, Stacy Philpott, Scott Powell, Tom Richardson, Alexei Rowles, Ted Schultz, Steve Shattuck, Dan Simberloff, Roy Snelling, Andy Suarez, Melissa Thomas, Chad Tillberg, John Vandermeer, Heraldo Vasconcelos, Darren Ward, Phil Ward, Seike Yamane, and Alan Yen, as well as those who preferred to remain anonymous. We are also grateful to Alan Andersen, Mike Kaspari, Dennis O 'Dowd, and multiple anonymous reviewers of our initial proposal for their ideas and encouragement.

Lori thanks Richard Hobbs and Viki Cramer for advice on book editing and all members of the Hobbs lab for their support. She is ever grateful to Manfred, Sydney, and Mom for the many manifestations of their encouragement, support, and inspiration. Lori was partially funded by the Australian Research Council.

Kate is extremely grateful to Richard for his patience during the many evenings at the computer and for nourishing, supporting, and inspiring her on this long endeavour. The Trapnell Fund provided funds to Kate.

Kirsti wishes to thank Katie Barnett and Charlotte Malycon for discussions on the etiquette and technicalities of publishing. Kirsti could not have been a part of the project if it were not for the support of Jeremy, Toni, Carol, and Mum, creating time where there was none, and allowing her the time away from parenting when it was most needed.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

List of Contributors

Kirsti L. Abbott Faculty of Science, Monash University 3800, VIC, Australia.
Email: Kirsti.Abbott@sci.monash.edu.au

Leeanne E. Alonso Rapid Assessment Program, Conservation International, 2011 Crystal Drive, Suite 500, Arlington, VA 22202, USA.
Email: l.alonso@conservation.org

Alan N. Andersen Tropical Ecosystems Research Centre, CSIRO Sustainable Ecosystems, PMB 44, Winnellie 0822, NT, Australia.
Email: Alan.Andersen@csiro.au

Inge Armbrecht Universidad del Valle, Departamento de Biología, Apartado Aéreo 25360, Cali, Colombia.
Email: inge@univalle.edu.co

Andrew J. Beattie Department of Biological Sciences, Macquarie University, 2109, NSW, Australia.
Email: abeattie@bio.mq.edu.au

Brandon T. Bestelmeyer USDA-ARS Jornada Experimental Range, New Mexico State University, Las Cruces, NM 88003, USA.
Email: bbestelm@nmsu.edu

Nico Blüthgen Department of Animal Ecology & Tropical Biology, University of Würzburg, Biozentrum, Am Hubland, 97074 Würzburg, Germany.
Email: bluethgen@biozentrum.uni-wuerzburg.de

Keith Christian School of Environmental and Life Sciences, Charles Darwin University, Darwin 0909, NT, Australia.
Email: keith.christian@cdu.edu.au

Ross H. Crozier School of Marine and Tropical Biology, James Cook University, DB23, Townsville 4811, QLD, Australia.
Email: Ross.Crozier@jcu.edu.au

Peter Davis Department of Agriculture and Food Western Australia, South Perth 6151, WA, Australia.
Email: pdavis@agric.wa.gov.au

Patrizia d'Ettorre Centre for Social Evolution, Department of Biology, Universitesparken 15, DK-2100, Copenhagen, Denmark.
Email: PDettorre@bi.ku.dk

Anna Dornhaus Department of Ecology and Evolutionary Biology, University of Arizona, P.O. Box 210088, Tucson, AZ 85721, USA.
Email: dornhaus@email.arizona.edu

Robert R. Dunn Department of Biology, North Carolina State University, Raleigh, NC 27695–7617, USA.
Email: Rob_Dunn@ncsu.edu

Christine Errard Domaine des Blaines F-36350 La Pérouille, France.
Email: christine.errard@wanadoo.fr

Heike Feldhaar Behavioural Biology, University of Osnabrück. Barbarastr. 11 49076 Osnabrück, Germany.
Email: feldhaar@biologie.uni-osnabrueck.de

Brian L. Fisher Entomology, California Academy of Sciences, 55 Music Concourse Drive, San Francisco, CA 94118, USA.
Email: bfisher@calacademy.org

Heloise Gibb Department of Zoology, La Trobe University, Bundoora 3086, VIC, Australia.
Email: h.gibb@latrobe.edu.au

Peter T. Green Department of Botany, La Trobe University, Bundoora 3086, VIC, Australia.
Email: p.green@latrobe.edu.au

Benoit Guénard Department of Biology. North Carolina State University, Raleigh. NC 27695–7617, USA.
Email: zeroben@gmail.com

Benjamin D. Hoffmann Tropical Ecosystems Research Centre, CSIRO Sustainable Ecosystems, PMB 44, Winnellie 0822, NT, Australia.
Email: Ben.Hoffmann@csiro.au

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

David A. Holway Ecology, Behaviour & Evolution, University of California San Diego, Division of Biological Sciences, 9500 Gilman Drive, La Jolla, CA 92093–0116, USA.
Email: dholway@biomail.ucsd.edu

Linda M. Hooper-Bùi Department of Entomology, Louisiana State University, Baton Rouge, LA 70803, USA.
Email: LHooper@agcenter.lsu.edu

Paul D. Krushelnycky U.S. Geological Survey, Pacific Island Ecosystems Research Center, Haleakala Field Station P.O. Box 369, Makawao, HI 96768 USA.
And
Department of Plant and Environmental Protection Sciences, 3050 Maile Way, Gilmore 310, University of Hawai'i, Honolulu, HI 96822, USA.
Email: pauldk@hawai'i.edu

Lori Lach School of Plant Biology, M084
The University of Western Australia
35 Stirling Highway, Crawley, WA 6009, Australia.
Email: lorilach@cyllene.uwa.edu.au

Edward G. LeBrun Brackenridge Field Laboratory, University of Texas at Austin, Austin, TX 78703, USA.
Email: elebrun@mail.texas.edu

Alain Lenoir IRBI, UMR CNRS 6035, Institut de Recherche sur la Biologie de l 'Insecte, Université François Rabelais, Tours, France.
Email: alain.lenoir@univ-tours.fr

Terrence P. McGlynn Department of Biology, California State University Dominguez Hills, 1000 E. Victoria St., Carson, CA 90747, USA.
Email: terry.mcglynn@gmail.com

Mathieu Molet Laboratoire Ecologie et Evolution, CNRS UMR 7625, Université Pierre-et-Marie Curie, 7 quai Saint Bernard, 75005 Paris, France.
Email: mathieu.molet@snv.jussieu.fr

Kailen Mooney Department of Ecology & Evolutionary Biology, University of California, 321 Steinhaus Hall, Irvine, CA 92697–2525, USA.
Email: mooneyk@uci.edu

Joshua Ness Biology Department, Skidmore College, 815 North Broadway, Saratoga Springs, NY 12866, USA.
Email: jness@skidmore.edu

Simon O 'Connor Ministry of Agriculture & Forestry, Biosecurity New Zealand, PO Box 2526, Wellington, New Zealand.
Email: simon.oconnor@maf.govt.nz

Dennis J. O 'Dowd Australian Centre for Biodiversity, School of Biological Sciences, Monash University 3800, VIC, Australia.
Email: dennis.odowd@sci.monash.edu.au

Catherine L. Parr Environmental Change Institute, School of Geography and the Environment, University of Oxford, South Parks Road, Oxford, OX1 3QY, UK.
Email: kate.parr@ouce.ox.ac.uk

Christian Peeters Laboratoire Ecologie et Evolution, CNRS UMR 7625, Université Pierre-et-Marie Curie, 7 quai Saint Bernard, 75005 Paris, France.
Email: christian.peeters@snv.jussieu.fr

Renkang Peng School of Environmental and Life Sciences, Charles Darwin University, Darwin 0909, NT, Australia.
Email: renkang.peng@cdu.edu.au

Ivette Perfecto School of Natural Resources and Environment, University of Michigan, MI 48109–1041, USA.
Email: perfecto@umich.edu

Stacy M. Philpott Department of Environmental Sciences, University of Toledo, Toledo, OH 43606–3390, USA.
Email: stacy.philpott@utoledo.edu

Scott Powell Department of Biology, University of Missouri–St Louis, One University Boulevard, Saint Louis, MO 63121–4499, USA.
And
Universidade Federal de Uberlândia, Brazil, Campus Umauarama Bloco 2D-sala 28, 38400–902 Uberlandia MG, Brazil.
Email: scottpowell@mac.com

Leticia Rios-Casanova Facultad de Estudios Superiores-Iztacala (UBIPRO). Universidad Nacional Autónoma de México Av. de los Barrios 1, Tlalnepantla 54090, Estado de México, México.
Email: leticiarc@campus.iztacala.unam.mx

Simon Robson School of Marine & Tropical Biology, James Cook University, Townsville 4811, QLD, Australia.
Email: simon.robson@jcu.edu.au

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Nathan J. Sanders Department of Ecology & Evolutionary Biology, 569 Dabney Hall, University of Tennessee, Knoxville, TN 37996, USA.
Email: nsanders@utk.edu

Birgit C. Schlick-Steiner School of Marine and Tropical Biology, James Cook University, DB23, Townsville 4811 QLD, Australia.
And
Institute of Ecology, University of Innsbruck, Technikerstr. 25, A-6020 Innsbruck, Austria.
Email: birgit.schlick-steiner@uibk.ac.at

Ted R. Schultz Department of Entomology, Smithsonian Institution, P.O. Box 37012, NHB, CE516, MRC 188, Washington, D.C. 20013–7012, USA.
Email: schultzt@si.edu

Joseph C. Spagna William Paterson University of New Jersey, 300 Pompton Rd., Wayne, NJ 07470, USA.
Email: spagnaj@wpunj.edu

Florian M. Steiner School of Marine and Tropical Biology, James Cook University, Townsville 4811 QLD, Australia.
And
Institute of Ecology, University of Innsbruck, Technikerstr. 25, A-6020 Innsbruck, Austria.
Email: florian.m.steiner@uibk.ac.at

Andrew V. Suarez Department of Entomology and Department of Animal Biology, School of Integrative Biology, University of Illinois at Urbana-Champaign, 505 S. Goodwin Ave., Urbana, IL 61801, USA.
Email: avsuarez@life.uiuc.edu

Robert W. Taylor 26 Ambalindum Drive, Hawker 2614, ACT, Australia.
Email: bob.taylor@homemail.com.au

Chadwick V. Tillberg Department of Biology, Linfield College, 900 S.E. Baker St., McMinnville, OR 97128, USA.
Email: ctillbe@linfield.edu

Neil D. Tsutsui Department of Environmental Science, Policy & Management, University of California-Berkeley, 137 Mulford Hall, MC3114, Berkeley, CA 94720–3114, USA.
Email: ntsutsui@nature.berkeley.edu

Philip S. Ward Department of Entomology and Center for Population Biology, University of California at Davis, Davis, CA 95616, USA.
Email: psward@ucdavis.edu

Michael D. Weiser Department of Biology, North Carolina State University, Raleigh, NC 27695, USA.
Email: mdweiser@ncsu.edu

Grant P. Weston Ministry of Agriculture and Forestry, Biosecurity New Zealand, Auckland – Biosecurity Centre, PO Box 53–066, Auckland, 2150, New Zealand.
Email: westong@maf.govt.nz

Stephen P. Yanoviak Department of Biology, University of Arkansas at Little Rock, 2801 S. University Ave., Little Rock, AR 72204–1099, USA.
Email: spyanoviak@ualr.edu

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

List of Plates

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Glossary

active constituent: A chemical in a bait matrix that mediates ant control; includes direct toxins and juvenile hormone analogues.

aculeate wasps: A group of wasps in which the egg-laying ovipositor has been modified to form a sting; most closely related group to ants.

adaptive management: A natural resource management approach that incorporates systematic experimentation and monitoring to compare alternative management actions and update these actions accordingly.

agricultural intensification: generally associated with crop specialization, increasing mechanization, and generalized use of agrochemicals and other external inputs in the crop field.

agroforestry: Agricultural systems incorporating trees.

alate: Winged reproductive; can refer to either queens or males.

allometry: A non-linear scaling relationship between the size of an organism and the size of any of its body parts. For example, head width increases more than leg length as body size increases. The opposite is isometry, where proportions between body parts stay constant across a range of body sizes.

altruism: Lifetime improvement of a beneficiary's reproductive success at the expense of the lifetime reproductive success of the altruist.

ant garden: Ant nest consisting of epiphytic plants that profit from the association with the ants.

ant mosaics: Spatial patchworks of two or more dominant ant species that have non-overlapping territories.

antennation: Investigation of an encountered ant with the antennae; the interaction allows nestmate recognition at contact or at very short distance.

arboreal ants: Ants that live and forage above the ground in trees and other vegetation.

assemblage: A taxonomic subset of a community.

bait matrix: Substance in which active constituents are delivered to ants. Matrices can be liquid (predominantly water, but sometimes other attractive substances such as sugar or honey) or solid (typically corn grit or fishmeal).

Bergmann's rule: The hypothesis that size of individuals (or for social organisms, colonies) increases with elevation and latitude.

biodiversity: Variation in life on Earth at all levels of biological organization (genetic, species, ecosystem).

biodiversity hotspot: An area of significant biodiversity containing at least 0.5% or 1,500 species of global vascular plants as endemics, and having lost at least 70% of its primary vegetation (see: www.conservation.org). Recently Conservation International has included areas of high irreplaceability but low vulnerability as hotspots.

biogeography: Study of the distribution of biodiversity in space and time, and includes physiological, morphological, and genetic perspectives.

bioregion: See **ecoregion.**

bivouac: Temporary nest structure formed by army and driver ants. The structure consists of a mass of tightly locked individuals that protects the queen and the larvae within it.

brachypterous queen: Queen with short wings that are ineffective for flying.

brood: Immature ant individuals, including eggs, all larval stages and pupae.

budding: A synonym for **dependent colony foundation**, originally meant for polygynous species whose nests remain interconnected; often used interchangeably with the term fission.

carton nest: Nest structures built actively by ants from different substrates such as detritus, earth, plant-fibres or trichomes, or silk collected from spiders.

caste: A group of female individuals distinguished from another group within the colony, by

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

function or morphology. See also **functional caste definition** and **morphological caste definition**.

caste determination: The process by which embryological development of a female ant is determined as either worker or queen; also see **genetic caste determination, environmental caste determination**, and **hybridization-mediated caste determination**.

central place foraging: A means of collecting food in which the forager returns to a central place to deliver food (e.g. in nesting birds or in most social insects).

cheater: A species that takes advantage of one or more benefits exchanged between two mutualists at a cost to one or both of the mutualists.

chemical insignificance: Absence or low quantities of cuticular hydrocarbons that allows acceptance in a social insect colony; characteristic of newly emerged individuals and of some social parasites.

clade: A monophyletic group; a group of biological taxa that includes a single common ancestor and all its descendants.

claustral: A mode of independent colony foundation in which the queen has sufficient metabolic reserves to raise her first brood of workers without a need to forage outside the nest.

cognitive map: A map-like representation of spatial locations stored in the brain.

colony: Eusocial society of cooperating individuals of the same ant species.

colony closure: Inaccessibility of a colony to organisms other than members of the colony.

colony fusion: Merging of two mature colonies into one.

colony odour: The colony specific blend of nonvolatile substances (mostly hydrocarbons) found on the cuticle of individuals and shared among all colony members.

colony size: Number of individuals in a colony, mainly depending on the number of workers in the colony.

colony structure: The caste, demographic, genealogical, and spatial make-up of a colony.

community: Interacting, coexisting assemblages of organisms.

co-occurrence analysis: A method for testing for non-random patterns of species occurrences.

correlated random walk: A random walk (an individual turns by a random angle after each step of a given distance), with the added aspect that turning angles are normally distributed around the previous direction of the movement.

crown group ants: Clade composed of the most recent common ancestor of all living ants and their descendants.

cue: A trait that can be used in communication to extract relevant information although it has not evolved for that purpose (see also **signal**).

cuticular hydrocarbons: Lipids found on the cuticle. In social insects, a blend of long-chain hydrocarbons forms the specific colony odour and play role in protecting against insects from desiccation and in communication.

deforestation: Removal of trees (sometimes complete extraction) from forested areas; usually by logging and/or burning.

dependent colony foundation (DCF): Initiation of a new colony by a group of nestmate queen(s) and workers that leave the maternal nest together; accordingly queens never go through a solitary stage; dispersal is on the ground and thus short ranged.

diaspore: A plant dispersal unit consisting of a seed plus any additional tissues.

diploid male vortex: Reduced allelic diversity in a population at the sex-determining locus (e.g. resulting from inbreeding and population size reduction); reduced heterozygosity at the locus increases production of nonviable, diploid males which reduces population growth rate and thus further reduces allelic diversity at the sex determining locus in the population.

discovery–dominance trade-off: The inverse relationship between the ability of a species to discover food and its ability to dominate resources (either behaviorally or numerically).

domain: The geometric area of interest, may be spatial (a mountain range, the globe, a continent) or temporal.

domatia: Plant structures including hollow thorns, stems, and leaf pouches in which colonies of ants reside.

dominance–impoverishment rule: A relationship between ant species richness and dominant species in a community. The fewer ant species in a local community, the more likely it is to be behaviourally dominated by one or two species with large, aggressive colonies. In many studies, however, the direction of this causality has been reversed, and emphasis has been placed on the effect dominants have on species richness, not vice versa.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

ecological gradient: A pattern, usually in richness, abundance, or body size, along an ecological axis. Common ecological axes are temperature, elevation, latitude, and net primary productivity.

ecoregion: A large unit of land or water containing geographically distinct communities associated with particular combinations of environmental conditions.

ecosystem engineers: Organisms that directly or indirectly modify ecosystem properties (e.g. the availability of resources for other species) by causing physical changes in biotic or abiotic material.

ecosystem services: Benefits humans derive from ecosystems, including provisioning services such as food and water, regulating services such as regulation of floods, drought, land degradation, and disease, supporting services such as soil formation and nutrient cycling and cultural services such as recreational, spiritual, religious, and other non-material benefits.

elaiosome: Lipid and protein-rich fleshy structures attached to seeds of many plants reliant upon ants for seed dispersal, consumed by many ant species.

endemic species: Species ecologically unique to a specifically defined place and not found elsewhere.

environmental caste determination: Exclusively non-genetic caste determination.

epigaeic ants: ground-active ants; forage primarily on the ground.

epigenetic: Changes in gene expression not involving changes in the underlying nucleotide sequence.

eradication: The intentional extirpation of geographically discrete populations of a species, irrespective of whether other discrete populations still remain within the landscape.

ergatoid queen: Under the functional caste definition, a queen with worker-like external morphology (permanently lacking wings and with a simplified mesosoma and fused sclerites); distinct from dealate queen, which is a winged queen that has shed her wings. A 'multi-purpose' ergatoid queen can either function as reproductive or perform worker-like sterile tasks, and is similar to workers in size. 'Sole-purpose' ergatoid queens function only as reproductives and may be similar to workers in size or extremely dimorphic. Identical with gamergate under the morphological caste definition.

ergatomorphic queen: see **ergatoid queen.**

eusociality: True sociality defined by reproductive division of labour between female castes, cooperative brood care, and the presence of workers of a later generation to the queen(s).

exotic species: species not native to an area of interest.

extent: The domain or scope of an analysis. For example an analysis of New World terrestrial latitudes (North and South America) has a scope of 148° of latitude (ranging from 55°S to ~83°N) or ~16,500 km (see also **grain**).

extinction: The death of every member of a population, an entire species or higher taxon from some area of interest.

extrafloral nectary: A structure on a plant that produces nectar in a location other than within a flower.

facultative polygyny: Polygyny that is not essential for a colony to remain viable. Colonies that display facultative polygyny can switch between monogyny and polygyny.

female calling: The emission, typically of pheromones, by a reproductive female in order to attract males to her.

fission: A synonym for dependent colony foundation, originally meant for monogynous species where colonies reproduce by dividing into two equal parts; often used interchangeably with the term budding.

fitness: The reproductive rate of a genotype.

food bodies: Lipid and protein-rich structures found on some species of plants; believed to have evolved in symbiotic interactions with ants.

formicoid: A well-supported clade that includes three widespread and species-rich ant subfamilies – Dolichoderinae, Formicinae, and Myrmicinae – as well as army ants and relatives (dorylomorphs), bulldog ants (Myrmeciinae), big-eyed arboreal ants (Pseudomyrmecinae), and a few other smaller groups.

functional caste definition: Definition of caste by role in the colony. Under the functional caste definition a queen is a mated individual laying both male- and female-destined eggs, independent of her external morphology, and a worker is an unmated individual that may lay male-destined eggs; compare with **morphological caste definition**.

functional monogyny: Presence of more than one mated female capable of reproduction in a colony, only one of which lays eggs.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

fungus garden: The cultivation of basidiomycete fungi as a food source by ants of the Attini tribe.

gamergate: A mated and egg-laying individual with worker-like external morphology; identical with ergatomorphic queen under the functional caste definition.

genetic caste determination: Caste determination encoded in nucleotide sequences; possibly modulated by environmental influences.

Gestalt model: Establishment of a common colony odour by sharing the recognition cues (by trophallaxis and/or allogrooming).

Gondwana: Also called Gondwanaland; southern hemisphere supercontinent in the Palaeozoic Era (248 to 545 Mya), formed with the break up of Pangaea; subsequent splitting resulted in the origins of the modern continents (Antarctica, South America, Africa, Australia-New Guinea) as well as Madagascar, New Zealand, the Arabian peninsula, and the Indian subcontinent.

grain: The resolution of an analysis, can range from 1 m^2 to 100 m^2 for local analyses of ant diversity up to 100 km^2 to 100,000 km^2 for regional or hemispheric scale analyses. Also see '**extent**'.

granary: A nest chamber in seed-harvesting ants in which the ants store plant seeds they have collected.

granivore: An organism that consumes seeds as a main food source.

group selection: Natural selection that works to the advantage of a group of not necessarily related individuals.

gyne: Broad term for a female reproductive; queens are functioning gynes.

habitat disturbance: Any event that removes biomass from a habitat.

habitat specialist: Species that can live and reproduce only in a particular type of habitat.

habitat transformation: Any event that reduces available resources or changes the microclimate or structure of a habitat.

haplodiploid: See **male haploidy**.

haplometrosis: Foundation of a new colony by a single queen.

honeydew: The carbohydrate-rich excreta of hemipterans that feed on plant sap, often collected and fed upon by ants.

hybridization-mediated caste-determination: Genetic caste determination in hybrids fixed in populations, workers bear the genomes of both parental species, but queens that of only one.

hypogaeic ants: Ants that forage and live underground.

inbreeding: Mating between related individuals.

inbreeding depression: Decreased population vitality in terms of growth, survival, or fecundity following inbreeding.

inclusive fitness: The fitness of an individual, taking into account not only that individual's own success in passing on genes to the next generation, but also the success of all its kin, that is, those bearing some portion of the same genotype; see also **kin selection** and **fitness**.

independent colony foundation (ICF): Initiation of a new colony by a solitary queen who raises her first brood of workers without the help of workers from the maternal nest, generally after dispersal flight and mating. See also claustral and non-claustral.

inquilinism: Extreme parasitic state where the parasitic species lacks a worker caste and is thus fully dependent on its host's workers to complete its life cycle.

insect growth regulator: Chemical used in ant baits that halts normal development of insects. They typically affect all stages of development including eggs, larvae, pupae, and adults. In reproductive individuals ovaries are compromised and production of eggs becomes limited or stops altogether. Includes juvenile hormone analogues.

integrated pest management (IPM): Pest control strategy that uses a range of complementary techniques to manage pest populations. It aims to also reduce reliance on chemicals. Techniques used include mechanical and physical devices, genetic, biological, and cultural control, as well as chemical control.

interspecific competition: Competition between and among individuals of different species.

intracolonial relatedness: Degree of average relatedness across all individuals of the colony; extreme values are 0.75 under monogyny–monandry and 0.0 in a spatially extensive supercolony.

intranidal: Within the nest.

intraspecific competition: Competition between individuals of the same species.

invasive: Those ant species that demonstrate ecological, environmental, or economic impacts.

invasive alien species: A species that has been introduced to an area and is invasive; distinct from alien, exotic, introduced, tramp, and other terms that only denote origin.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

IUCN Red List of Threatened Species: A list of taxa deemed threatened by IUCN criteria, it provides taxonomic, conservation status, and distribution information (http://www.iucnredlist.org).

juvenile hormone analogue: Synthetic version of a biological juvenile hormone. These hormones regulate many aspects of insect physiology. The juvenile hormone analogues used in ant baits most commonly halt development of workers before becoming adults (at various stages).

keystone species: A species whose impact on its community or ecosystem is disproportionately large relative to its abundance; also a species that regulates local species diversity in lower trophic levels.

kin selection: Natural selection mediated by interactions between relatives. Under Hamilton's formulation, an individual's fitness is divided into personal reproductive success and the effects of the individual on the reproductive success of others weighted by relatedness, a formulation under which reproductive self-sacrifice is selected for if the transmission of genes identical to genes in the altruist by relatives is increased sufficiently.

leaf litter: The layer of decaying leaves, rotting wood, and other organic material that accumulates on the ground, typically under woody vegetation.

macrogyne: The larger queen morph under queen dimorphism.

male aggregation: The mating arrangement whereby males from different nests assemble in a group for queens to join them for the purpose of insemination.

male haploidy: Genetic system in which males are haploid; in Hymenoptera this results from normal males arising from unfertilized eggs and females from fertilized ones. Males are thus a genetic subsample of their mother which results in a relatedness asymmetry in the colony. Generally seen as a synonym for haplodiploidy.

mesosoma: in the Apocrita, the fused thorax and first abdominal segment

metapleural gland: Gland on the alitrunk that is peculiar to ants, although not all ant species possess it. Produces and secretes antibiotics that can prevent the growth of bacteria and fungi on the ants and inside their nest.

microgyne: The smaller queen morph under queen dimorphism.

monandry: Mating of a queen with just one male.

monodomy: The use of a single nest by a colony. Serially monodomous colonies construct more than one nest but live in only one of them at a time.

monogyny: Possessing a single queen. Primary monogyny is monogyny resulting from haplometrosis. Secondary monogyny results from pleometrosis in which only one of the founding queens persists.

monophyletic: See **clade**.

morphological caste definition: Definition of caste under which a queen is morphologically distinguishable from a worker; not applicable to all ant species; to be distinguished from the **Functional caste definition**.

morphospecies: Species that are distinguished solely on the basis of appearance.

multicoloniality: Colony structure characterized by distinct colony and nest boundaries within a population.

multi-level selection: Selection operating at several levels including individual, patriline, matriline, nest, colony, and population.

mutualism: An interaction between two species that is mutually beneficial to the fitness of each. Obligate mutualisms are required for the persistence of a species, facultative mutualisms are not required for the persistence of a species.

myrmechophile: An organism that lives in association with ants.

myrmecochore: A plant that depends in whole or in part upon ants for seed dispersal.

myrmecochory: Ant dispersal of seeds.

myrmecophyte: A plant that permanently hosts a colony of ants in specialized domatia and usually provides food in the form of food bodies or extrafloral nectar.

natural enemy: A predator, parasite, parasitoid, pathogen, or herbivore adversely affecting the species or group of species being described.

nest: Dwelling of a colony.

nest chamber: Cavity within a nest, distinct from tunnels.

nest odour: Mixture of all substances found inside or at vicinity of the nest, including the colony odour, which allows orientation to and recognition of the nest.

nestmate recognition: Recognition of individuals of the same nest sharing a common colony odour allowing altruistic behaviours towards nestmates and discrimination and rejection of non-nestmates.

net diversification: The difference between the rate of extinction and the rate of speciation.

net primary productivity (NPP): A measure of the grams of carbon per unit area per unit time sequestered.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

non-claustral: Mode of independent colony foundation where the queen has limited metabolic reserves and needs to forage outside the nest regularly to feed her first brood of workers.

null models: Models that exclude some process of interest in order to consider the pattern expected in its absence. A null model of diversity along gradients is used to examine the pattern of diversity that would be expected in the absence of climatic drivers of diversity.

nutrient balance: Ratio of nutrients (e.g. carbohydrate–protein balance) contained in food. Food that is ingested that diverges from the optimum for an organism requires the excess nutrients to be excreted so that the balance is achieved.

nutritional upgrading: Enhancement of nutritional value of food sources by endosymbiotic bacteria either via recycling of excretions or production of higher quality nutrients from lower quality ones, e.g. production of essential amino acids from non-essential ones.

obligate polygyny: Polygyny that is necessary or essential for the species to ensure full viability and reproduction success of a colony.

oligogyny: A special case of polygyny in which colonies possess a low and limited number of queens that are intolerant of each other and frequently occupy different parts of the nest.

omnivore: A consumer feeding on both plant- and animal-based diets; a mixture of primary and secondary consumption.

parabiosis: Association of two or more ant species in the same nest, involves cooperation of the two colonies but separation of brood.

paraphyletic: A group of biological taxa that contains a common ancestor, but does not contain all descendents of that ancestor.

parataxonomist: A biodiversity collection and inventory specialist, usually recruited from local areas and trained by professional biologists, who typically collects specimens, prepares them and sorts them into morphospecies.

pest risk analysis (PRA): Combination of risk assessment and risk management for a particular pest threat. Pest Risk Analysis aims to directly link the severity of the risk to management objectives and priorities.

pheromone: A chemical substance (or a specific blend of substances) that mediates communication between members of the same species. By contrast, allelomones mediate communication between members of different species (and are further distinguished in allomones, kairomones, and synomones). Pheromones are called releasers if they trigger an immediate behavioural response in the receiver; and primers if they cause physiological changes in the receiver that can eventually result in a behavioural response.

phragmosis: Blocking of the entrance of the nest by a body part, usually the head; usually performed by a morphologically specialized worker subcaste.

phylogenetic diversity: A measure of biodiversity based on the length of evolutionary pathways that connect a given set of taxa (sum of the length of branches of a phylogeny).

phylogeny: The evolutionary development and history of a particular taxonomic group, usually a species or higher taxonomic grouping; constructed using molecular sequencing data and morphological data matrices.

physogastry: Enlargement of the gaster by stretching of the intersegmental membranes, allowing for increased ovarian activity.

pleometrosis: Foundation of a new colony by two or more cooperating queens.

polyandry: Mating of a queen with more than one male.

polydomy: The use of two or more spatially separated nests by one colony.

polyethism: Functional specialization of different workers of the colony leading to a division of labour among workers; may be as a function of age (age polyethism) or permanent, involving specializations of individuals over their entire adult life, sometimes but not always accompanied by morphological adaptation, see also **caste**.

polygyny: Possessing more than one queen, distinct from oligogyny in that several to very many queens mix freely within the nest. Primary polygyny results from pleiometrosis. Secondary polygyny develops from a colony founded by a single queen that later adopts other queens. Serial polygyny is a derived strategy under monogyny whereby after the queen's death she is replaced by a daughter-queen to avoid colony dissolution, resulting in temporary coexistence of worker offspring of different queens.

polymorphism: Substantial differences in the size and/or shape of non-gyne females in the same colony; see also **worker subcastes**.

population viscosity: A measure of the genetic isolation-by-distance effect across colonies of a population.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

post-pharyngeal gland: A gland positioned in the head, mainly found in Formicinae, that produces salivary secretions and functions as a reservoir of hydrocarbons that are shared between individuals by trophallaxis.

propaganda pheromone: A volatile substance used by social parasites to influence workers of a host ant colony.

proventriculus: Valve-like muscular and sclerotized structure separating the crop from the midgut. The proventriculus is important in ants feeding largely on liquids since it dams the efflux of liquid from the crop into the midgut and therefore allows storage of large volumes of liquid in the crop.

queen: A mated female reproductively active and able to produce offspring of both sexes; frequently queens differ in their external morphology from workers, mainly by wings, and by larger mesosoma size.

queen dimorphism: Existence of two distinct queen phenotypes in a species.

Rapoport's rule (also Rapoport pattern): The hypothesis that there is a positive relationship between range size and latitude.

rare species: Species with low abundance that are infrequently encountered; may have a widespread or localized distribution.

relatedness asymmetry: The state of one individual being more related to another than the other is to it, e.g., under male haploidy, a father is twice as related to a daughter as she is to him, and sisters are more related to each other than their brothers are to them.

replete: A worker with her crop full of sweet liquids for provision; an example of permanent polyethism, not present in all species.

selective logging: A type of logging where only certain, usually economically important, tree species are removed from forests.

sex allocation: Proportion of investment in either male or female reproductive function, generally measured as the proportion of investment into producing males to queens.

sex determining locus: The genetic locus that governs sex determination whereby heterozygosity results in females but homozygosity in non-viable, diploid males; viable males are haploid. Not yet identified in ants.

sex ratio: Proportion of reproductive individuals of both sexes produced.

signal: A trait that evolves in a signaller to provide information to a receiver in a way that induces a change in the behaviour of the receiver for the benefit of the signaller (see also **cue**).

silvopastoral system: Pasture or grazing systems that include trees.

social parasite: Ant species that live in the nest of another genetically distinct ant species almost exclusively producing sexual offspring while remaining reproductively isolated from their hosts.

soil bioturbation: Movement of soils; caused by ants through the formation of mounds, subterranean galleries and chambers, and the movement of soil particles along the soil profile.

soldier: A distinct worker phenotype that is functionally specialized for the role of colony defence.

speciation: The evolutionary process by which one species forms a new species.

species diversity: Species richness weighted by some measure of abundance such as number of individuals or biomass. Many people use the term species diversity when they are actually referring to species richness.

species richness: Number of different species in a sample, location, region, habitat, ecosystem, or other biological unit.

stable isotope: Any of the different types of atoms of the same chemical element that differ in atomic mass and do not decay.

stable isotope analysis: The measurement of the ratio of two stable isotopes of an element typically to estimate the relative contributions of multiple resources to a consumer or the consumer's trophic position.

stem group ants: All the taxa in a clade preceding a major cladogenesis event. For ants a group containing all organisms more closely related to ants than to any other extant taxa; can refer to extinct taxa that are outside the crown group but that are inferred to be more closely related to ants than to any other living aculeate wasps.

supercolony: An ant colony with multiple queens integrated harmoniously over a large area. Individuals freely mix among nests across spatially separate parts of the colony.

symbiosis: The close and often long-term relationship between different species that is frequently, but not always beneficial to one or both species.

systematics: Study of relationships among taxa through time involving the systematic classification of organisms and the evolutionary relationships among them.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

taxon cycle: Sequential stages of expansion and contraction of the ranges of species; often linked with shifts in ecological distribution.

taxonomy (Linnaean): A method of classifying living things; originally devised by Carolus Linnaeus. It uses a combination of a genus name and a single specific characterizing word (species name) to uniquely identify each species.

template: Internal (neural) representation of the colony odour believed to be learned just after emergence (sometimes during the preimaginal period) and constantly updated.

tending: The collective actions of ants collecting honeydew and closely associating with honeydew-producing herbivorous hemipterans.

threatened species: Species that are at risk of extinction due to human activities that directly or indirectly affect their life or their habitat.

trophallaxis: The exchange of either regurgitated or excreted liquid food that occurs among members of an ant colony.

trophic egg: Egg laid for later consumption by another individual in the colony; frequently understood as a term for eggs that also are inviable.

trophic level: A quantitative description of the position a species or group of species occupies in a food chain, with primary producers being the first trophic level, herbivores the second, primary predators the third, and secondary predators the fourth.

trophobiont: see **trophobiosis**.

trophobiosis: A symbiotic association between organisms where food is obtained or provided. The provider of food in the association is referred to as a trophobiont.

umbrella taxon: A taxon for which protection also confers protection on coexisting organisms.

unicoloniality: Colony structure characterized dependent colony foundation, inbreeding, and the lack of distinct colony boundaries within a population.

worker: Female ant, typically incapable of producing offspring, and differing morphologically from the queen by absence of wings and frequently smaller mesosoma size.

worker policing: Destruction of an egg laid by one worker by another worker, to avoid a reduction of relative fitness by the egg-destroyer.

worker subcastes: Extreme case of worker polymorphism in that worker phenotypes differ in a strong deviation from isometry; a morphological adaptation to permanent polyethism.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

References

Abbot, P., Grinath, J., Brown, J., Peeden, E., Erickson, D., and Billick, I. (2008) Insect herbivore stoichiometry: the relative importance of hostplant. *Ecological Entomology 33*, 497–502.

Abbott, K.L. (2005) Supercolonies of the invasive yellow crazy ant, *Anoplolepis gracilipes*, on an oceanic island: forager patterns, density and biomass. *Insectes Sociaux 52*, 266–73.

——(2006) Spatial dynamics of supercolonies of the invasive yellow crazy ant, *Anoplolepis gracilipes*, on Christmas Island, Indian Ocean. *Diversity and Distributions 12*, 101–10.

——and Green, P.T. (2007) Collapse of an ant-scale mutualism in a rainforest on Christmas Island. *Oikos 116*, 1238–46.

——Sarty, M., and Lester, P.J. (2006) The ants of Tokelau. *New Zealand Journal of Zoology 33*, 157–64.

—— Greaves, S., Ritchie, P., and Lester, P. (2007) Behaviourally and genetically distinct populations of an invasive ant provide insight into invasion history and impacts on a tropical ant community. *Biological Invasions 9*, 453–63.

Abdelkrim, A., Pascal, M., and Samadi, S. (2007) Establishing causes of eradication failure based on genetics: case study of ship rat eradication in Ste. Anne Archipelago. *Conservation Biology 21*, 719–30.

Abedrabbo, S. (1994) Control of the little fire ant *Wasmannia auropunctata* on Santa Fe Island in the Galápagos Islands. In D.F. Williams, ed. *Exotic Ants: biology, impact, and control of introduced species*, pp. 219–27. Westview Press, Boulder, CO.

Adams, E.S. (1994) Territory defense by the ant *Azteca trigona*: maintenance of an arboreal ant mosaic. *Oecologia 97*, 203–8.

——(2001) Approaches to the study of territory size and shape. *Annual Review of Ecology and Systematics 32*, 277–303.

——and Mesterton-Gibbons, M. (2006) Lanchester's attrition models and fights among social animals. *Behavioral Ecology 14*, 719–23.

Addison, P., and Samways, M.J. (2000) A survey of ants (Hymenoptera: Formicidae) that forage in vineyards in the Western Cape Province, South Africa. *African Entomology 8*, 251–60.

Adis, J. (1982) Eco-entomological observations from the Amazon: III. How do leafcutting ants of inundation-forests survive flooding? *Acta Amazonica 12*, 839–40.

——Marques, M.I., and Wantzen, K.M. (2001) First observations on the survival strategies of terricolous arthropods in the northern Pantanal wetland of Brazil. *Andrias 15*, 127–8.

Adler, F.R., Lebrun, E.G., and Feener, D.H. (2007) Maintaining diversity in an ant community: modeling, extending, and testing the dominance-discovery trade-off. *American Naturalist 169*, 323–33.

Agnew, C.W., Sterling, W.L., and Dean, D.A. (1982) Influence of cotton nectar on red imported fire ants and other predators. *Environmental Entomology 11*, 629–34.

Agosti, D., and Alonso, L.E. (2000) The ALL protocol: a standard protocol for the collection of ground-dwelling ants. In D. Agosti, J.D. Majer, L.E. Alonso, and T.R. Schultz, eds. *Ants: standard methods for measuring and monitoring biodiversity*, pp. 204–6. Smithsonian Institution Press, Washington, DC.

——and Johnson, N.F. (2005) *Antbase*. www.antbase.org.

——Majer, J., Alonso, L.E., and Schultz, T.R. (2000) *Ants: standard methods for measuring and monitoring biodiversity*. Smithsonian Institution Press, Washington, DC.

Agrawal, A.A., and Fordyce, J.A. (2000) Induced indirect defence in a lycaenid-ant association: the regulation of a resource in a mutualism. *Proceedings of the Royal Society of London B 267*, 1857–61.

Akino, T. (2006) Cuticular hydrocarbons of *Formica truncorum* (Hymenoptera: Formicidae): description of new very long chained hydrocarbon components. *Applied Entomology and Zoology 41*, 667–77.

——and Yamaoka, R. (2000) Evidence for volatile and contact signals of nestmate recognition in the black shining ant *Lasius fuliginosus* Latreille (Hymenoptera: Formicidae). *Entomological Science 3*, 1–8.

——(2005a) The chemical basis for trail recognition in *Lasius nipponensis*. *Chemoecology 15*, 13–20.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Akino, T. (2005b) Trail discrimination signal of *Lasius japonicus*. *Chemoecology 15*, 21–30.

——Yamamura, N., Wakamura, S., and Yamaoka, R. (2004) Direct behavioral evidence for hydrocarbons as nestmate recognition cues in *Formica japonica* (Hymenoptera: Formicidae). *Applied Entomology and Zoology 39*, 381–7.

Albrecht, M., and Gotelli, N.J. (2001) Spatial and temporal niche partitioning in grassland ants. *Oecologia 126*, 134–41.

Albuquerque, N.L., and Brandão, C.R.F. (2004) A revision of the Neotropical Solenopsidini ant genus *Oxyepoecus* Santschi, 1926 (Hymenoptera: Formicidae: Myrmicinae). 1. The *Vezenyii* species-group *Papeis Avulsos de Zoologia (São Paulo) 44*, 55–80.

Aleksiev, A.S., Longdon, B., Christmas, M.J., Sendova-Franks, A.B., and Franks, N.R. (2007) Individual choice of building material for nest construction by worker ants and the collective outcome for their colony. *Animal Behaviour 74*, 559–66.

Ali, A.D., and Reagan, T.E. (1985) Vegetation manipulation impact on predator and prey populations in Louisiana sugarcane ecosystems. *Journal of Economic Entomology 78*, 1409–14.

Ali, J.R., and Aitchison, J.C. (2008) Gondwana to Asia: plate tectonics, paleogeography and the biological connectivity of the Indian subcontinent from the Middle Jurassic through latest Eocene (166–35 Ma). *Earth-Science Reviews*, doi:10.1016/j.earscirev.2008.1001.1007.

Allen, A.P., Brown, J.H., and Gillooly, J.F. (2002) Global biodiversity, biochemical kinetics, and the energetic-equivalence rule. *Science 297*, 1545–8.

——Gillooly, J.F., Savage, V.M., and Brown, J.H. (2006) Kinetic effects of temperature on rates of genetic divergence and speciation. *Proceedings of the National Academy of Sciences USA 103*, 9130–5.

Allen, C.R., Epperson, D.M., and Garmestani, A.S. (2004) Red imported fire ant impacts on wildlife: a decade of research. *American Midland Naturalist 152*, 88–103.

——Forys, E.A., Rice, K.G., and Wojcik, D.P. (2001) Effects of fire ants (Hymenoptera: Formicidae) on hatchling turtles and prevalence of fire ants on sea turtle nesting beaches in Florida. *Florida Entomologist 84*, 250–3.

Allen, G.E., and Buren, W.F. (1974) Microsporidian and fungal diseases of *Solenopsis invicta* Buren in Brazil. *Journal of the New York Entomological Society 82*, 125–30.

Alonso, L.E. (2000) Ants as indicators of diversity. In D. Agosti, J. Majer, L.E. Alonso, and T.R. Schultz, eds. *Ants: standard methods for measuring and monitoring biodiversity*, pp. 80–8. Smithsonian Institution Press, Washington, DC.

Alpert, G.D. (2007) A review of the ant genus *Metapone* Forel from Madagascar. *Memoirs of the American Entomological Institute 80*, 8–18.

Altfeld, L., and Stiling, P. (2006) Argentine ants strongly affect some but not all common insects on *Baccharis halimifolia*. *Environmental Entomology 35*, 31–6.

——and Stiling, P. (2009) Effects of aphid-tending Argentine ants, nitrogen enrichment and early-season herbivory on insects hosted by a coastal shrub. *Biological Invasions 11*, 183–91.

Amador, J.A., and Gorres, J.H. (2007) Microbiological characterization of the structures built by earthworms and ants in an agricultural field. *Soil Biology & Biochemistry 39*, 2070–7.

Andersen, A.N. (1991) Parallels between ants and plants: implications for community ecology. In C.R. Huxley and D.F. Cutler, eds. *Ant-plant interactions*, pp. 539–53. Oxford University Press, Oxford.

——(1992) Regulation of momentary diversity by dominant species in exceptionally rich ant communities of the Australian seasonal tropics. *American Naturalist 140*, 401–20.

——(1995) A classification of Australian ant communities, based on functional groups which parallel plant life-forms in relation to stress and disturbance. *Journal of Biogeography 22*, 15–29.

——(1997) Functional groups and patterns of organization in North American ant communities: a comparison with Australia. *Journal of Biogeography 24*, 433–60.

——(2000) A global ecology of rainforest ants: functional groups in relation to environmental stress and disturbance. In D. Agosti, J.D. Majer, L.E. Alonso, and T.R. Schultz, eds. *Ants: standard methods for measuring and monitoring biodiversity*, pp. 25–34. Smithsonian Institution Press, Washington, DC.

——(2002) Common names for Australian ants (Hymenoptera: Formicidae). *Australian Journal of Entomology 41*, 285–93.

——(2003) Ant biodiversity in arid Australia: productivity, species richness and community organisation. *Records of the South Australian Museum Monograph Series 7*, 79–92.

——(2006) A systematic overview of the Australian species of the myrmecine ant genus *Meranoplus* F. Smith, 1853 (Hymenoptera: Formicidae). *Myrmecologische Nachrichten 8*, 157–70.

——(2008) Not enough niches: non-equilibrial processes promoting species coexistence in diverse ant communities. *Austral Ecology 33*, 211–20.

——and Majer, J.D. (2004) Ants show the way Down Under: invertebrates as bioindicators in land management. *Frontiers in Ecology and the Environment 2*, 291–8.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

——and Morrison, S.C. (1998) Myrmecochory in Australia's seasonal tropics: effects of disturbance on distance dispersal. *Australian Journal of Ecology 23*, 483–91.

——and Patel, A.D. (1994) Meat ants as dominant members of Australian ant communities: an experimental test of their influence on the foraging success and forager abundance of other species. *Oecologia 98*, 15–24.

——and Yen, A.L. (1985) Immediate effects of fire on ants in the semi-arid mallee region of north-western Australia. *Australian Journal of Ecology 10*, 25–30.

——Blum, M.S., and Jones, T.H. (1991) Venom alkaloids in *Monomorium rothsteini* Forel repel other ants – is this the secret to success by *Monomorium* in Australian ant communities? *Oecologia 88*, 157–60.

——Hertog, T., and Woinarski, J.C.Z. (2006) Long-term fire exclusion and ant community structure in an Australian tropical savanna: congruence with vegetation succession. *Journal of Biogeography 33*, 823–32.

——Hoffmann, B.D., and Somes, J. (2003) Ants as indicators of minesite restoration: community recovery at one of eight rehabilitation sites in central Queensland. *Ecological Management & Restoration 4*, S12-9.

——Parr, C.L., Lowe, L.M., and Müller, W.J. (2007) Contrasting fire-related resilience of ecologically dominant ants in tropical savannas of northern Australia. *Diversity and Distributions 13*, 438–46.

——Fisher, A., Hoffmann, B.D., Read, J.L., and Richards, R. (2004a) The use of terrestrial invertebrates for biodiversity monitoring in Australian rangelands, with particular reference to ants. *Austral Ecology 29*, 87–92.

Andersen, M.C., Adams, H., Hope, B., and Powell, M. (2004b) Risk analysis for invasive species: general framework and research needs. *Risk Analysis 24*, 893–900.

Anderson, C., and Franks, N.R. (2001) Teams in animal societies. *Behavioral Ecology 12*, 534–40.

——and McShea, D.W. (2001a) Individual vs. social complexity, with particular reference to ant colonies. *Biological Reviews 76*, 211–37.

————(2001b) Intermediate-level parts in insect societies: adaptive structures that ants build away from the nest. *Insectes Sociaux 48*, 291–301.

——Boomsma, J.J., and Bartholdi, J.J. (2002) Task partitioning in insect societies: bucket brigades. *Insectes Sociaux 49*, 171–80.

Anderson, K.E., and Munger, J.C. (2003) Effect of temperature on brood relocation in *Pogonomyrmex salinus* (Hymenoptera: Formicidae). *Western North American Naturalist 63*, 122–8.

——Linksvayer, T.A., and Smith, C.R. (2008) The causes and consequences of genetic caste determination in ants (Hymenoptera: Formicidae). *Myrmecological News 11*, 119–32.

André, J.-B., Peeters, C., and Doums, C. (2001) Serial polygyny and colony genetic structure in the monogynous queenless ant *Diacamma cyaneiventre*. *Behavioral Ecology and Sociobiology 50*, 72–80.

————Huet, M., and Doums, C. (2006) Estimating the rate of gamergate turnover in the queenless ant *Diacamma cyaneiventre* using a maximum likelihood model. *Insectes Sociaux 53*, 233–40.

ANeT (2008) http://homepage.mac.com/dorylus/index.html.

Angilletta, M.J.J., Roth, T.C., Wilson, R.S., Niehaus, A.C., and Ribeiro, P.L. (2008) The fast and the fractalous: speed and tortuosity trade off in running ants. *Functional Ecology 22*, 78–83.

Antonialli, W.F.J., Lima, S.M., Andrade, L.H.C., and Suarez, Y.R. (2007) Comparative study of the cuticular hydrocarbon in queens, workers and males of *Ectatomma vizottoi* (Hymenoptera, Formicidae) by Fourier transformation-infrared photoacoustic spectroscopy. *Genetics and Molecular Research 6*, 492–9.

——Suarez, Y.R., Izida, T., Andrade, L.H.C., and Lima, S.M. (2008) Intra- and interspecific variation of cuticular hydrocarbon composition in two *Ectatomma* species (Hymenoptera: Formicidae) based on Fourier transform infrared photoacoustic spectroscopy. *Genetics and Molecular Research 7*, 559–66.

Antony, G., Scanlam, J., Francis, A., Kloessing, K., and Nguyen, Y. (2009) Fire ants revisited – the economics of eradication. *Proceedings of the Australian Agricultural and Resource Economics Society 53rd Annual Conference*, Cairns.

AntWeb (2008) http://www.AntWeb.org/

Archibald, S.B., Cover, S.P., and Moreau, C.S. (2006) Bulldog ants of the Eocene Okanagan Highlands and history of the subfamily (Hymenoptera: Formicidae: Myrmeciinae). *Annals of the Entomological Society of America 99*, 487–523.

Armbrecht, I., and Gallego, M.C. (2007) Testing ant predation on the coffee berry borer in shaded and sun coffee plantations in Colombia. *Entomologia Experimentalis et Applicata 124*, 261–7.

——and Perfecto, I. (2003) Litter-twig dwelling ant species richness and predation potential within a forest fragment and neighboring coffee plantations of contrasting habitat quality in Mexico. *Agriculture Ecosystems & Environment 97*, 107–15.

——Perfecto, I., and Vandermeer, J. (2004) Enigmatic biodiversity correlations: ant diversity responds to diverse resources. *Science 304*, 284–6.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Arnan, X., Rodrigo, A., and Retana, J. (2006) Post-fire recovery of Mediterranean ground ant communities follows vegetation and dryness gradients. *Journal of Biogeography 33*, 1246–58.

Aron, S. (2001) Reproductive strategy: an essential component in the success of incipient colonies of the invasive Argentine ant. *Insectes Sociaux 48*, 25–7.

Atkin, L., and Proctor, J. (1988) Invertebrates in litter and soil on Volcan Barva, Costa Rica. *Journal of Tropical Ecology 4*, 307–10.

Autori, M. (1947) Combate a formiga saúva. *Biológico 13*, 196–9.

Ayre, G.L. (1967) The relationships between food and digestive enzymes in five species of ants (Hymenoptera: Formicidae). *Canadian Entomologist 99*, 408–11.

Azevedo-Ramos, C., de Carvalho Jr., O., and do Amaral, B.D. (2006) Short-term effects of reduced-impact logging on eastern Amazon fauna. *Forest Ecology and Management 232*, 26–35.

Bach, C.E. (1991) Direct and indirect interactions between ants (*Pheidole megacephala*), scales (*Coccus viridis*) and plants (*Pluchea indica*). *Oecologia 87*, 233–9.

Ballinger, A., Lake, P.S., and Mac Nally, R. (2007) Do terrestrial invertebrates experience floodplains as landscape mosaics? Immediate and longer-term effects of flooding on ant assemblages in a floodplain forest. *Oecologia 152*, 227–38.

Banks, W.A., Miles, L.R., and Harlan, D.P. (1983) The effects of insect growth-regulators and their potential as control agents for imported fire ants (Hymenoptera: Formicidae). *Florida Entomologist 66*, 172–81.

Barber, T.C. (1916) The Argentine ant: distribution and control in the United States. *USDA Bureau of Entomology Bulletin 377*, 1–23.

Barbero, F., Thomas, J.A., Bonelli, S., Balletto, E., and Schonrogge, K. (2009) Queen ants make distinctive sounds that are mimicked by a butterfly social parasite. *Science 323*, 782–5.

Baroni-Urbani, C. (1993) The diversity and evolution of recruitment behaviour in ants, with a discussion of the usefulness of parsimony criteria in the reconstruction of evolutionary histories. *Insectes Sociaux 40*, 233–60.

——(1998) The number of castes in ants, where major is smaller than minor and queens wear the shield of the soldiers. *Insectes Sociaux 45*, 315–33.

——and Collingwood, C.A. (1976) A numerical analysis of the distribution of British Formicidae (Hymenoptera, Aculeata). *Verhandlungen der Naturforschenden Gesellschaft (Basel) 85*, 51–91.

————(1977) The zoogeography of ants (Hymenoptera, Formicidae) in northern Europe. *Annales Zoologici Fennici 152*, 1–34.

——and de Andrade, M.L. (1997) Pollen eating, storing, and spitting by ants. *Naturwissenschaften 84*, 256–8.

————(2003) The ant genus *Proceratium* in the extant and fossil record (Hymenoptera: Formicidae). *Museo Regionale di Scienze Naturali Monografie Turin 36*, 1–492.

————(2006) A new *Protanilla* Taylor, 1990 (Hymenoptera: Formicidae: Leptanillinae) from Sri Lanka. *Myrmecologische Nachrichten 8*, 45–7.

——and Wilson, E.O. (1987) The fossil members of the ant tribe Leptomyrmecini (Hymenoptera: Formicidae). *Psyche (Cambridge) 94*, 1–8.

——Bolton, B., and Ward, P.S. (1992) The internal phylogeny of ants (Hymenoptera: Formicidae). *Systematic Entomology 17*, 301–29.

Barrow, L., Parr, C.L., and Kohen, J.L. (2007) Habitat type influences fire resilience of ant assemblages in the semi-arid tropics of Northern Australia. *Journal of Arid Environments 69*, 80–95.

Barzman, M.S., and Daane, K.M. (2001) Host-handling behaviours in parasitoids of the black scale: a case for ant-mediated evolution. *Journal of Animal Ecology 70*, 237–47.

Basset, Y., Novotny, V., Miller, S.E., and Pyle, R. (2000) Quantifying biodiversity: experience with parataxonomists and digital photography in Papua New Guinea and Guyana. *BioScience 50*, 899–908.

——Novotny, V., Miller, S.E., Weiblen, G.D., Missa, O., and Stewart, A.J.A. (2004) Conservation and biological monitoring of tropical forests: the role of parataxonomists. *Journal of Applied Ecology 41*, 163–74.

Basu, P. (1997) Competition hierarchy in the ground foraging ant community in a wet evergreen forest (Western Ghats, India): role of interference behaviour. *Current Science 73*, 173–9.

Beattie, A.J. (1985) *The Evolutionary Ecology of Ant-Plant Mutualisms*. Cambridge University Press, Cambridge.

——(1995) Natural history at the cutting edge. *Ecological Economics 13*, 93–7.

——(2006) The evolution of ant pollination systems. *Botanische Jahrbücher 127*, 43–55.

——and Culver, D.C. (1981) The guild of myrmecochores in the herbaceous flora of West Virginia forests *Ecology 62*, 107–11.

——Turnbull, C., Knox, R.B., and Williams, E.G. (1984) Ant inhibition of pollen function: a possible reason why ant pollination is rare? *American Journal of Botany 71*, 421–6.

————Hough, T., and Knox, R.B. (1986) Antibiotic production: a possible function for the metapleural glands of ants (Hymenoptera: Formicidae). *Annals of the Entomological Society of America 79*, 448–50.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Becerra, J.X.I., and Venable, D.L. (1989) Extrafloral nectaries – a defense against ant-Homoptera mutualisms? *Oikos 55*, 276–80.

Beckers, R., Goss, S., Deneubourg, J.L., and Pasteels, J.M. (1989) Colony size, communication and ant foraging strategy. *Psyche (Cambridge) 96*, 239–56.

Beckmann, R.L., and Stucky, J.M. (1981) Extrafloral nectaries and plantguarding in *Ipomoea pandurata* (L.) G.F. W. Mey. (Convolvulaceae). *American Journal of Botany 68*, 72–9.

Beekman, M., Sumpter, D., and Ratnieks, F. (2001) Phase transition between disordered and ordered foraging in Pharaoh's ants. *Proceedings of the National Academy of Sciences USA 98*, 9703–4.

Beever, E.A., and Herrick, J.E. (2005) Effects of feral horses in Great Basin landscapes on soils and ants: direct and indirect mechanisms. *Journal of Arid Environments 66*, 96–112.

Behar, A., Yuval, B., and Jurkevitch, E. (2005) Enterobacteria-mediated nitrogen fixation in natural populations of the fruit fly *Ceratitis capitata*. *Molecular Ecology 14*, 2637–43.

Beibl, J., Stuart, R.J., Heinze, J., and Foitzik, S. (2005) Six origins of slavery in formicoxenine ants. *Insectes Sociaux 52*, 291–7.

Belshaw, R., and Bolton, B. (1993) The effect of forest disturbance on the leaf-litter ant fauna in Ghana. *Biodiversity and Conservation 2*, 656–66.

Bensasson, D., Zhang, D.X., Hartl, D.L., and Hewitt, G.M. (2001) Mitochondrial pseudogenes: evolution's misplaced witnesses. *Trends Ecology and Evolution 16*, 314–21.

Bentley, B.L. (1976) Plants bearing extrafloral nectaries and the associated ant community: interhabitat differences in the reduction of herbivore damage. *Ecology 57*, 815–20.

Berg, R.Y. (1975) Myrmecochorous plants in Australia and their dispersal by ants. *Australian Journal of Botany 23*, 475–508.

Bergsten, J. (2005) A review of long-branch attraction. *Cladistics 21*, 163–93.

Bergstrom, D.M., Lucieer, A., Kiefer, K., Wasley, J., Belbin, L., Pedersen, T.K., and Chown, S.L. (2009) Indirect effects of invasive species removal devastate World Heritage Island. *Journal of Applied Ecology 46*, 73–81.

Bernasconi, G., and Strassmann, J.E. (1999) Cooperation among unrelated individuals: the ant foundress case. *Trends in Ecology and Evolution 14*, 477–82.

Bernstein, R.A., and Gobbel, M. (1979) Partitioning of space in communities of ants. *Journal of Animal Ecology 48*, 931–42.

Bertness, M.D., and Callaway, R. (1994) Positive interactions in communities. *Trends in Ecology and Evolution 9*, 191–3.

Beshers, S.N., and Fewell, J.H. (2001) Models of division of labor in social insects. *Annual Review of Entomology 46*, 413–40.

Bestelmeyer, B.T. (2000) The trade-off between thermal tolerance and behavioural dominance in a subtropical South American ant community. *Journal of Animal Ecology 69*, 998–1009.

——and Wiens, J.A. (1996) The effects of land use on the structure of ground-foraging ant communities in the Argentine Chaco. *Ecological Applications 6*, 1225–40.

——Agosti, D., and Alonso, L.E. (2000) Field techniques for the study of ground-dwelling ants. In D. Agosti, J.D. Majer, L.E. Alonso, and T.R. Schultz, eds. *Ants: standard methods for measuring and monitoring biodiversity*, pp. 122–44. Smithsonian Institution Press, Washington, DC.

Beye, M., Neumann, P., and Moritz, R.F.A. (1997) Nestmate recognition and the genetic gestalt in the mound- building ant *Formica polyctena*. *Insectes Sociaux 44*, 49–58.

——Neumann, P., Chapuisat, M., Pamilo, P., and Moritz, R.F.A. (1998) Nestmate recognition and the genetic relatedness of nests in the ant *Formica pratensis*. *Behavioral Ecology and Sociobiology 43*, 67–72.

Bickel, T.O., Brühl, C.A., Gadau, J.R., Hölldobler, B., and Linsenmair, K.E. (2006) Influence of habitat fragmentation on the genetic variability in leaf litter ant populations in tropical rainforests of Sabah, Borneo. *Biodiversity and Conservation 15*, 157–75.

Biesmeijer, J.C., and de Vries, H. (2001) Exploration and exploitation of food sources by social insect colonies: a revision of the scout-recruit concept. *Behavioral Ecology and Sociobiology 49*, 89–99.

Bihn, J.H., and Verhaagh, M. (2007) A review of the genus *Mystrium* (Hymenoptera: Formicidae) in the Indo-Australian region. *Zootaxa 1642*, 65–8.

Billen, J., and Buschinger, A. (2000) Morphology and ultrastructure of a specialized bacterial pouch in the digestive tract of *Tetraponera* ants (Formicidae, Pseudomyrmecinae). *Arthropod Structure & Development 29*, 259–66.

Billick, I., Brown, R., and Reithel, J.S. (2005) Importance of fertilization of host plants to ant tending and growth rates in *Glaucopsyche lygdamus* (Lepidoptera: Lycaenidae). *Annals of the Entomological Society of America 98*, 491–5.

——Wiernasz, D.C., and Cole, B.J. (2001) Recruitment in the Harvester ant, *Pogonomyrmex occidentalis*: effects of experimental removal. *Oecologia 129*, 228–33.

Biosecurity New Zealand (2008) Red imported fire ant response update: April 2009, Ministry of Agriculture and Forestry, Auckland.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

BirdLife International (2000) *Threatened Birds of the World*. Lynx Edicions Barcelona, Spain.

——(2008) http://www.birdlife.org/.

Bishop, D., and Bristow, C. (2001) Effect of Allegheny mound ant (Hymenoptera: Formicidae) presence on homopteran and predator populations in Michigan jack pine forests. *Annals of the Entomological Society of America 94*, 33–40.

Blancafort, X., and Gomez, C. (2005) Consequences of the Argentine ant, *Linepithema humile* (Mayr), invasion on pollination of *Euphorbia characias* (L.) (Euphorbiaceae). *Acta Oecologia 28*, 49–55.

————(2006) Downfall of pollen carriage by ants after Argentine ant invasion in two Mediterranean *Euphorbia* species. *Vie et Milieu 56*, 1–4.

Blanchard, G.B., Orledge, G.M., Reynolds, S.E., and Franks, N.R. (2000) Division of labour and seasonality in the ant *Leptothorax albipennis*: worker corpulence and its influence on behaviour. *Animal Behaviour 59*, 723–38.

Blanton, C.M., and Ewel, J.J. (1985) Leaf-cutting ant herbivory in successional and agricultural tropical ecosystems. *Ecology 66*, 861–9.

Blomquist, G.J., Tillman, J.A., Mpuru, S., and Seybold, S.J. (1998) The cuticle and cuticular hydrocarbons of insects: structure, function, and biochemistry. In R.K. Vander Meer, M.D. Breed, K. Espelie, and M.L. Winston, eds. *Pheromone communication in social insects. Ants, wasps, bees and termites*, pp. 34–54. Westview Press, Boulder, CO.

Blüthgen, N., and Fiedler, K. (2004a) Competition for composition: lessons from nectar-feeding ant communities. *Ecology 85*, 1479–85.

————(2004b) Preferences for sugars and amino acids and their conditionality in a diverse nectar-feeding ant community. *Journal of Animal Ecology 73*, 155–66.

——and Stork, N.E. (2007) Ant mosaics in a tropical rainforest in Australia and elsewhere: a critical review. *Austral Ecology 32*, 93–104.

——Gebauer, G., and Fiedler, K. (2003) Disentangling a rainforest food web using stable isotopes: dietary diversity in a species-rich ant community. *Oecologia 137*, 426–35.

——Gottsberger, G., and Fiedler, K. (2004a) Sugar and amino acid composition of ant-attended nectar and honeydew sources from an Australian rainforest. *Austral Ecology 29*, 418–29.

——Stork, N.E., and Fiedler, K. (2004b) Bottom-up control and co-occurrence in complex communities: honeydew and nectar determine a rainforest ant mosaic. *Oikos 106*, 344–58.

——Mezger, D., and Linsenmair, K.E. (2006) Ant-hemipteran trophobioses in a Bornean rainforest – diversity, specificity and monopolisation. *Insectes Sociaux 53*, 194–203.

——Menzel, F., Hovestadt, T., Fiala, B., and Blüthgen, N. (2007) Specialization, constraints, and conflicting interests in mutualistic networks. *Current Biology 17*, 341–6.

——Verhaagh, M., Goitía, W., Jaffé, K., Morawetz, W., and Barthlott, W. (2000) How plants shape the ant community in the Amazonian rainforest canopy: the key role of extrafloral nectaries and homopteran honeydew. *Oecologia 125*, 229–40.

Boevé, J.L., and Wäckers, F.L. (2003) Gustatory perception and metabolic utilization of sugars by *Myrmica rubra* ant workers. *Oecologia 136*, 508–14.

Bohlen, P.J. (2006) Biological invasions: linking the aboveground and belowground consequences. *Applied Soil Ecology 32*, 1–5.

Bohm, M., and Mayhew, P.J. (2005) Historical biogeography and the evolution of the latitudinal gradient of species richness in the Papionini (Primata: Cercopithecidae). *Biological Journal of the Linnean Society 85*, 235–46.

Bolger, D.T., Beard, K.H., Suarez, A.V., and Case, T.J. (2008) Increased abundance of native and non-native spiders with habitat fragmentation. *Diversity and Distributions 14*, 655–65.

Bolger, D.T., Suarez, A.V., Crooks, K.R., Morrison, S.A., and Case, T.J. (2000) Arthropods in urban habitat fragments in southern California: area, age, and edge effects. *Ecological Applications 10*, 1230–48.

Bollazzi, M., and Roces, F. (2002) Thermal preference for fungus culturing and brood location by workers of the thatching grass-cutting ant *Acromyrmex heyeri*. *Insectes Sociaux 49*, 153–7.

Bolton, B. (1994) *Identification Guide to the Ant Genera of the World*. Harvard University Press, Cambridge, MA.

——(1995a) *A Catalog of the Ants of the World*. Harvard University Press, Cambridge, MA.

——(1995b) A taxonomic and zoogeographical census of the extant ant taxa (Hymenoptera: Formicidae). *Journal of Natural History 29*, 1037–56.

——(2000) The ant tribe Dacetini. *Memoirs of the American Entomological Institute 65*, 1–1028.

——(2003) Synopsis and classification of Formicidae. *Memoirs of the American Entomological Institute 71*, 1–370.

——(2007) Taxonomy of the dolichoderine ant genus *Technomyrmex* Mayr (Hymenoptera: Formicidae) based on the worker caste. *Contributions of the American Entomological Institute 35*(1), 1–150.

——and Fisher, B.L. (2008a) Afrotropical ants of the ponerine genera *Centromyrmex* Mayr, *Promyopias* Santschi gen. rev. and *Feroponera* gen. n., with a revised key to

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

genera of African Ponerinae (Hymenoptera: Formicidae). *Zootaxa 1929*, 1–37.

————(2008b) The Afrotropical ponerine ant genus *Phrynoponera* Wheeler (Hymenoptera: Formicidae). *Zootaxa 1892*, 35–52.

——and Marsh, A.C. (1989) The Afrotropical thermophilic ant genus *Ocymyrmex* (Hymenoptera: Formicidae). *Journal of Natural History 23*, 1267–308.

——Alpert, G., Ward, P.S., and Naskrecki, P. (2006) *Bolton's catalogue of ants of the world*. Harvard University Press, Cambridge, MA. CD-ROM.

Bond, W.J., and Slingsby, P. (1983) Seed dispersal by ants in shrublands of the Cape Province and its evolutionary implications. *South African Journal of Science 79*, 231–3.

————(1984) Collapse of an ant-plant mutualism: the Argentine ant (*Iridomyrmex humilis*) and myrmecochorous Proteaceae. *Ecology 65*, 1031–7.

Boomsma, J.J., and Franks, N.R. (2006) Social insects: from selfish genes to self organisation and beyond. *Trends in Ecology and Evolution 21*, 303–8.

——Baer, B., and Heinze, J. (2005) The evolution of male traits in social insects. *Annual Review of Entomology 50*, 395–420.

Boomsma, J.J., Schmid-Hempel, P., and Hughes W.O.H. (2005) Life histories and parasite pressure across the major groups of social insects. In M. Fellowes, G. Holoway and J. Rolff, eds. *Insect Evolutionary Ecology*, pp. 139–75 CABI publishing, Wallingford, UK.

——Nielsen, J., Sundström, L., Oldham, N.J., Tentschert, J., Petersen, H.C., and Morgan, E.D. (2003) Informational constraints on optimal sex allocation in ants. *Proceedings of the National Academy of Sciences USA 100*, 8799–804.

Borgesen, L.W. (2000) Nutritional function of replete workers in the pharaoh's ant, *Monomorium pharaonis* (L.). *Insectes Sociaux 47*, 141–6.

Bos, M.M., Tylianakis, J.M., Steffan-Dewenter, I., and Tscharntke, T. (2008) The invasive yellow crazy ant and the decline of forest ant diversity in Indonesian cacao agroforests. *Biological Invasions 10*, 1399–409.

Boswell, G.P., Britton, N.F., and Franks, N.R. (1998) Habitat fragmentation, percolation theory, and the conservation of a keystone species. *Proceedings of the Royal Society of London B 265*, 1921–5.

Bot, A.N.M., Currie, C.R., Hart, A.G., and Boomsma, J.J. (2001a) Waste management in leaf-cutting ants. *Ethology Ecology & Evolution 13*, 225–37.

——Rehner, S.A., and Boomsma, J.J. (2001b) Partial incompatibility between ants and symbiotic fungi in two sympatric species of *Acromyrmex* leaf-cutting ants. *Evolution 55*, 1980–91.

Botes, A., McGeoch, M.A., Robertson, H.G., van Niekerk, A., Davids, H.P., and Chown, S.L. (2006) Ants, altitude and change in the northern Cape Floristic Region. *Journal of Biogeography 33*, 71–90.

Boulay, R., Hefetz, A., Soroker, V., and Lenoir, A. (2000) *Camponotus fellah* colony integration: worker individuality necessitates frequent hydrocarbons exchanges. *Animal Behaviour 59*, 1127–33.

——Cerdá, X., Simon, T., Roldan, M., and Hefetz, A. (2007a) Intraspecific competition in the ant *Camponotus cruentatus*: should we expect the 'dear enemy' effect? *Animal Behaviour 74*, 985–93.

——Hefetz, A., Cerdá, X., Devers, S., Francke, W., Twele, R., and Lenoir, A. (2007b) Production of sexuals in a fission-performing ant: dual effects of queen pheromones and colony size. *Behavioral Ecology and Sociobiology 61*, 1531–41.

Bourke, A.F.G. (2005) Genetics, relatedness and social behaviour in insect societies. In M. Fellowes, G. Holloway, and J. Rolff, eds. *Insect Evolutionary Ecology*, pp. 1–30. CABI publishing, Wallingford, UK.

——and Franks, N.R. (1995) *Social Evolution in Ants*. Princeton University Press, Princeton, NJ.

Bradshaw, J.W.S., Baker, R., and Howse, P.E. (1975) Multicomponent alarm pheromones of the weaver ant. *Nature 258*, 230–1.

Brady, S.G. (2003) Evolution of the army ant syndrome: the origin and long-term evolutionary stasis of a complex of behavioral and reproductive adaptations. *Proceedings of the National Academy of Sciences USA 100*, 6575–9.

——Fisher, B.L., Schultz, T.R., and Ward, P.S. (2006) Evaluating alternative hypotheses for the early evolution and diversification of ants. *Proceedings of the National Academy of Sciences USA 103*, 18172–7.

Braekman, J.C., Daloze, D., Pasteels, J.M., Van Hecke, P., Declercq, J.P., Sinnwell, V., and Francke, W. (1987) Tetraponerine-8, an alkaloidal contact poison in a Neoguinean pseudomyrmecine ant *Tetraponera* sp. *Z. Naturforsch 42*, 627–30.

Brandão, C.R.F. (2000) Major regional and type collections of ants (Formicidae) of the world and sources for the identification of ant species. In D. Agosti, J.D. Majer, L. E. Alonso, and T.R. Schultz, eds. *Ants: standard methods for measuring and monitoring biodiversity*, pp. 172–85. Smithsonian Institution Press, Washington, DC.

——Diniz, J.L.M., and Tomotake, E.M. (1991) *Thaumatomyrmex* strips millipedes for prey: a novel predatory behaviour in ants, and the first case of sympatry in the genus (Hymenoptera: Formicidae). *Insectes Sociaux 38*, 335–44.

————Agosti, D., and Delabie, J.H. (1999) Revision of the Neotropical ant subfamily Leptanilloidinae. *Systematic Entomology 24*, 17–36.

—— Feitosa, R.M., Schmidt, F.A., and de Castro Solar, R.R. (2008) Rediscovery of the putatively extinct ant species

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Simopelta minima (Brandão) (Hymenoptera: Formicidae), with a discussion on rarity and conservation status of ant species. *Revista Brasileira de Entomologia 52*, 480–3.

——Diniz, J.L.M., Silva, P.R., Albuquerque, N.L., and Silvestre, R. (2001) The first case of intranidal phragmosis in ants. The ergatoid queen of *Blepharidatta conops* (Formicidae: Myrmicinae) blocks the entrance of the brood chamber. *Insectes Sociaux 48*, 251–8.

Brandstaetter, A.S., Endler, A., and Kleineidam, C.J. (2008) Nestmate recognition in ants is possible without tactile interaction. *Naturwissenschaften 95*, 601–8.

Brandt, M., Heinze, J., Schmitt, T., and Foitzik, S. (2006) Convergent evolution of the Dufour's gland secretion as a propaganda substance in the slave-making ant genera *Protomognathus* and *Harpagoxenus*. *Insectes Sociaux 53*, 291–9.

Braschler, B. (2009) Successfully implementing a citizen-scientist approach to insect monitoring in a resource-poor country. *BioScience 59*, 103–4.

Breed, M.D., Welch, C.K., and Cruz, R.C. (1994) Kin discrimination within honey bee (*Apis mellifera*) colonies: an analysis of the evidence. *Behavioural Processes 33*, 25–40.

Brent, C., Peeters, C., Dietemann, V., Crewe, R., and Vargo, E. (2006) Hormonal correlates of reproductive status in the queenless ponerine ant, *Streblognathus peetersi*. *Journal of Comparative Physiology A 192*, 315–20.

Breton, L.M., and Addicott, J.F. (1992) Density-dependent mutualism in an aphid-ant interaction. *Ecology 73*, 2175–80.

Brew, C.R., O'Dowd, D.J., and Rae, I.D. (1989) Seed dispersal by ants - behavior-releasing compounds in elaiosomes. *Oecologia 80*, 490–7.

Brian, M.V. (1956) Segregation of species of the ant genus *Myrmica*. *Journal of Animal Ecology 25*, 319–37.

——(1978) *Production ecology of ants and termites, IBP 13*. Cambridge University Press, Cambridge.

Briese, D.T. (1983) Different modes of reproductive behaviour (including a description of colony fission) in a species of *Chelaner* (Hymenoptera: Formicidae). *Insectes Sociaux 30*, 308–16.

Bristow, C.M. (1983) Treehoppers transfer parental care to ants: a new benefit of mutualism *Science 220*, 532–3.

——(1991) Are ant-aphid associations a tritrophic interaction? Oleander aphids and Argentine ants. *Oecologia 87*, 514–21.

Broekhuysen, G.J. (1948) The brown house ant (*Pheidole megacephala*, Fabr.). *Union of South Africa Department of Agriculture Bulletin 266*, 1–40.

Bromham, L., and Cardillo, M. (2003) Testing the link between the latitudinal gradient in species richness and rates of molecular evolution. *Journal of Evolutionary Biology 16*, 200–7.

Bronstein, J.L. (1998) The contribution of ant-plant protection studies to our understanding of mutualism. *Biotropica 30*, 150–61.

——Alarcon, R., and Geber, M. (2006) The evolution of plant-insect mutualisms. *New Phytologist 172*, 412–28.

Brooks, T.M., Da Fonseca, G.A.B., and Rodrigues, A.S. (2004) Species, data, and conservation planning. *Conservation Biology 18*, 1682–8.

Brouat, C., Garcia, N., Andary, C., and McKey, D. (2001) Plant lock and ant key: pairwise coevolution of an exclusion filter in an ant-plant mutualism. *Proceedings of the Royal Society of London B 268*, 2131–41.

Brown, J.H., and Lomolino, M.V. (1998) *Biogeography*. Sinaur Associates, Sunderland, MA.

——Gillooly, J.F., Allen, A.P., Savage, V.M., and West, G. B. (2004) Toward a metabolic theory of ecology. *Ecology 85*, 1771–89.

Brown, M.J.F. (1999) Semi-claustral founding and worker behaviour in gynes of *Messor andrei*. *Insectes Sociaux 46*, 194–5.

——and Bonhoeffer, S. (2003) On the evolution of claustral colony founding in ants. *Evolutionary Ecology Research 5*, 305–13.

Brown Jr., W.L. (1954) Remarks on the internal phylogeny and subfamily classification of the family Formicidae. *Insectes Sociaux 1*, 21–31.

——(1960) Contributions toward a reclassification of the Formicidae. III. Tribe Amblyoponini (Hymenoptera). *Bulletin of the Museum of Comparative Zoology 122*, 143–230.

——(1973) A Comparison of the Hylean and Congo-West African rain forest ant faunas. In B.J. Meggers, E.S. Ayensu, and W.D. Duckworth, eds. *Tropical forest ecosystems in Africa and South America: a comparative review*, pp. 161–85. Smithsonian Institution Press, Washington, DC.

——(1975) Contributions toward a reclassification of the Formicidae. V. Ponerinae, tribes Platythyreini, Cerapachyini, Cylindromyrmecini, Acanthostichini, and Aenictogitini. *Search Agriculture (Ithaca NY) 5*(1), 1–115.

——(1980) A remarkable new species of *Proceratium*, with dietary and other notes on the genus (Hymenoptera: Formicidae). *Psyche (Cambridge) 86*, 337–46.

——(2000) Diversity of ants. In D. Agosti, J.D. Majer, L. E. Alonso, and T.R. Schultz, eds. *Ants: standard methods for measuring and monitoring biodiversity*, pp. 45–79. Smithsonian Institution Press, Washington, DC.

——and Kempf, W.W. (1968) *Tatuidris*, a remarkable new genus of Formicidae (Hymenoptera). *Psyche (Cambridge) 74*, 183–90.

——and Wilson, E.O. (1959a) The evolution of the dacetine ants. *The Quarterly Review of Biology 34*, 278–94.

——(1959b) The search for *Nothomyrmecia*. *Western Australian Naturalist 7*, 25–30.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Brühl, C.A., Eltz, T., and Linsenmair, K.E. (2003) Size does matter – effects of tropical rainforest fragmentation on the leaf litter ant community in Sabah, Malaysia. *Biodiversity and Conservation 12*, 1371–89.

——Mohamed, M., and Linsenmair, K.E. (1999) Altitudinal distribution of leaf litter ants along a transect in primary forest on Mount Kinabalu, Sabah, Malaysia. *Journal of Tropical Ecology 15*, 265–7.

Bruno, J.F., Stachowicz, J.J., and Bertness, M.D. (2003) Inclusion of facilitation into ecological theory. *Trends in Ecology and Evolution 18*, 119–25.

Buckley, L.B., and Jetz, W. (2007) Environmental and historical constraints on global patterns of amphibian richness. *Proceedings of the Royal Society of London B 274*, 1167–73.

Buckley, R.C. (1982) Ant-plant interactions: a world review. In R.C. Buckley, ed. *Ant-plant Interactions in Australia*, pp. 111–41. W. Junk, The Hague.

——and Gullan, P. (1991) More aggressive ant species (Hymenoptera: Formicidae) provide better protection for soft scales and mealybugs (Homoptera: Coccidae, Pseudococcidae). *Biotropica 23*, 282–6.

Buczkowski, G., and Bennett, G.W. (2008) Aggressive interactions between the introduced Argentine ant, *Linepithema humile* and the native odorous house ant, *Tapinoma sessile*. *Biological Invasions 10*, 1001–11.

——Kumar, R., Suib, S.L., and Silverman, J. (2005) Diet-related modification of cuticular hydrocarbon profiles of the Argentine ant, *Linepithema humile*, diminishes intercolony aggression. *Journal of Chemical Ecology 31*, 829–43.

——Vargo, E.L., and Silverman, J. (2004) The diminutive supercolony: the Argentine ants of the southeastern United States. *Molecular Ecology 13*, 2235–42.

Burd, M. (2006) Ecological consequences of traffic organisation in ant societies. *Physica A – Statistical Mechanics and Its Applications 372*, 124–31.

——and Howard, J.J. (2005) Central-place foraging continues beyond the nest entrance: the underground pertormance of leaf-cutting ants. *Animal Behaviour 70*, 737–44.

Buren, W.F., Allen, G.E., Whitcomb, W.H., Lennartz, F.E., and Williams, R.N. (1974) Zoogeography of the imported fire ants. *New York Entomological Society 82*, 113–24.

Buschinger, A. (1990) Evolutionary transitions between types of social parasitism in ants, hypotheses and evidence. In: social insects and the environment. In G.K. Veeresh, B. Mallik, and C.A. Viraktamath, eds. *Social insects and the environment. Proceedings of the 11th International Congress of IUSSI*, pp. 145–6. Oxford & IBH Publishing Co, New Delhi.

——(1991) Host specificity and host selection in parasitic ants. *Proceedings of the 4th ECE/ 13th SIEEC, Gödöllö Hungary*, 682–85.

——(2004) International pet ant trade, increasing risk and danger in Europe - (Hymenoptera, Formicidae). *Aliens 19/20*, 24–6.

——(2005) Experimental evidence for genetically mediated queen polymorphism in the ant species *Myrmecina graminicola* (Hymenoptera: Formicidae). *Entomologia Generalis 27*, 185–200.

——and Maschwitz, U. (1984) Defensive behavior and defensive mechanisms in ants. In H.R. Hermann, ed. *Defensive mechanisms in social insects*, pp. 95–150.

——and Schreiber, M. (2002) Queen polymorphism and queen-morph related facultative polygyny in the ant, *Myrmecina graminicola* (Hymenoptera, Formicidae). *Insectes Sociaux 49*, 344–53.

Buys, B. (1987) Competition for nectar between Argentine ants *Iridomyrmex humilis* and honeybees *Apis mellifera* on black ironbark *Eucalyptus sideroxylon*. *South African Journal of Zoology 22*, 173–4.

Buzas, M.A., Collins, L.S., and Culver, S.J. (2002) Latitudinal difference in biodiversity caused by higher tropical rate of increase. *Proceedings of the National Academy of Sciences USA 99*, 7841–3.

Byrne, M.M. (1994) Ecology of twig-dwelling ants in a wet lowland tropical forest. *Biotropica 26*, 61–72.

Cagniant, H. (2005) Les *Crematogaster* du Maroc (Hym., Formicidae). Clé de détermination et commentaires. *Orsis (Organismes i Sistemes) 20*, 7–12.

Caldera, E.J., Ross, K.G., DeHeer, C.J., and Shoemaker, D.D. (2008) Putative native source of the invasive fire ant *Solenopsis invicta*. *Biological Invasions 10*, 1457–79.

Cammaerts, M.C., and Cammaerts, R. (1998) Marking of nest entrance vicinity in the ant *Pheidole pallidula* (Formicidae, Myrmicinae). *Behavioural Processes 42*, 19–31.

——(2000a) Foraging area in two related *Tetramorium* ant species. *Journal of Insect Behavior 13*, 679–98.

——(2000b) Nest odour in the ant *Myrmica rubra*. *Biologia 55*, 509–23.

Cammeraat, E.L.H., and Risch, A.C. (2008) The impact of ants on mineral soil properties and processes at different spatial scales. *Journal of Applied Entomology 132*, 285–94.

Campomizzi, A. (2008) *Effects of red imported fire ants on songbird nest survival*. Master of Science thesis, Texas A&M University, College Station.

Campos, R.B.F., Schoereder, J.H., and Sperber, C.F. (2007) Small-scale patch dynamics after disturbance in litter ant communities. *Basic and Applied Ecology 8*, 36–43.

Cane, J.S. (1986) Predator deterrence by mandibular gland secretions of bees (Hymenoptera: Apoidea). *Journal of Chemical Ecology 12*, 1295–309.

Cardillo, M. (1999) Latitude and rates of diversification in birds and butterflies. *Proceedings of the Royal Society of London B 266*, 1221–5.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Cardillo, M., Orme, C.D.L., Owens, I.P.F. (2005) Testing for latitudinal bias in diversification rates: an example using New World birds. *Ecology 86*, 2278–87.

Cardinale, B.J., Harvey, C.T., Gross, K., and Ives, A.R. (2003) Biodiversity and biocontrol: emergent impacts of a multi-enemy assemblage on pest suppression and crop yield in an agroecosystem. *Ecology Letters 6*, 857–65.

Carney, S.E., Byerley, M.B., and Holway, D.A. (2003) Invasive Argentine ants (*Linepithema humile*) do not replace native ants as seed dispersers of *Dendromecon rigida* (Papaveraceae) in California, USA. *Oecologia 135*, 576–82.

Carpintero, S., and Reyes-López, J. (2008) The role of competitive dominance in the invasive ability of the Argentine ant (*Linepithema humile*). *Biological Invasions 10*, 25–35.

————and Arias de Reyna, L. (2003) Impact of human dwellings on the distribution of the exotic Argentine ant: a case study in the Donana National Park, Spain. *Biological Conservation 115*, 279–89.

————(2005) Impact of Argentine ants *Linepithema humile* on an arboreal ant community in Doñana National Park, Spain. *Biodiversity and Conservation 14*, 151–63.

——Retana, J., Cerdá, X., Reyes-López, J., and Arias de Reyna, L. (2007) Exploitative strategies of the invasive Argentine ant (*Linepithema humile*) and native ant species in a southern Spanish pine forest. *Environmental Entomology 36*, 1100–11.

Carroll, C.R., and Janzen, D.H. (1973) Ecology of foraging by ants. *Annual Review of Ecology and Systematics 4*, 231–57.

Carson, R. (1962) *Silent Spring*. Houghton Mifflin, Boston, MA.

Carvalho, K.S., and Vasconcelos, H.L. (1999) Forest fragmentation in central Amazonia and its effects on litter-dwelling ants. *Biological Conservation 91*, 151–7.

Carver, M., Gross, G.F., and Woodward, T.E. (1991) Hemiptera. In I.D. Naumann, ed. *The Insects of Australia*. Melbourne University Press, Melbourne.

Case, T.J. (2000) *An Illustrated Guide to Theoretical Ecology*. Oxford University Press, USA.

——and Gilpin, M.E. (1974) Interference competition and niche theory. *Proceedings of the National Academy of Sciences USA 71*, 3073–7.

Causton, C.E., Sevilla, C.R., and Porter, S.D. (2005) Eradication of the little fire ant, *Wasmannia auropunctata* (Roger) (Hymenoptera: Formicidae), from Marchena Island, Galapàgos: on the edge of success? *Florida Entomologist 88*, 159–67.

Cerdá, X. (1998) Critical thermal limits in Mediterranean ant species: trade-offs between mortality risk and foraging performance. *Functional Ecology 12*, 45–55.

——and Retana, J. (1998) Interference interactions and nest usurpation between two subordinate ant species. *Oecologia 113*, 577–83.

————and Cros, S. (1997) Thermal disruption of transitive hierarchies in Mediterranean ant communities. *Journal of Animal Ecology 66*, 363–74.

————and De Haro, A. (1994) Social carrying between nests in polycalic colonies of the monogynous ant, *Cataglyphis iberica* (Hymenoptera: Formicidae). *Sociobiology 23*, 215–31.

————and Manzaneda, A. (1988) The role of competition by dominants and temperature in the foraging of subordinate species in Mediterranean ant communities. *Oecologia 117*, 404–12.

Chacón, P., Bustos, J., Aldana, R.C., and Baena, M.L. (2000) Control de la hormiga loca *Paratrechina fulva* (Hymenoptera: Formicidae), con cebos tóxicos en la Reserva Natural Laguna de Sonso (Valle, Colombia). *Revista Colombiana de Entomología 26*, 151–6.

Chamberlain, S.C., and Holland, J.N. (2009) Quantitative synthesis of context dependency in ant-plant protection mutualisms. *Ecology 90*, 2384–92.

Chang, V.C.S. (1985) Colony revival and notes on rearing and life history of the big-headed ant. *Proceedings of the Hawaiian Entomological Society 25*, 53–8.

Chapuisat, M., Goudet, J., and Keller, L. (1997) Microsatellites reveal high population viscosity and limited dispersal in the ant *Formica paralugubris*. *Evolution 51*, 475–82.

——Bernasconi, G., Hoehn, S., and Reuter, M. (2005) Nestmate recognition in the unicolonial ant *Formica paralugubris*. *Behavioral Ecology 16*, 15–9.

——Oppliger, A., Magliano, P., and Christe, P. (2007) Wood ants use resin to protect themselves against pathogens. *Proceedings of the Royal Society of London B 274*, 2013–7.

Chéron, B., Doums, C., and Monnin, T. (2008) The mechanism of queen selection during queen replacement in a fission-performing ant. In *Proceedings of the 4th European Meeting of the International Union for the Study of Social Insects. La Roche-en-Ardenne, Belgium*.

Cherrett, J.M. (1968) The foraging behaviour of *Atta cephalotes* L. (Hymenoptera: Formicidae), I: Foraging pattern and plant species attacked in tropical rain forest. *Journal of Animal Ecology 37*, 387–403.

——(1972) Some factors involved in the selection of vegetable substrate by *Atta cephalotes* L. (Hymenoptera: Formicidae) in tropical rain forest. *Journal of Animal Ecology 41*, 647–60.

Choe, J.C., and Perlman, D.L. (1997) Social conflict and cooperation among founding queens in ants (Hymenoptera: Formicidae). In J.C. Choe and B.J. Crespi, eds.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

The Evolution of Social Behavior in Insects and Arachnids, pp. 392–406. Cambridge University Press, Cambridge.

Chown, S.L., Sinclair, B.J., Leinaas, H.P., and Gaston, K.J. (2004) Hemispheric asymmetries in biodiversity – A serious matter for ecology. *PLoS Biology 2*, e406. doi:10.1371/journal.pbio.0020406.

Christian, C.E. (2001) Consequences of a biological invasion reveal the importance of mutualism for plant communities. *Nature 413*, 635–9.

——and Stanton, M.L. (2004) Cryptic consequences of a dispersal mutualism: seed burial, elaiosome removal and seed-bank dynamics. *Ecology 85*, 1101–10.

Clark, D.B., Guayasamín, C., Pazmiño, O., Donoso, C., Páez de and Villacís, Y. (1982) The tramp ant *Wasmannia auropunctata*: autecology and effects on ant diversity and distribution on Santa Cruz Island, Galapagos. *Biotropica 14*, 196–207.

Clark, J. (1934) Notes on Australian ants, with descriptions of new species and a new genus. *Memoirs of the National Museum of Victoria 8*, 5–20.

Clarke, A., and Gaston, K.J. (2006) Climate, energy and diversity. *Proceedings of the Royal Society of London B 273*, 2257–66.

Clarke, C.M., and Kitching, R.L. (1995) Swimming ants and pitcher plants: a unique ant-plant interaction from Borneo. *Journal of Tropical Ecology 11*, 589–602.

Clémencet, J., Rome, Q., Fédérici, P., and Doums, C. (2007) Aggressions and size-related fecundity of queenless workers in the ant *Cataglyphis cursor*. *Naturwissenschaften 95*, 133–9.

——Viginier, B., and Doums, C. (2005) Hierarchical analysis of population genetic structure in the monogynous ant *Cataglyphis cursor* using microsatellite and mitochondrial DNA markers. *Molecular Ecology 14*, 3735–44.

Clouse, R.M. (2007) The ants of Micronesia (Hymenoptera: Formicidae). *Micronesica 39*, 171–295.

Coenen-Staß, D., Schaarschmidt, B., and Lamprecht, I. (1980) Temperature distribution and calorimetric determination of heat-production in the nest of the wood ant, *Formica polyctena* (Hymenoptera, Formicidae). *Ecology 61*, 238–44.

Colautti, R., and Richardson, D. (2009) Subjectivity and flexibility in invasion terminology: too much of a good thing? *Biological Invasions 11*, 1225–9.

Colby, D., Husseneder, C., and Foil, L. (2008) Microsatellite genotyping of red imported fire ant (Hymenoptera: Formicidae) colonies reveals that most colonies persist in plowed pastures. *Journal of Economic Entomology 101*, 1062–7.

Cole, A.C. (1940) A guide to the ants of Great Smoky Mountains National Park, Tennessee. *The American Midland Naturalist 24*, 1–88.

Cole, B.J. (1983) Assembly of mangrove ant communities: patterns of geographical distribution. *Journal of Animal Ecology 52*, 339–47.

——and Wiernasz, D.C. (2002) Recruitment limitation and population density in the harvester ant. *Pogonomyrmex occidentalis 83*, 1433–42.

Cole, F.R., Medeiros, A.C., Loope, L.L., and Zuehlke, W. W. (1992) Effects of the Argentine ant on arthropod fauna of Hawaiian high-elevation shrubland. *Ecology 73*, 1313–22.

Collett, T.S., and Graham, P. (2004) Animal navigation: path integration, visual landmarks and cognitive maps. *Current Biology 14*, R475-7.

Collingwood, C.A., Pohl, H., Guesten, R., Wranik, W., and van Harten, A. (2004) The ants (Insecta: Hymenoptera: Formicidae) of the Socotra Archipelago. *Fauna of Arabia 20*, 473–95.

Collins, N.M. (1980) The distribution of soil macrofauna on the West Ridge of Gunung (Mount) Mulu, Sarawak. *Oecologia 44*, 262–75.

Colwell, R.K., and Hurtt, G.C. (1994) Nonbiological gradients in species richness and a spurious Rapoport effect. *American Naturalist 144*, 570–95.

——and Lees, D.C. (2000) The mid-domain effect: geometric constraints on the geography of species richness. *Trends in Ecology and Evolution 15*, 70–6.

——Brehm, G., Cardelús, C.L., Gilman, A.C., and Longino, J.T. (2008) Global warming, elevational range shifts, and lowland biotic attrition in the wet tropics. *Science 322*, 258–61.

——Rahbek, C., and Gotelli, N.J. (2004) The mid-domain effect and species richness patterns: what have we learned so far? *American Naturalist 163*, e1–e23.

Commonwealth of Australia (2006) *Threat Abatement Plan to Reduce the Impacts of Tramp Ants on Biodiversity in Australia and its Territories*. Department of the Environment and Heritage, Canberra.

Connell, J.H. (1980) Diversity and the coevolution of competitors, or the ghost of competition past. *Oikos 35*, 131–8.

——(1983) On the prevalence and relative importance of interspecific competition – evidence from field experiments. *American Naturalist 122*, 661–96.

Connor, E.F., and Simberloff, D. (1979) The assembly of species communities: chance or competition? *Ecology 60*, 1132–40.

————(1986) Competition, scientific method, and null models in ecology. *American Scientist 74*, 155–62.

Cook, S.C., and Davidson, D.W. (2006) Nutritional and functional biology of exudate-feeding ants. *Entomologia Experimentalis et Applicata 118*, 1–10.

Coppler, L.B., Murphy, J.F., and Eubanks, M.D. (2007) Red imported fire ants (Hymenoptera: Formicidae) increase

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

the abundance of aphids in tomato. *Florida Entomologist 90*, 419–25.

Copren, K.A., Nelson, L.J., Vargo, E.L., and Haverty, M.I. (2005) Phylogenetic analyses of mtDNA sequences corroborate taxonomic designations based on cuticular hydrocarbons in subterranean termites. *Molecular Phylogenetics and Evolution 35*, 689–700.

Corbara, B., Dejean, A., and Orivel, J. (1999) Ant gardens, a unique epiphyte-ant association. *Année Biologique 38*, 73–89.

Corin, S.E., Abbott, K.L., Ritchie, P.A., and Lester, P.J. (2007a) Large scale unicoloniality: the population and colony structure of the invasive Argentine ant (*Linepithema humile*) in New Zealand. *Insectes Sociaux 54*, 275–82.

——Lester, P.J., Abbott, K.L., and Richie, P.A. (2007b) Inferring historical introduction pathways with mitochondrial DNA: the case of introduced Argentine ants (*Linepithema humile*) into New Zealand. *Diversity and Distributions 13*, 510–8.

Cornelius, M.L., and Grace, J.K. (1997) Influence of brood on the nutritional preferences of the tropical ant species, *Pheidole megacephala* (F.) and *Ochetellus glaber* (Mayr). *Journal of Entomological Science 32*, 421–9.

————and Yates, J.R., III (1996) Acceptability of different sugars and oils to three tropical ant species (Hymen., Formicidae). *Anzeiger für Schädlingskunde Pflanzenschutz Umweltschutz 69*, 41–3.

Costa, A.N., Vasconcelos, H.L., Vieira-Neto, E.H.M., and Bruna, E.M. (2008) Do herbivores exert top-down effects in Neotropical savannas? Estimates of biomass consumption by leaf-cutter ants (*Atta* spp.) in a Brazilian Cerrado site. *Journal of Vegetation Science 19*, 849–54.

Costanza, R., D'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R.V., Paruelo, J., Raskin, R.G., Sutton, P., and ven den Belt, M. (1997) The value of the world's ecosystem services and natural capital. *Nature 387*, 253–260.

Couzin, I.D., and Franks, N.R. (2003) Self-organized lane formation and optimized traffic flow in army ants. *Proceedings of the Royal Society of London B 270*, 139–46.

Cox, C.B. (2001) The biogeographic regions reconsidered. *Journal of Biogeography 28*, 511–23.

Coyle, F.A. (1966) Defensive behavior and associated morphological features in three species of the ant genus *Paracryptocerus*. *Insectes Sociaux 13*, 93–104.

Cremer, S., Armitage, S.A.O., Schmid-Hempel, P. (2007) Social immunity. *Current Biology 17*, R693-R702.

——Ugelvig, L.V., Drijfhout, F.P., Schlick-Steiner, B.C., Steiner, F.M., Cremer, S., Ugelvig, L.V., Drijfhout, F.P., Schlick-Steiner, B.C., Steiner, F.M., Seifert, B., Hughes, D.P., Schulz, A., Petersen, K.S., Konrad, H., Stauffer, C., Kiran, K., Espadaler, X., d'Ettorre, P., Aktac, N., Eilenberg, J., Jones, G.R., Nash, D.R., Pedersen, J.S., and Boomsma, J.J. (2008) The evolution of invasiveness in garden ants. *PLoS ONE 3*, e3838. doi:10.1371/journal.pone.0003838.

————Lommen, S.T.E., Petersen, K.S., and Pedersen, J.S. (2006) Attack of the invasive garden ant: aggression behaviour of *Lasius neglectus* (Hymenoptera: Formicidae) against native *Lasius* species in Spain. *Myrmecologische Nachrichten 9*, 13–9.

Crist, T.O. (2008) Biodiversity, species interactions, and functional roles of ants (Hymenoptera: Formicidae) in fragmented landscapes: a review. *Myrmecological News 12*, 3–13.

——and Haefner, J.W. (1994) Spatial model of movement and foraging in harvester ants (*Pogonomyrmex*) (II): the roles of environment and seed dispersion. *Journal of Theoretical Biology 166*, 315–23.

Croll, D.A., Maron, J.L., Estes, J.A., Danner, E.M., and Byrd, G.V. (2005) Introduced predators transform subarctic islands from grassland to tundra. *Science 307*, 1959–61.

Crozier, R.H. (1979) Genetics of sociality. In H.R. Hermann, ed. *Social Insects*, pp. 223–86. Academic Press, New York.

——(1986) Genetic clonal recognition abilities in marine invertebrates must be maintained by selection for something else. *Evolution 40*, 1100–1.

——(1987) Genetic aspects of kin recognition: concepts, models, and synthesis. In D.J.C. Fletcher and C.D. Michener, eds. *Kin Recognition in Animals*, pp. 55–73. John Wiley, New York.

——(1989) Kin recognition using innate labels: a central role for piggy-backing? In R.K. Grosberg, D. Hedgecock, and K. Nelson, eds. *Invertebrate Historecognition*, pp. 143–56. Plenum Press, New York and London.

——(2008) Advanced eusociality, kin selection and male haploidy. *Australian Journal of Entomology 47*, 2–8.

——and Dix, M.W. (1979) Analysis of two genetic models for the innate components of colony odor in social Hymenoptera. *Behavioral Ecology and Sociobiology*, *4*, 217–24.

——and Pamilo, P. (1996) *Evolution of Social Insect Colonies. Sex Allocation and Kin Selection*. Oxford University Press, Oxford.

——Jermiin, L.S., and Chiotis, M. (1997) Molecular evidence for a Jurassic origin of ants. *Naturwissenschaften 84*, 22–3.

——Pamilo, P., and Crozier, Y.C. (1984) Relatedness and microgeographic genetic variation in *Rhytidoponera mayri*, an Australian arid-zone ant. *Behavioral Ecology and Sociobiology 15*, 143–50.

Csosz, S., Radchenko, A., and Schulz, A. (2007) Taxonomic revision of the Palaearctic *Tetramorium chefketi* species complex (Hymenoptera: Formicidae). *Zootaxa 1405*, 1–38.

Cuatle, M., Rico-Gray, V., and Diaz-Castelazo, C. (2005) Effects of ant behaviour and presence of extrafloral

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

nectaries on seed dispersal of the Neotropical myrmecochore *Turnera ulmifolia* L. (Turneraceae). *Biological Journal of the Linnaean Society London 86*, 67–77.

Currie, C.R. (2001) A community of ants, fungi, and bacteria: a multilateral approach to studying symbiosis. *Annual Review of Microbiology 55*, 357–80.

——and Stuart, A.E. (2001) Weeding and grooming of pathogens in agriculture by ants. *Proceedings of the Royal Society of London B 268*, 1033–9.

——Bot, A.N.M., and Boomsma, J.J. (2003) Experimental evidence of a tripartite mutualism: bacteria protect ant fungus gardens from specialized parasites. *Oikos 101*, 91–102.

——Poulsen, M., Mendenhall, J., Boomsma, J.J., and Billen, J. (2006) Coevolved crypts and exocrine glands support mutualistic bacteria in fungus-growing ants. *Science 311*, 81–3.

——Scottt J.A., Summerbell, R.C., and Malloch, D. (1999) Fungus-growing ants use antibiotic-producing bacteria to control garden parasites. *Nature 398*, 701–4.

Cushman, J.H. (1991) Host-plant mediation of insect mutualisms: variable outcomes in herbivore-ant interactions. *Oikos 61*, 138–44.

——and Addicott, J.F. (1989) Intraspecific and interspecific competition for mutualists – Ants as a limited and limiting resource for aphids. *Oecologia 79*, 315–21.

——and Whitham, T.G. (1989) Conditional mutualism in a membracid-ant association: temporal, age-specific, and density dependent effects. *Ecology 70*, 1040–7.

————(1991) Competition mediating the outcome of mutualism: protective services of ants as a limiting resource for membracids. *American Naturalist 138*, 851–65.

——Lawton, J.H., and Manly, B.F.J. (1993) Latitudinal patterns in European ant assemblages: variation in species richness and body size. *Oecologia 95*, 30–7.

——Martinsen, G.D., and Mazeroll, A.I. (1988) Density-dependent and size-dependent spacing of ant nests: evidence for intraspecific competition. *Oecologia 77*, 522–5.

——Rashbrook, V.K., and Beattie, A.J. (1994) Assessing benefits to both participants in a Lycaenid-ant association. *Ecology 75*, 1031–41.

Cuvillier-Hot, V., Renault, V., and Peeters, C. (2005) Rapid modification in the olfactory signal of ants following a change in reproductive status. *Naturwissenschaften 92*, 73–7.

——Lenoir, A., Crewe, R., Malosse, C., and Peeters, C. (2004) Fertility signalling and reproductive status in queenless ants. *Animal Behaviour 68*, 1209–19.

d'Ettorre, P., and Heinze, J. (2005) Individual recognition in ant queens. *Current Biology 15*, 2170–4.

——Brunner, E., Wenseleers, T., and Heinze, J. (2004) Knowing your enemies: seasonal dynamics of host-social parasite recognition. *Naturwissenschaften 91*, 594–7.

——Mondy, N., Lenoir, A., and Errard, C. (2002a) Blending in with the crowd: social integration into their host colonies using a flexible signature. *Proceedings of the Royal Society of London B 269*, 1911–8.

——Mora, P., Dibangou, V., Rouland, C., and Errard, C. (2002b) The role of the symbiotic fungus in the digestive metabolism of two species of fungus-growing ants. *Journal of Comparative Physiology B 172*, 169–76.

Daane, K.M., Sime, K.R., Fallon, J., and Cooper, M.L. (2007) Impacts of Argentine ants on mealybugs and their natural enemies in California's coastal vineyards. *Ecological Entomology 32*, 583–96.

Dadd, R.H. (1985) Nutrition: organisms. In G.A. Kerkut and L.I. Gilbert, eds. *Comprehensive Insect Physiology, Biochemistry and Pharmacology*, pp. 313–90. Pergamon Press, Oxford.

Dahbi, A., and Lenoir, A. (1998) Nest separation and the dynamics of the gestalt odor in the polydomous ant *Cataglyphis iberica* (Hymenoptera, Formicidae). *Behavioral Ecology and Sociobiology 42*, 349–55.

————Tinaut, A., Taghizadeh, T., Francke, W., and Hefetz, A. (1996) Chemistry of the postpharyngeal gland secretion and its implication for the phylogeny of Iberian *Cataglyphis* species (Hymenoptera: Formicidae). *Chemoecology 7*, 163–71.

Dalecky, A., Renucci, M., Tirard, A., *et al*. (2007) Changes in composition of cuticular biochemicals of the facultatively polygynous ant *Petalomyrmex phylax* during range expansion in Cameroon with respect to social, spatial and genetic variation. *Molecular Ecology 16*, 3778–91.

Daniels, H., Gottsberger, G., and Fiedler, K. (2005) Nutrient composition of larval nectar secretions from three species of myrmecophilous butterflies. *Journal of Chemical Ecology 31*, 2805–21.

Darwin, C. (1859) *On the Origin of Species by Means of Natural Selection*. W. Clowes and Sons, London.

Dauber, J., and Wolters, V. (2004) Edge effects on ant community structure and species richness in an agricultural landscape. *Biodiversity and Conservation 13*, 901–15.

——Bengtsson, J., and Lenoir, L. (2006a) Evaluating effects of habitat loss and land-use continuity on ant species richness in seminatural grassland remnants. *Conservation Biology 20*, 1150–60.

——Rommeler, A., and Wolters, V. (2006b) The ant *Lasius flavus* alters the viable seed bank in pastures. *European Journal of Soil Biology 42*, S157-63.

——Schroeter, D., and Wolters, V. (2001) Species specific effects of ants on microbial activity and N-availability in the soil of an old-field. *European Journal of Soil Biology 37*, 259–61.

Davic, R.D. (2003) Linking keystone species and functional groups: a new operational definition of the keystone species concept. *Conservation Ecology 7*, r11. http://www.consecol.org/vol17/iss1/resp11/.

Davidson, D.W. (1988) Ecological studies of Neotropical ant gardens. *Ecology 69*, 1138–52.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Davidson, D.W. (1997) The role of resource imbalances in the evolutionary ecology of tropical arboreal ants. *Biological Journal of the Linnaean Society London 61*, 153–81.

——(1998) Resource discovery versus resource domination in ants: a functional mechanism for breaking the trade-off. *Ecological Entomology 23*, 484–90.

——and McKey, D. (1993) The evolutionary ecology of symbiotic ant-plant relationships. *Journal of Hymenoptera Research 2*, 13–83.

——and Morton, S.R. (1981) Myrmecochory in some plants (F. Chenopodiaceae) of the Australian arid zone. *Oecologia 50*, 357–66.

——Cook, S.C., and Snelling, R.R. (2004) Liquid-feeding performances of ants (Formicidae): ecological and evolutionary implications. *Oecologia 139*, 255–66.

——Snelling, R.R., and Longino, J.T. (1989) Competition among ants for myrmecophytes and the significance of plant trichomes. *Biotropica 21*, 64–73.

——Cook, S.C., Snelling, R.R., and Chua, T.H. (2003) Explaining the abundance of ants in lowland tropical rainforest canopies. *Science 300*, 969–72.

——Lessard, J.P., Bernau, C.R., and Cook, S.C. (2007) The tropical ant mosaic in a primary Bornean rain forest. *Biotropica 39*, 468–75.

Davis, N.E., O'Dowd, D.J., Green, P.T., and MacNally, R. (2008) Effects of an alien ant invasion on abundance, behavior, and reproductive success of endemic island birds. *Conservation Biology 22*, 1165–76.

Dawkins, R. (1976) *The Selfish Gene*. Oxford University Press, Oxford.

——(1982) *The Extended Phenotype*. Oxford University Press, Oxford.

de Andrade, M.L., and Baroni-Urbani, C. (1999) Diversity and adaptation in the ant genus *Cephalotes*, past and present. *Stuttgarter Beiträge zur Naturkunde Serie B (Geologie und Paläontologie) 271*, 1–889.

de Bruyn, L.A.L. (1999) Ants as bioindicators of soil function in rural environments. *Agriculture Ecosystems & Environment 74*, 425–41.

De Heer, C.J., and Ross, K.G. (1997) Lack of detectable nepotism in multiple-queen colonies of the fire ant *Solenopsis invicta* (Hymenoptera: Formicidae). *Behavioral Ecology and Sociobiology 40*, 27–33.

de la Fuente, M.A.S., and Marquis, R.J. (1999) The role of ant-tended extrafloral nectaries in the protection and benefit of a Neotropical rainforest tree. *Oecologia 118*, 192–202.

Debout, G., Schatz, B., Elias, M., and McKey, D. (2007) Polydomy in ants: what we know, what we think we know, and what remains to be done. *Biological Journal of the Linnean Society 90*, 319–48.

Debuse, V.J., King, J., and House, A.P.N. (2007) Effect of fragmentation, habitat loss and within-patch habitat characteristics on ant assemblages in semi-arid woodlands of eastern Australia. *Landscape Ecology 22*, 731–45.

Decaëns, T., Asakawa, N., Galvis, J.H., Thomas, R.J., and Amezquita, E. (2002) Surface activity of soil ecosystem engineers and soil structure in contrasted land use systems of Colombia. *European Journal of Soil Biology 38*, 267–71.

Dechaume-Moncharmont, F.X., Dornhaus, A., Houston, A.I., McNamara, J.M., Collins, E.J., and Franks, N.R. (2005) The hidden cost of information in collective foraging. *Proceedings of the Royal Society of London B 272*, 1689–95.

DeFauw, S.L., Vogt, J.T., and Boykin, D.L. (2008) Influence of mound construction by red and hybridized imported fire ants on soil chemical properties and turfgrass in a sod production agroecosystem. *Insectes Sociaux 55*, 301–12.

Dejean, A., and Beugnon, G. (1991) Persistent intercolonial trunkroute-marking in the African weaver ant *Oecophylla longinoda* Latreille (Hymenoptera, Formicidae): tom Thumb's versus Ariadne's orienting strategies. *Ethology 88*, 89–98.

——and Corbara, B. (2003) A review of mosaics of dominant ants in rainforests and plantations. In Y. Basset, V. Novotny, S.E. Miller, and R.L. Kitching, eds. *Arthropods of Tropical Forests: spatio-temporal dynamics and resource use in the canopy*, pp. 341–7. Cambridge University Press, Cambridge.

——and Gibernau, M. (2000) A rainforest ant mosaic: the edge effect (Hymenoptera: Formicidae). *Sociobiology 35*, 385–402.

——Kenne, M., and Moreau, C.S. (2007b) Predatory abilities favour the success of the invasive ant *Pheidole megacephala* in an introduced area. *Journal of Applied Entomology 131*, 625–9.

——Corbara, B., Orivel, J., and Leponce, M. (2007a) Rainforest canopy ants: the implications of territoriality and predatory behavior. *Functional Ecosystems and Communities 1*, 105–20.

——Moreau, C.S., Kenne, M., and Leponce, M. (2008) The raiding success of *Pheidole megacephala* on other ants in both its native and introduced ranges. *Comptes Rendus Biologies 331*, 631–5.

——Le Breton, J., Suzzoni, J.P., Orivel, J., and Saux-Moreau, C. (2005a) Influence of interspecific competition on the recruitment behavior and liquid food transport in the tramp ant species *Pheidole megacephala*. *Naturwissenschaften 92*, 324–7.

——Solano, P.J., Ayroles, J., Corbara, B., and Orivel, J. (2005b) Arboreal ants build a trap to ambush and capture prey. *Nature 434*, 793.

Dekoninck, W. (2007) Acceptance of two native myrmecophilous species, *Platyarthrus hoffmannseggii* (Isopoda:

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

oniscidea) and *Cyphoderus albinos* (Collembola: Cyphoderidae) by the introduced invasive garden ant *Lasius neglectus* (Hymenoptera: Formicidae) in Belgium. *European Journal of Entomology 104*, 159–61.

Del-Claro, K., and Oliveira, P. (1996) Honeydew flicking by treehoppers provides cues to potential tending ants. *Animal Behaviour 51*, 1071–5.

——and Oliveira, P.S. (2000) Conditional outcomes in a neotropical treehopper-ant association: temporal and species-specific variation in ant protection and homopteran fecundity. *Oecologia 124*, 156–65.

Delabie, J.H.C. (2001) Trophobiosis between Formicidae and Hemiptera (Sternorrhyncha and Auchenorrhyncha): an overview. *Neotropical Entomology 30*, 501–16.

——Agosti, D., and do Nascimento, I. (2000) Litter ant communities of the Brazilian Atlantic rain forest region. In D. Agosti, J. Majer, L. Alonso, and T.R. Schultz, eds. *Sampling Ground-dwelling Ants: case studies from the world's rain forests*. Curtin University of Technology School of Environmental Biology Bulletin No. *18*.

Delaplane, K.S., and LaFage, J.P. (1990) Wood excavations of three species of subterranean termites. *Entomologia Experimentalis et Applicata 54*, 81–7.

Depickère, S., Fresneau, D., Detrain, C., and Deneubourg, J.L. (2004) Marking as a decision factor in the choice of new nesting site in *Lasius niger*. *Insectes Sociaux 51*, 243–6.

Des Granges, J.L. (1979) Organization of a tropical nectar feeding bird guild in a variable environment. *Living Bird 17*, 199–236.

Deslippe, R.J., and Savolainen, R. (1995) Sex investment in a social insect: the proximate role of food. *Ecology 76*, 375–82.

Detrain, C., and Pasteels, J.M. (1992) Caste polyethism and collective defense in the ant, *Pheidole pallidula*: the outcome of quantitative differences in recruitment. *Behavioral Ecology and Sociobiology 29*, 405–12.

——Deneubourg, J.-L., and Pasteels, J.M. (1999) *Information processing in social insects*. Birkhäuser, Basel.

Dettner, K., and Liepert, C. (1994) Chemical mimicry and camouflage. *Annual Review of Entomology 39*, 129–54.

Deutsch, C.A., Tewksbury, J.J., and Huey, R.B. (2008) Impacts of climate warming on terrestrial ectotherms across latitude. *Proceedings of the National Academy of Sciences USA 105*, 6668–72.

Devigne, C., and Detrain, C. (2002) Collective exploitation and area marking in the ant *Lasius niger*. *Insectes Sociaux 49*, 357–62.

DeVries, P.J. (1991) Mutualisms between *Thisbe irenea* butterflies and ants, the role of ant ecology in the evolution of larval-ant associations. *Biological Journal of the Linnean Society 43*, 179–95.

——and Baker, I. (1989) Butterfly exploitation of an ant-plant mutualism: adding insult to herbivory. *Journal of the New York Entomological Society 97*, 332–40.

Deyrup, M. (2003) An updated list of Florida ants (Hymenoptera: Formicidae). *Florida Entomologist 86*, 43–8.

——and Cover, S. (2004) A new species of the ant genus *Leptothorax* from Florida, with a key to the *Leptothorax* of the southeast (Hymenoptera: Formicidae). *Florida Entomologist 87*, 51–9.

Diamond, J.M. (1975) Assembly of species communities. In M.L. Cody and J.M. Diamond, eds. *Ecology and Evolution of Communities*, pp. 342–444. Harvard University Press, Cambridge, MA.

——and Case, T.J. (1986) Overview: introductions, extinctions, exterminations, and invasions. In J.M. Diamond and T.J. Case, eds. *Community Ecology*, pp. 65–79. Harper and Row, New York.

Díaz-Castelazo, C., and Rico-Gray, V. (1998) Numero y variacion estacional de asociaciones hormiga-planta en un bosque montano bajo de Veracruz, Mexico. *Acta Zoologica Mexicana (nueva serie) 73*, 45–55.

————Oliveira, P.S., and Cuatle, M. (2004) Extrafloral nectary-mediated ant-plant interactions in the coastal vegetation of Veracruz, Mexico: richness, occurrence, seasonality, and ant foraging patterns. *Ecoscience 11*, 472–81.

Diaz, R., Knutson, A., and Bernal, J.-S. (2004) Effect of the red imported fire ant on cotton aphid population density and predation of bollworm and beet armyworm eggs. *Journal of Economic Entomology 97*, 222–9.

Dietrich, C.O., Schlick, B., and Steiner, F. (1998) Ameisen bei Hochwasser (Hymenoptera: Formicidae) – Beobachtungen in Ostösterreich im Juli 1997. *Myrmecologische Nachrichten 2*, 35–41.

DiGirolamo, L.A., and Fox, L.R. (2006) The influence of abiotic factors and temporal variation on local invasion patterns of the Argentine ant (*Linepithema humile*). *Biological Invasions 8*, 125–35.

Dijkstra, M.B., and Boomsma, J.J. (2003) *Gnamptogenys hartmani* Wheeler (Ponerinae: Ectatommini): an agro-predator of *Trachymyrmex* and *Sericomyrmex* fungus-growing ants. *Naturwissenschaften 90*, 568–71.

——Nash, D.R., and Boomsma, J.J. (2005) Self-restraint and sterility in workers of *Acromyrmex* and *Atta* leafcutter ants. *Insectes Sociaux 52*, 67–76.

Dill, M., Williams, D.J., and Maschwitz, U. (2002) Herdsmen ants and their mealybug partners. *Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft 557*, 1–373.

Diniz, J.L.M., and Brandão, C.R.F. (1993) Biology and myriapod predation by the neotropical myrmicine ant

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Stegomyrmex vizottoi (Hymenoptera: Formicidae). *Insectes Sociaux 40*, 301–11.

Djiéto-Lordon, C., Dejean, A., Gibernau, M., Hossaert-McKey, M., and McKey, D. (2004) Symbiotic mutualism with a community of opportunistic ants: protection, competition, and ant occupancy of the myrmecophyte *Barteria nigritana* (Passifloraceae). *Acta Oecologica 26*, 109–16.

Dlussky, G.M., and Rasnitsyn, A.P. (2003) Ants (Hymenoptera: Formicidae) of Formation Green River and some other Middle Eocene deposits of North America. *Russian Entomological Journal 11*, 411–36.

——Brothers, D.J., and Rasnitsyn, A.P. (2004) The first Late Cretaceous ants (Hymenoptera: Formicidae) from southern Africa, with comments on the origin of the Myrmicinae. *Insect Systematics and Evolution 35*, 1–13.

Domisch, T., Finér, L., and Jurgensen, M.F. (2005) Red wood ant mound densities in managed boreal forests. *Annales Fennici Zoologici 42*, 277–82.

Don, W. (2008) *Ants of New Zealand*. Otago University Press, New Zealand.

Dornhaus, A. (2008) Specialization does not predict individual efficiency in an ant. *PLoS Biology 6*, e285. doi: 10.1371/journal.pbio.0060285.

——and Franks, N.R. (2008) Individual and collective cognition in ants and other insects (Hymenoptera: Formicidae). *Myrmecological News 11*, 215–26.

——Franks, N., Hawkins, R.M., and Shere, H.N.S. (2004) Ants move to improve – colonies of *Leptothorax albipennis* emigrate whenever they find a superior nest site. *Animal Behaviour 67*, 959–63.

——Holley, J.-A., Pook, V.G., Worswick, G., and Franks, N. R. (2008) Why don't all workers work? Colony size and workload during emigrations in the ant *Temnothorax albipennis*. *Behavioral Ecology and Sociobiology 63*, 43–51.

——Klügl, F., Oechslein, C., Puppe, F., and Chittka, L. (2006b) Benefits of recruitment in honey bees: effects of ecology and colony size in an individual-based model. *Behavioral Ecology 17*, 336–44.

——Collins, E.J., Dechaume-Moncharmont, F.X., Houston, A.I., Franks, N.R., and McNamara, J.M. (2006a) Paying for information: partial loads in central place foragers. *Behavioral Ecology and Sociobiology 61*, 151–61.

Douglas, A.E. (1993) The nutritional quality of phloem sap utilized by natural aphid populations. *Ecological Entomology 18*, 31–8.

Doums, C., Cabrera, H., and Peeters, C. (2002) Population genetic structure and male-biased dispersal in the queenless ant *Diacamma cyaneiventre*. *Molecular Ecology 11*, 2251–64.

Drees, B.M., Berger, L.A., Cavazos, R., and Vinson, S.B. (1991) Factors affecting sorghum and corn seed predation by foraging red imported fire ants (Hymenoptera: Formicidae). *Journal of Economic Entomology 84*, 285–9.

Dreier, S., van Zweden, J.S., d'Ettorre, P. (2007) Long-term memory of individual identity in ant queens. *Biology Letters 3*, 459–62.

Dronnet, S., Lohou, C., Christides, J.-P., and Bagnères, A. G. (2006) Cuticular hydrocarbon composition reflects genetic relationship among colonies of the introduced termite *Reticulitermes santonensis* Feytaud. *Journal of Chemical Ecology 32*, 1027–42.

Dudley, R., Byrnes, G., Yanoviak, S.P., Borrell, B., Brown, R., and McGuire, J. (2007) Gliding and the functional origins of flight: biomechanical novelty or necessity? *Annual Review of Ecology Evolution and Systematics 38*, 179–201.

Dugatkin, L.A., and Reeve, H.K. (2000) *Game Theory and Animal Behavior*. Oxford University Press, USA.

Dumpert, K., Maschwitz, U., and Weissflog, A. (2006) Description of five new weaver ant species of *Camponotus* subgenus *Karavaievia* Emery, 1925 (Hymenoptera: Formicidae) from Malaysia and Thailand, with contribution to their biology, especially to colony foundation. *Myrmecologische Nachrichten 8*, 69–82.

Dunn, R.R. (2004) Managing the tropical landscape: a comparison of the effects of logging and forest conversion to agriculture on ants, birds and Lepidoptera. *Forest Ecology and Management 191*, 215–24.

——(2005) Modern insect extinctions, the neglected majority. *Conservation Biology 19*, 1030–6.

——(2008a) *Global Ant Community database*. http://www.antmacroecology.org/.

——(2008b) The trouble with biodiversity. *Seed Magazine, October*, http://seedmagazine.com/news/2008/2010/the_trouble_with_biodiversity.php.

——Colwell, R.K., and Nilsson, C. (2006) The river domain: why are there more species halfway up the river? *Ecography 29*, 251–9.

——Parker, C.R., and Sanders, N.J. (2007c) Temporal patterns of diversity: assessing the biotic and abiotic controls on ant assemblages. *Biological Journal of the Linnean Society 91*, 191–201.

——Sanders, N.J., Fitzpatrick, M.C., Laurent, E.J., Lessard, J.P., Agosti, D., Andersen, A.N., Brühl, C.A, Cerdá, X., Ellison, A.M., Fisher, B.L., Gibb, H., Gotelli, N.J., Gove, A.D., Guénard, B., Janda, M., Kaspari, M., Longino, J.T., Majer, J.D., McGlynn, T.P., Menke, S.B., Parr, C.L., Philpott, S.M., Pfeiffer, M., Retana, J., Suarez, A.V., and Vasconcelos, H.L. (2007d) Global ant (Hymenoptera: Formicidae) biodiversity and biogeography–a new database and its possibilities. *Myrmecological News 10*, 77–83.

——Parker, C.R., Geraghty, M., and Sanders, N.J. (2007b) Reproductive phenologies in a diverse temperate ant fauna. *Ecological Entomology 32*, 135–42.

——Gove, A.D., Barraclough, T.G., Givnish, T.J., and Majer, J.D. (2007a) Convergent evolution of an ant-

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

plant mutualism across plant families, continents, and time. *Evolutionary Ecology Research 9*, 1349–62.

——Agosti, D., Andersen, A.N., Arnan, X., Brühl, C.A, Cerdá, X., Ellison, A.M., Fisher, B.L., Fitzpatrick, M.C., Gibb, H., Gotelli, N.J., Gove, A.D., Guénard, B., Janda, M., Kaspari, M., Laurent, E.J., Lessard, J.P., Longino, J.T., Majer, J.D., McGlynn, T.P., Menke, S.B., Parr, C.L., Philpott, S.M., Pfeiffer, M., Retana, J., Suarez, A.V., Vasconcelos, H.L., Weiser, M.D., and Sanders, N.J. (2009) Climatic drivers of hemispheric asymmetry in global patterns of ant species richness. *Ecology Letters 12*, 324–33.

Dussutour, A., and Simpson, S.J. (2008) Description of a simple synthetic diet for studying nutritional responses in ants. *Insectes Sociaux 55*, 329–33.

——Beshers, S., Deneubourg, J.L., and Fourcassie, V. (2007) Crowding increases foraging efficiency in the leaf-cutting ant *Atta colombica*. *Insectes Sociaux 54*, 158–65.

Dutcher, J.D., Estes, P.M., and Dutcher, M.J. (1999) Interactions in entomology: aphids, aphidophaga and ants in pecan orchards. *Journal of Entomological Science 34*, 40–56.

Dutra, H.P., Freitas, A.V.L., and Oliveira, P.S. (2006) Dual ant attraction in the Neotropical shrub *Urera baccifera* (Urticaceae): the role of ant visitation to pearl bodies and fruits in herbivore deterrence and leaf longevity. *Functional Ecology 20*, 252–60.

Dynesius, M., and Jansson, R. (2000) Evolutionary consequences of changes in species' geographical distributions driven by Milankovitch climate oscillations. *Proceedings of the National Academy of Sciences USA 97*, 9115–20.

Eastwood, R., and Fraser, A.M. (1999) Associations between lycaenid butterflies and ants in Australia. *Australian Journal of Ecology 24*, 503–37.

——Pierce, N.E., Kitching, R.L., and Hughes, J.M. (2006) Do ants enhance diversification in lycaenid butterflies? Phylogeographic evidence from a model myrmecophile, *Jalmenas evagoras*. *Evolution 60*, 315–27.

Edelstein-Keshet, L., Watmough, J., and Ermentrout, G.B. (1995) Trail following in ants: individual properties determine population behaviour. *Behavioral Ecology and Sociobiology 36*, 119–33.

Eguchi, K. (2008) A revision of Northern Vietnamese species of the ant genus *Pheidole* (Insecta: Hymenoptera: Formicidae: Myrmicinae). *Zootaxa 1902*, 1–118.

——Yoshimura, M., and Yamane, S. (2006) The Oriental species of the ant genus *Probolomyrmex* (Insecta: Hymenoptera: Formicidae: Proceratiinae). *Zootaxa 1376*, 1–35.

Ehmer, B., and Hölldobler, B. (1995) Foraging behavior of *Odontomachus bauri* on Barro Colorado Island, Panama. *Psyche (Cambridge) 102*, 215–24.

Eken, G., Bennun, L., and Brooks, T.M. (2004) Key biodiversity areas as site conservation targets. *BioScience 54*, 1110–8.

Elias, M., Rosengren, R., and Sundstrom, L. (2005) Seasonal polydomy and unicoloniality in a polygynous population of the red wood ant *Formica truncorum*. *Behavioral Ecology and Sociobiology 57*, 339–49.

Elmes, G.W., and Petal, J. (1990) Queen number as an adaptable trait: evidence from wild populations of two red ant species (genus *Myrmica*). *Journal of Animal Ecology 59*, 675–90.

——Thomas, J.A., Wardlaw, J.C., Hochberg, M.E., Clarke, R.T., and Simcox, D.J. (1998) The ecology of *Myrmica* ants in relation to the conservation of *Maculinea* butterflies. *Journal of Insect Conservation 2*, 67–78.

Elton, C.S. (1932) Territory among wood ants (*Formica rufa* L.) at Picket Hill. *Journal of Animal Ecology 1*, 69–76.

——(1958) *The Ecology of Invasions by Animals and Plants*. Methuen and Co. Ltd.

Endler, A., Liebig, J., Schmitt, T., Parker, J.E., Jones, G.R., Schreier, P., and Hölldobler, B. (2004) Surface hydrocarbons of queen eggs regulate worker reproduction in a social insect. *Proceedings of the National Academy of Sciences USA 101*, 2945–50.

Engel, M.S., and Grimaldi, D.A. (2005) Primitive new ants in Cretaceous amber from Myanmar, New Jersey, and Canada (Hymenoptera: Formicidae). *American Museum Novitates 3485*, 1–23.

Enquist, B.J., Haskell, J.P., and Tiffney, B.H. (2002) General patterns of taxonomic and biomass partitioning in extant and fossil plant communities. *Nature 419*, 610–3.

EoL (2008) *Encyclopedia of Life*. http://www.eol.org/home.html.

Epperson, D.M., and Heise, C.D. (2003) Nesting and hatchling ecology of gopher tortoises (*Gopherus polyphemus*) in southern Mississippi. *Journal of Herpetology 37*, 315–24.

Erickson, J.M. (1971) The displacement of native ant species by the introduced Argentine ant *Iridomyrmex humilis* Mayr. *Psyche (Cambridge) 78*, 257–66.

Errard, C. (1994a) Development of interpecific recognition behavior in the ants *Manica rubida* and *Formica selysi* (Hymenoptera: Formicidae) reared in mixed-species groups. *Journal of Insect Behaviour 7*, 83–99.

——(1994b) Long-term memory involved in nestmate recognition in ants. *Animal Behaviour 48*, 263–71.

——Hefetz, A., and Jaisson, P. (2006) Social discrimination tuning in ants: template formation and chemical similarity. *Behavioral Ecology and Sociobiology 59*, 9–14.

——Le Guisquet, A.M., Christides, J.P., Mercier, J., Lenoir, A., and Hefetz, A. (2008) Early learning of volatile chemical cues leads to interspecific recognition between two ant species. *Insectes Sociaux 55*, 115–22.

Erthal, M., Silvab, C.P., and Samuelsc, R.I. (2007) Digestive enzymes in larvae of the leaf cutting ant, *Acromyrmex subterraneus* (Hymenoptera: Formicidae: Attini). *Journal of Insect Physiology 53*, 1101–11.

Espadaler, X. (2005) *Monomorium destructor*, la hormiga de Singapur, detectada y detenida en el puerto de Barcelona (Hymenoptera, Formicidae). *Orsis 20*, 27–32.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Espadaler, X. and Rey, S. (2001) Biological constraints and colony founding in the polygynous invasive ant *Lasius neglectus* (Hymenoptera, Formicidae). *Insectes Sociaux 48*, 159–64.

——Tartally, A., Schultz, R., Seifert, B., and Nagy, C. (2007) Regional trends and preliminary results on the local expansion rate in the invasive garden ant, *Lasius neglectus* (Hymenoptera, Formicidae). *Insectes Sociaux 54*, 293–301.

Eubanks, M.D., Blackwell, S.A., Parrish, C.J., DeLamar, Z. D., and Hull-Sanders, H. (2002) Intraguild predation of beneficial arthropods by red imported fire ants in cotton. *Environmental Entomology 31*, 1168–74.

Evans, K.L., and Gaston, K.J. (2005) Can the evolutionary-rates hypothesis explain species-energy relationships? *Functional Ecology 19*, 899–915.

——Warren, P.H., and Gaston, K.J. (2005) Species-energy relationships at the macroecological scale: a review of the mechanisms. *Biological Reviews 80*, 1–25.

Fagan, W.F., Siemann, E., Mitter, C., Denno, R.F., Huberty, A.F., Woods, H.A., Elser, J.J. (2002) Nitrogen in insects: implications for trophic complexity and species diversification. *American Naturalist 160*, 784–802.

FAO (1997) *Framework for pest risk analysis*. https://www.ippc.int.

——(1998) *Guidelines for pest eradication programmes*. https://www.ippc.int.

——(2006) International Standards for Phytosanitary Measures 1–27, Secretariat of the International Plant Protection Convention.

Farji-Brener, A.G. (2001) Why are leaf-cutting ants more common in early secondary forests than in old-growth tropical forests? An evaluation of the palatable forage hypothesis. *Oikos 92*, 167–77.

——and Ghermandi, L. (2008) Leaf-cutting ant nests near roads increase fitness of exotic plant species in natural protected areas. *Proceedings of the Royal Society of London B 275*, 1431–40.

——and Illes, A.E. (2000) Do leaf-cutting ants make 'bottom-up' gaps in neotropical rain forests? A critical review of the evidence. *Ecology Letters 3*, 219–27.

——Corley, J.C., and Bettinelli, J. (2002) The effects of fire on ant communities in north-western Patagonia: the importance of habitat structure and regional context. *Diversity and Distributions 8*, 235–43.

Farley, J. (2008) The role of prices in conserving critical natural capital. *Conservation Biology 22*, 1399–408.

Federle, W., Maschwitz, U., Fiala, B., and Riederer, M. (1997) Slippery ant-plants and skilful climbers: selection and protection of specific ant partners by epicuticular wax blooms in *Macaranga* (Euphorbiaceae). *Oecologia 112*, 217–24.

Fedriani, J.M., Rey, P.J., Garrido, J.L., Guitián, J., Herrera, C.M., Medrano, M., Sánchez-Lafuente, A.M. and Cerdá, X. (2004) Geographical variation in the potential of mice to constrain an ant-seed dispersal mutualism. *Oikos 105*, 181–91.

Feener, D.H. (1981) Competition between ant species: outcome controlled by parasitic flies. *Science 214*, 815–7.

——(2000) Is the assembly of ant communities mediated by parasitoids? *Oikos 90*, 79–88.

——and Moss, K.A.G. (1990) Defense against parasites by hitchhikers in leaf-cutting ants: a quantitative assessment. *Behavioral Ecology and Sociobiology 26*, 17–29.

——and Schupp, E.W. (1998) Effect of treefall gaps on the patchiness and species richness of Neotropical ant assemblages. *Oecologia 116*, 191–201.

——Orr, M.R., Wackford, K.M., Longo, J.M., Benson, W. W., and Gilbert, L.E. (2008) Geographic variation in resource dominance-discovery in Brazilian ant communities. *Ecology 89*, 1824–36.

Feitosa, R.M., and Brandão, C.R.F. (2008) A taxonomic revision of the Neotropical myrmicine ant genus *Lachnomyrmex* Wheeler (Hymenoptera: Formicidae). *Zootaxa 1890*, 1–49.

————and Dietz, B.H. (2007) *Basiceros scambognathus* (Brown, 1949) n. comb., with the first worker and male descriptions, and a revised generic diagnosis (Hymenoptera: Formicidae: Myrmicinae). *Papeis Avulsos de Zoologia (São Paulo) 47*, 15–26.

————and Diniz, J.L.M. (2008) Revisionary studies on the enigmatic Neotropical ant genus *Stegomyrmex* Emery, 1912 (Hymenoptera: Formicidae: Myrmicinae), with the description of two new species. *Journal of Hymenoptera Research 17*, 64–82.

Feldhaar, H., Fiala, B., and Gadau, J. (2005) A shift in colony founding behaviour in the obligate plant-ant *Crematogaster* (*Decacrema*) morphospecies 2. *Insectes Sociaux 52*, 222–30.

——Foitzik, S., and Heinze, J. (2008) Lifelong commitment to the wrong partner: hybridization in ants. *Philosophical Transactions of the Royal Society B 363*, 2891–9.

——Fiala, B., Hashim, R., and Maschwitz, U. (2003) Patterns of the *Crematogaster-Macaranga* association: the ant partner makes the difference. *Insectes Sociaux 50*, 9–19.

——Straka, J., Krischke, M., Berthold, K., Stoll, S., Mueller, M.J. and Gross, R. (2007) Nutritional upgrading for omnivorous carpenter ants by the endosymbiont *Blochmannia*. *BMC Biology 5*, 48. doi:10.1186/1741-7007-5-48.

Fellers, J.H. (1987) Interference and exploitation in a guild of woodland ants. *Ecology 68*, 1466–78.

Felsenstein, J. (1985) Phylogenies and the comparative method. *American Naturalist 125*, 1–15.

Ferguson, B.G., Boucher, D.H., Pizzi, M., and Rivera, C. (1995) Recruitment and decay of a pulse of *Cecropia* in Nicaraguan rain forest damaged by hurricane Joan: relation to mutualism with *Azteca* ants. *Biotropica 27*, 455–60.

Fernández, F. (2003) Revision of the myrmicine ants of the *Adelomyrmex* genus-group (Hymenoptera: Formicidae). *Zootaxa 361*, 1–52.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

——(2004) The American species of the myrmicine ant genus *Carebara* Westwood (Hymenoptera: Formicidae. *Caldasia 26*, 191–238.

——(2006) A new species of *Carebara* Westwood (Hymenoptera: Formicidae) and taxonomic notes on the genus. *Revista Colombiana de Entomología 32*, 97–9.

——(2007a) The myrmicine ant genus *Allomerus* Mayr (Hymenoptera: Formicidae). *Caldasia 29*, 159–75.

——(2007b) Two new South American species of *Monomorium* Mayr with taxonomic notes on the genus. *Memoirs of the American Entomological Institute 80*, 128–45.

——and Guerrero, R.J. (2008) *Technomyrmex* (Formicidae: dolichoderinae) in the New World: synopsis and description of a new species. *Revista Colombiana de Entomología 34*, 110–5.

Fernández-Escudero, I., Seppä, P., and Pamilo, P. (2001) Dependent colony founding in the ant *Proformica longiseta*. *Insectes Sociaux 48*, 80–2.

Fernández-Marín, H., Zimmerman, J.K., and Wcislo, W.T. (2007) Fungus garden platforms improve hygiene during nest establishment in *Acromyrmex* ants (Hymenoptera, Formicidae, Attini). *Insectes Sociaux 54*, 64–9.

Ferrier, S., Powell, G.V.N., Richardson, K.S., Manion, G., Overton, J.M., Allnutt, T.F., Cameron, S.E., Mantle, K., Burgess, N.D., Faith, D.R., Lamoreux, J.F., Kier, G., Hijmans, R.J., Funk, V.A., Cassis, G.A., Fisher, B.L., Flemons, P., Lees, D., Lovett, J.C., and Van Rompaey, R.S.A.R. (2004) Mapping more of terrestrial biodiversity for global conservation assessment. *BioScience 54*, 1101–9.

Ferveur, J.F. (2005) Cuticular hydrocarbons: their evolution and roles in *Drosophila* pheromonal communication. *Behavior Genetics 35*, 279–95.

Fewell, J., Harrison, J., Lighton, J., and Breed, M.D. (1996) Foraging energetics of the ant, *Paraponera clavata*. *Oecologia 105*, 419–27.

Fiala, B., Maschwitz, U., Pong, T.Y., and Helbig, A.J. (1989) Studies of a south east Asian ant-plant association: protection of *Macaranga* trees by *Crematogater borneensis*. *Oecologia 79*, 463–70.

Fiedler, K. (1995) Lycaenid butterflies and plants: is myrmecophily associated with particular hostplant preferences? *Ethology Ecology & Evolution 7*, 107–32.

——(2006) Ant-associates of Palaearctic lycaenid butterfly larvae (Hymenoptera: Formicidae; Lepidoptera: Lycaenidae) – a review. *Myrmecologische Nachrichten 9*, 77–87.

——Kuhlmann, F., Schlick-Steiner, B.C., Steiner, F.M., and Gebauer, G. (2007) Stable N-isotope signatures of central European ants – assessing positions in a trophic gradient. *Insectes Sociaux 54*, 393–402.

Fischer, R.C., Ölzant, S.M., Wanek, W., and Mayer, V. (2005) The fate of *Corydalis cava* elaiosomes within an ant colony of *Myrmica rubra*: elaiosomes are preferentially fed to larvae. *Insectes Sociaux 52*, 55–62.

——Richter, A., Hadacek, F., and Mayer, V. (2008) Chemical differences between seeds and elaiosomes indicate an adaptation to nutritional needs of ants. *Oecologia 155*, 539–47.

————Wanek, W., and Mayer, V. (2002) Plants feed ants: food bodies of myrmecophytic *Piper* and their significance for the interaction with *Pheidole bicornis* ants. *Oecologia 133*, 186–92.

Fisher, B.L. (1996) Ant diversity patterns along an elevational gradient in the Réserve Naturelle Intégrale d'Andringitra, Madagascar. *Fieldiana Zoology 85*, 93–108.

——(1997) Biogeography and ecology of the ant fauna of Madagascar (Hymenoptera: Formicidae). *Journal of Natural History 9*, 714–31.

——(1998) Ant diversity patterns along an elevational gradient in the Reserve Speciale d'Anjanaharibe-Sud and on the western Masoala Peninsula, Madagascar. *Zoology 90*, 39–67.

——(1999a) Ant diversity patterns along an elevational gradient in the Réserve Naturelle Intégrale d'Andohahela, Madagascar. *Fieldiana Zoology 94*, 129–47.

——(1999b) Improving inventory efficiency: a case study of leaf litter ant diversity in Madagascar. *Ecological Applications 9*, 714–31.

——(2000) The Malagasy fauna of *Strumigenys*. In B. Bolton, ed. *The Ant Tribe Dacetini. Memoirs of the American Entomological Institute*, pp. 612–710.

——(2003) Ants (Formicidae: Hymenoptera). In S.M. Goodman and J.P. Benstead, eds. *The Natural History of Madagascar*, pp. 811–819. University of Chicago Press.

——(2005) A new species of *Discothyrea* Roger from Mauritius and a new species of *Proceratium* from Madagascar (Hymenoptera: Formicidae). *Proceedings of the California Academy of Sciences (4) 56*, 657–67.

——(2009) Ants. In R.G. Gillespie and D.A. Clague, eds. *Encyclopedia of Islands*, pp. 35–41. University of California Press, Berkeley, CA.

——and Cover, S.P. (2007) *Ants of North America. A guide to genera*. University of California Press, Berkeley, CA.

——and Smith, M.A. (2008) A revision of Malagasy species of *Anochetus* Mayr and *Odontomachus* Latreille (Hymenoptera: Formicidae). *PLoS ONE 3*, e1787, doi:1710.1371/journal.pone.0001787.

Fitzpatrick, M.C., Weltzin, J.F., and Sanders, N.J., and Dunn, R.R. (2007) The biogeography of prediction error: why does the introduced range of the fire ant over-predict its native range? *Global Ecology and Biogeography 16*, 24–33.

Fjerdingstad, E.J., and Crozier, R.H. (2006) The evolution of worker caste diversity in social insects. *American Naturalist 167*, 390–400.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Flatt, T., and Weisser, W.W. (2000) The effects of mutualistic ants on aphid life history traits. *Ecology 81*, 3522–9.

Fleet, R.R., and Young, B.L. (2000) Facultative mutualism between imported fire ants (*Solenopsis invicta*) and a legume (*Senna occidentalis*). *Southwestern Naturalist 45*, 289–98.

Fletcher, D.J.C., and Michener, C.D. (1987) *Kin recognition in animals*. John Wiley and Sons, New York.

Floren, A., and Linsenmair, K.E. (2000) Do ant mosaics exist in pristine lowland rain forests? *Oecologia 123*, 129–37.

——Freking, A., Biehl, M., and Linsenmair, K.E. (2001) Anthropogenic disturbance changes the structure of arboreal tropical ant communities. *Ecography 24*, 547–54.

Fluker, S.S., and Beardsley, J.W. (1970) Sympatric associations of three ants: *Iridomyrmex humilis, Pheidole megacephala*, and *Anoplolepis longipes* in Hawaii. *Annals of the Entomological Society of America 63*, 1290–6.

Foitzik, S., and Heinze, J. (1998) Nest site limitation and colony takeover in the ant *Leptothorax nylanderi*. *Behavioral Ecology 9*, 367–75.

Fokuhl, G., Heinze, J., and Poschlod, P. (2007) Colony growth in *Myrmica rubra* with supplementation of myrmecochorous seeds. *Ecological Research 22*, 845–7.

Folgarait, P.J. (1998) Ant biodiversity and its relationship to ecosystem functioning: a review. *Biodiversity and Conservation 7*, 1221–44.

——and Davidson, D.W. (1994) Antiherbivore defenses of myrmecophytic *Cecropia* under different light regimes. *Oikos 71*, 305–20.

————(1995) Myrmecophytic *Cecropia*: antiherbivore defenses under different nutrient treatments. *Oecologia 104*, 189–206.

——and Gilbert, L.E. (1999) Phorid parasitoids affect foraging activity of *Solenopsis richteri* under different availability of food in Argentina. *Ecological Entomology 24*, 163–73.

——Gorosito, N., Pizzio, R., Rossi, J.P., and Fernandez, J. (2007) *Camponotus punctulatus* ant's demography: a temporal study across land-use types and spatial scales. *Insectes Sociaux 54*, 42–52.

Fonseca, C.R. (1993) Nesting space limits colony size of the plant-ant *Pseudomyrmex concolor*. *Oikos 67*, 473–82.

——(1999) Amazonian ant-plant interactions and the nesting space limitation hypothesis. *Journal of Tropical Ecology 15*, 807–25.

Forest, F., Grenyer, R., and Rouget, M., Davies, T.J., Cowling, R.M., Faith, D.P., Balmford, A., Manning, J.C., Proches, S., van der Bank, M., Reeves, G., Hedderson, T.A.J., and Savolainen, V. (2007) Preserving the evolutionary potential of floras in biodiversity hotspots. *Nature 445*, 757–60.

Forestry Commission (2007) http://www.forestresearch.gov.uk/pdf/FCIN090.pdf/$FILE/FCIN090.pdf.

Forte, P.N. (1956) The effectiveness of dieldrin for the control of the Argentine ant in Western Australia. *Journal of the Department of Agriculture, Western Australia 5*, 85.

Foucaud, J., Jourdan, H., Le Breton, J., Loiseau, A., Konghouleux, D., and Estoup, A. (2006) Rare sexual reproduction events in the clonal reproductive system of introduced populations of the little fire ant. *Evolution 60*, 1646–57.

——Fournier, D., Orivel, J., Delabie, J.H.C., Loiseau, A., Le Breton, J., Kergoat, G.J., and Estoup, A. (2007) Sex and clonality in the little fire ant. *Molecular Biology and Evolution 24*, 2465–2473.

Fourcassié, V., and Traniello, J.F.A. (1993) Effects of experience on food-searching behavior in the ant *Formica schaufussi* (Hymenoptera: Formicidae). *Journal of Insect Behavior 6*, 287–99.

Fournier, D., Estoup, A., Orivel, J., Foucaud, J., Jourdan, H., Le Breton, J., and Keller, L. (2005) Clonal reproduction by males and females in the little fire ant. *Nature 435*, 1230–34.

Fowler, H.G., and Roberts, R.B. (1983) Behavioural and developmental effects of some insect growth-regulators on carpenter ants, *Camponotus pennsylvanicus* (Deg) (Hymenoptera: Formicidae). *Journal of Applied Entomology 95*, 507–12.

Fox, C.W., and Czesak, M.E. (2000) Evolutionary ecology of progeny size in arthropods. *Annual Review of Entomology 45*, 341–69.

Francoeur, A. (1997) Ants (Hymenoptera: Formicidae) of the Yukon. *Biological Survey of Canada Monograph Series, 2*, 901–910.

Franks, N.R. (1987) The organization of working teams in social insects. *Trends in Ecology and Evolution 2*, 72–5.

——(1989) Thermoregulation in army ant bivouacs. *Physiological Entomology 14*, 397–404.

——and Partridge, L.W. (1993) Lanchester battles and the evolution of combat in ants. *Animal Behaviour 45*, 197–9.

——Gomez, N., Goss, S., and Deneubourg, J.L. (1991) The blind leading the blind in army ant raid patterns: testing a model of self-organization (Hymenoptera: Formicidae). *Journal of Insect Behavior 4*, 583–607.

——Hooper, J., Webb, C., and Dornhaus, A. (2005) Tomb evaders: house-hunting hygiene in ants. *Biology Letters 1*, 190–2.

——Dornhaus, A., Hitchcock, G., Guillem, R., Hooper, J., and Webb, C. (2007a) Avoidance of conspecific colonies during nest choice by ants. *Animal Behaviour 73*, 525–34.

——Hooper, J.W., Dornhaus, A., Aukett, P.J., Hayward, A. L., and Berghoff, S.M. (2007b) Reconnaissance and latent learning in ants. *Proceedings of the Royal Society of London B 274*, 1505–9.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Frederickson, M., Greene, M.J., Gordon., D.M. (2005) 'Devil's gardens' bedevilled by ants. *Nature 437*, 495–96.

Freeland, J. (1958) Biological and social patterns in the Australian bulldog ants of the genus *Myrmecia*. *Australian Journal of Ecology 6*, 1–18.

Freitas, L., Galetto, L., Bernardello, G., Paoli, A.A.S. (2000) Ant exclusion and reproduction of *Croton sarcopetalus* (Euphorbiaceae). *Flora 195*, 398–402.

Fresneau, D., and Errard, C. (1994) L'identité coloniale et sa "représentation" chez les fourmis. *Intellectica 2*, 91–115.

Friedrich, R., and Philpott, S.M. (2009) Nest-site limitation and nesting resources of ants (Hymenoptera: Formicidae) in urban green spaces. *Environmental Entomology 38*, 600–7.

Frouz, J., and Jilková, V. (2008) The effect of ants on soil properties and processes (Hymenoptera: Formicidae). *Myrmecological News 11*, 191–9.

Gabet, E.J., Reichman, O.J., and Seabloom, E.W. (2003) The effects of bioturbation on soil processes and sediment transport. *Annual Review of Earth and Planetary Science 31*, 249–73.

Gadau, J., Gertsch, P.J., Heinze, J., Pamilo, P., and Hölldobler, B. (1998) Oligogyny by unrelated queens in the carpenter ant, *Camponotus ligniperdus*. *Behavioral Ecology and Sociobiology 44*, 23–33.

Galen, C., and Butchart, B. (2003) Ants in your plants: effects of nectar-thieves on pollen fertility and seed-siring capacity in the alpine wildflower, *Polemonium viscosum*. *Oikos 101*, 521–8.

Gamboa, G.J., Reeve, H.K., and Holmes, W.G. (1991) Conceptual issues and methodology in kin recognition research, a critical discussion. *Ethology 88*, 109–27.

Gammans, N., Bullock, J.M., and Schonrogge, K. (2005) Ant benefits in a seed dispersal mutualism. *Oecologia 146*, 43–9.

Gardner, A., and West, S.A. (2007) Social evolution: the decline and fall of genetic kin recognition. *Current Biology 17*, R810-2.

Gardner, T.A., Barlow, J., and Araujo, I.S., Ávila-Pires, T. C., Bonaldo, A.B., Costa, J.E., Esposito, M.C., Ferreira, L. V., Hawes, J., Hernandez, M.I.M., Hoogmoed, M.S., Leite, R.N., Lo-Man-Hung, N.F., Malcolm, J.R., Martins, M.B., Mestre, L.A.M., Miranda-Santos, R., Overal, W.L., Parry, L., Peters, S.L., Ribeiro Jr, M.A., Da Silva, M.N.F., Da Silva Motta, C., and Peres, C.A. (2008) The cost-effectiveness of biodiversity surveys in tropical forests. *Ecology Letters 11*, 139–50.

Garnas, J.R., Drummond, F.A., and Groden, E. (2007) Intercolony aggression within and among local populations of the invasive ant, *Myrmica rubra* (Hymenoptera: Formicidae), in coastal Maine. *Environmental Entomology 36*, 105–13.

Gaston, K.J. (1996) Species-range-size distributions: patterns, mechanisms and implications. *Trends in Ecology and Evolution 11*, 197–201.

——and Blackburn, T.M. (1997) Age, area and avian diversification. *Biological Journal of the Linnean Society 62*, 239–53.

Gaston, K.J., Gauld, I.D., and Hanson, P. (1998) Rapoport's rule: time for an epitaph? *Trends in Ecology and Evolution 13*, 70–4.

——Davies, R.G., Orme, C.D.L., Olson, V.A., Thomas, G. H., Ding, T.S., Rasmussen, P.C., Lennon, J.J., Bennett, P.M., Owens, I.P.F., and Blackburn, T.M. (2007) Spatial turnover in the global avifauna. *Proceedings of the Royal Society of London B. 274*, 1567–74.

Gaume, L., McKey, D., and Anstett, M.C. (1997) Benefits conferred by "timid" ants: active anti-herbivore protection of the rainforest tree *Leonardoxa africana* by the minute ant *Petalomyrmex phylax*. *Oecologia 112*, 209–16.

————and Terrin, S. (1998) Ant-plant-homopteran mutualism how the third partner affects the interaction between a plant-specialist ant and its myrmecophyte host. *Proceedings of the Royal Society of London B 265*, 560–75.

——Zacharias, M., Grosbois, V., and Borges, R. (2005) The fitness consequences of bearing domatia and having the right ant partner: experiments with protective and non-protective ants in a semi-myrmecophyte. *Oecologia 145*, 76–86.

Gayahan, G.G., and Tschinkel, W.R. (2008) Fire ants, *Solenopsis invicta*, dry and store insect pieces for later use. *Journal of Insect Science 8*, 39, available online: insectscience.org/8.39.

Geraghty, M.J., Dunn, R.R., and Sanders, N.J. (2007) Body size, colony size, and range size in ants (Hymenoptera: Formicidae): are patterns along elevational and latitudinal gradients consistent with Bergmann's rule? *Myrmecological News 10*, 51–8.

Gerlach, J. (2004) Impact of the invasive crazy ant *Anoplolepis gracilipes* on Bird Island, Seychelles. *Journal of Insect Conservation 8*, 15–25.

Ghazoul, J. (2001) Can floral repellents pre-empt potential ant-plant conflicts? *Ecology Letters 4*, 295–9.

Gibb, H. (2005) The effect of a dominant ant, *Iridomyrmex purpureus*, on resource use by ant assemblages depends on microhabitat and resource type. *Austral Ecology 30*, 856–67.

——and Hochuli, D.F. (2003) Colonisation by a dominant ant facilitated by anthropogenic disturbance: effects on ant assemblage composition, biomass and resource use. *Oikos 103*, 469–78.

——and Hochuli, D.F. (2004) Removal experiment reveals limited effects of a behaviorally dominant species on ant assemblages. *Ecology 85*, 648–57.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Gibbons, L., and Simberloff, D. (2005) Interaction of hybrid imported fire ants (*Solenopsis invicta* x *S. richteri*) with native ants at baits in southeastern Tennessee. *Southeastern Naturalist 4*, 303–20.

Giladi, I. (2006) Choosing benefits or partners: a review of the evidence for the evolution of myrmecochory. *Oikos 112*, 481–92.

Giraud, T., Pedersen, J.S., and Keller, L. (2002) Evolution of supercolonies: the Argentine ants of southern Europe. *Proceedings of the National Academy of Sciences USA 99*, 6075–9.

——Blatrix, R., Poteaux, C., Solignac, M., and Jaisson, P. (2000) Population structure and mating biology of the polygynous ponerine ant *Gnamptogenys striatula* in Brazil. *Molecular Ecology 9*, 1835–41.

Giray, T., Giovanetti, M., and West-Eberhard, M.J. (2005) Juvenile hormone, reproduction, and worker behavior in the Neotropical social wasp *Polistes canadensis*. *Proceedings of the National Academy of Sciences USA 102*, 3330–5.

Glaser, F. (2006) Biogeography, diversity and vertical distribution of ants (Hymenoptera: Formicidae) in Vorarlbergt, Austria. *Myrmecological News 8*, 263–70.

Glenn, S., and Holway, D. (2008) Consumption of introduced prey by native predators: Argentine ants and pit-building ant lions. *Biological Invasions 10*, 273–80.

Golden, D.M., and Crist, T.O. (2000) Experimental effects of habitat fragmentation on rove beetles and ants: patch area or edge? *Oikos 90*, 525–38.

Gómez, C., and Oliveras, J. (2003) Can the Argentine ant (*Linepithema humile* Mayr) replace native ants in myrmecochory? *Acta Oecologica 24*, 47–53.

——Pons, P., and Bas, J.-M. (2003) Effects of the Argentine ant *Linepithema humile* on seed dispersal and seedling emergence of *Rhamnus alaternus*. *Ecography 26*, 532–8.

Gómez, L.A., Arcila, A.M., Lastra, L.A., and Chacón, P. (2002) Algunas bases biológicas para el manejo de la hormiga loca *Paratrechina fulva* (Hymenoptera: Formicidae). *Carta Trimestral Cenicaña 24*, 12–3.

Goodisman, M.A.D., and Hahn, D.A. (2005) Breeding system, colony structure, and genetic differentiation in the *Camponotus festinatus* species complex of carpenter ants. *Evolution 59*, 2185–99.

——Kovacs, J.L., and Hunt, B.G. (2008) Functional genetics and genomics in ants (Hymenoptera: Formicidae): the interplay of genes and social life. *Myrmecological News 11*, 107–17.

——Sankovich, K.A., and Kovacs, J.L. (2007) Genetic and morphological variation over space and time in the invasive fire ant *Solenopsis invicta*. *Biological Invasions 9*, 571–84.

Gorb, E., and Gorb, S. (2003) *Seed Dispersal by Ants in a Deciduous Forest Ecosystem. Mechanisms, strategies, adaptations*. Springer-Verlag, New York.

Gordon, D.M. (1987) Group-level dynamics in harvester ants: young colonies and the role of patrolling. *Animal Behaviour 35*, 833–43.

——(1988) Nest-plugging: interference competition in desert ants (*Novomessor cockerelli* and *Pogonomyrmex barbatus*). *Oecologia 75*, 114–8.

——(1996) The organization of work in social insect colonies. *Nature 380*, 121–4.

——(1999) *Ants at Work: how an insect society is organized*. The Free Press, New York.

——(2002) The regulation of foraging activity in red harvester ant colonies. *American Naturalist 159*, 509–18.

——and Kulig, A.W. (1996) Founding, foraging, and fighting: colony size and the spatial distribution of harvester ant nests. *Ecology 77*, 2393–409.

——and Wagner, D. (1997) Neighbourhood density and reproductive potential in harvester ants. *Oecologia 109*, 556–60.

——Holmes, S., and Nacu, S. (2008) The short-term regulation of foraging in harvester ants. *Behavioral Ecology 19*, 217–22.

Gorosito, N.B., Curmi, P., Hallaire, V., Folgarait, P.J., and Lavelle, P.M. (2006) Morphological changes in *Camponotus punctulatus* (Mayr) anthills of different ages. *Geoderma 132*, 249–60.

Gotelli, N.J. (1996) Ant community structure: effects of predatory ant lions. *Ecology 77*, 630–8.

——(2000) Null model analysis of species co-occurrence patterns. *Ecology 81*, 2606–21.

——and Ellison, A.M. (2002) Assembly rules for New England ant assemblages. *Oikos 99*, 591–9.

——and Entsminger, G.L. (2007) *EcoSim: null models software for ecology*. Acquired Intelligence Inc. and Kesey-Bear, Jericho, VT.

——and Graves, G.R. (1996) *Null Models in Ecology*. Smithsonian Institution Press, Washington, DC.

Gotwald Jr., W.H. (1995) *Army Ants: the biology of social predation*. Cornell University Press, Ithaca, NY.

Gotzek, D., and Ross, K. (2007) Genetic regulation of colony social organization in fire ants: an integrative overview. *Quarterly Review of Biology 82*, 201–26.

Gove, A.D., Dunn, R.R., and Majer, J.D. (2007) A keystone ant species promotes seed dispersal in a "diffuse" mutualism. *Oecologia 153*, 687–97.

——Majer, J.D., and Rico-Gray, V. (2005) Methods for conservation outside of formal reserve systems: the case of ants in the seasonally dry tropics of Veracruz, Mexico. *Biological Conservation 126*, 328–38.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Grafen, A. (1990) Do animals really recognize kin? *Animal Behaviour 39*, 42–54.

——(1998) Green beard as death warrant. *Nature 394*, 521–2.

Graham, L.C., Porter, S.D., Periera, R.M., Dorough, H.D., and Kelley, A.T. (2003) Field releases of the decapitating fly *Pseudacteon curvatus* (Diptera: Phoridae) for control of imported fire ants (Hymenoptera: Formicidae) in Alabama, Florida, and Tennessee. *Florida Entomologist 86*, 334–9.

Grangier, J., Orivel, J., Negrini, M., and Dejean, A. (2008) Low intraspecific aggressiveness in two obligate plant-ant species. *Insectes Sociaux 55*, 238–40.

Grasso, D.A., Sledge, M.F., Le Moli, F., Mori, A., and Turillazzi, S. (2005) Nest-area marking with faeces: a chemical signature that allows colony-level recognition in seed-harvesting ants (Hymenoptera, Formicidae). *Insectes Sociaux 52*, 36–44.

Green, P.T., O'Dowd, D.J. (2009) Management of invasive invertebrates: lessons from the management of an invasive alien ant. In M.N. Clout, and P.A. Williams, eds. *Invasive Species Management. A Handbook of Techniques*, pp. 153–71. Oxford University Press, Oxford.

Greene, M.J., and Gordon, D.M. (2003) Cuticular hydrocarbons inform task decision. *Nature 423*, 32.

————(2007a) Interaction rate informs harvester ant task decisions. *Behavioral Ecology 18*, 451–5.

————(2007b) Structural complexity of chemical recognition cues affects the perception of group membership in the ants *Linephithema humile* and *Aphaenogaster cockerelli*. *Journal of Experimental Biology 210*, 897–905.

Greenslade, P.J.M. (1971) Interspecific competition and frequency changes among ants in Solomon Islands coconut plantations. *Journal of Applied Ecology 8*, 323–52.

——(1976) The meat ant *Iridomyrmex purpureus* (Hymenoptera: Formicidae) as a dominant member of ant communities. *Journal of the Australian Entomological Society 15*, 237–40.

——(1978) Ants. In W.A. Lowe, ed. *The physical and biological features of Kunoth Paddock in central Australia*, pp. 109–13. CSIRO Division of Land Resources Technical Paper No. 4, Canberra.

——(1987) Environment and competition as determinants of local geographical distribution of five meat ants, *Iridomyrmex purpureus* and allied species (Hymenoptera; Formicidae). *Australian Journal of Zoology 35*, 259–73.

Gregg, R.E. (1963) *The Ants of Colorado*. The University of Colorado Press, Boulder, CO.

Grimaldi, D., and Agosti, D. (2000) A formicine in New Jersey Cretaceous amber (Hymenoptera: Formicidae) and early evolution of the ants. *Proceedings of the National Academy of Sciences USA 97*, 13678–83.

——and Engel, M.S. (2005) *Evolution of the Insects*. Cambridge University Press, Cambridge.

——Agosti, D., and Carpenter, J.M. (1997) New and rediscovered primitive ants (Hymenoptera: Formicidae) in Cretaceous amber from New Jersey, and their phylogenetic relationships. *American Museum Novitates 3208*, 1–43.

Grime, J.P. (1979) *Plant Strategies, Vegetation Processes, and Ecosystem Properties*. John Wiley, Chichester, UK.

Gris, G., and Cherix, D. (1977) Les grandes colonies de fourmis des bois du Jura (groupe *Formica rufa*). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft 50*, 249–50.

Groden, E., Drummond, F.A., Garnas, J., and Franceour, A. (2005) Distribution of an invasive ant, *Myrmica rubra* (Hymenoptera: Formicidae), in Maine. *Journal of Economic Entomology 98*, 1774–84.

Gronenberg, W. (1995) The fast mandible strike in the trap-jaw ant *Odontomachus* I. Temporal properties and morphological characteristics. *Journal of Comparative Physiology A 176*, 391–8.

——(1996) The trap-jaw mechanisms in the dacetine ants *Daceton armigerum* and *Strumigenys* sp. *Journal of Experimental Biology 199*, 2021–33.

——and Ehmer, B. (1996) The mandible mechanism of the ant genus *Anochetus* (Hymenoptera, Formicidae) and the possible evolution of trap-jaws. *Zoology-Analysis Of Complex Systems 99*, 153–62.

——Tautz, T., and Hölldobler, B. (1993) Fast trap jaws and giant neurons in the ant *Odontomachus*. *Science 262*, 561–3.

——Paul, J., Just, S., and Hölldobler, B. (1997) Mandible muscle fibers in ants: fast or powerful? *Cell and Tissue Research 289*, 347–61.

Grosholz, E.D. (2005) Recent biological invasion may hasten invasional meltdown by accelerating historical introductions. *Proceedings of the National Academy of Sciences USA 102*, 1088–91.

Grotkopp, E., Rejmanek, M., and Rost, T.L. (2002) Towards causal explantion of plant invasiveness: seedling growth and life history strategies of 29 pine (*Pinus*) species. *American Naturalist 159*, 396–419.

Grover, C.D., Dayton, K.C., Menke, S.B., and Holway, D. A. (2008) Effects of aphids on foliar foraging by Argentine ants and the resulting effects on other arthropods. *Ecological Entomology 33*, 101–6.

——Kay, A.D., Monson, J.A., Marsh, T.C., and Holway, D. A. (2007) Linking nutrition and behavioural dominance: carbohydrate scarcity limits aggression and activity in Argentine ants. *Proceedings of the Royal Society of London B 274*, 2951–7.

Guerrieri, F.J., and d'Ettorre, P. (2008) The mandible opening response: quantifiying aggression elicited by

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

chemical cues in ants. *Journal of Experimental Biology 211*, 1109–13.

Guerrero, R.J., and Fernández, F. (2008) A new species of the ant genus *Forelius* (Formicidae: Dolichoderinae) from the dry forest of Colombia. *Zootaxa* 1958, 51–60.

Guitian, P., Medrano, M., and Guitian, J. (2003) Seed dispersal in *Erythronium denscanis* L. (Liliaceae): variation among habitats in a myrmecochorous plant. *Plant Ecology 169*, 171–7.

Gurevitch, J. (2006) Commentary on Simberloff (2006): meltdowns, snowballs and positive feedbacks. *Ecology Letters 9*, 919–21.

Haemig, P.D. (1997) Effects of birds on the intensity of ant rain: a terrestrial form of invertebrate drift. *Animal Behaviour 54*, 89–97.

——(1999) Predation risk alters interactions among species: competition and facilitation between ants and nesting birds in a boreal forest. *Ecology Letters 2*, 178–84.

Haering, R., and Fox, B.J. (1987) Short-term coexistence and long-term competitive displacement of 2 dominant species of *Iridomyrmex:* The successional response of ants to regenerating habitats. *Journal of Animal Ecology 56*, 495–507.

Haines, B.L. (1978) Element and energy flow through colonies of the leaf-cutting ant, *Atta columbica*, in Panama. *Biotropica 10*, 270–7.

Haines, I.H., and Haines, J.B. (1978a) Colony structure, seasonality and food requirements of the crazy ant, *Anoplolepis longipes* (Jerd.), in the Seychelles. *Ecological Entomology 3*, 109–18.

————(1978b) Pest status of the crazy ant, *Anoplolepis longipes* (Jerdon)(Hymenoptera: Formicidae) in the Seychelles. *Bulletin of Entomological Research 68*, 627–38.

Halloy, J., Sempo, G., Caprari, G., Rivault, C., Asadpour, M., Tâche, F., Saïd, I., Durier, V., Canonge, S., Amé, J.M., Detrain, C., Correll, N., Martinolli, A., Mondada, F., Siegwart, R., and Deneubourg, J.-L. (2007) Social intergration of robots into groups of cockroaches to control self-organized choices. *Science 318*, 1155–1158.

Hamilton, W.D. (1963) The evolution of altruistic behavior. *American Naturalist 97*, 354–6.

——(1964) The genetical evolution of social behaviour. I - II. *Journal of Theoretical Biology 7*, 1–52.

——(1987) Discrimination nepotism: expectable, common, overlooked. In D.J.C. Fletcher and C.D. Michener, eds. *Kin Recognition in Animals*, pp. 417–37. John Wiley and Sons, New York.

——and May, R.M. (1977) Dispersal in stable habitats. *Nature 269*, 578–81.

Hammond, R.L., and Keller, L. (2004) Conflict over male parentage in social insects. *PLoS Biology 2*, e248. doi:10.1371/journal.pbio.0020248.

Handel, S.N. (1981) Ants disperse a majority of herbs in a mesic forest community in New York State. *Bulletin of the Torrey Botanical Society 108*, 430–7.

Handler, A.T., Gruner, D.S., Haines, W.P., Lange, M.W., and Kaneshiro, K.Y. (2007) Arthropod surveys on Palmyra Atoll, Line Islands, and insights into the decline of the native tree *Pisonia grandis* (Nyctaginaceae). *Pacific Science 61*, 485–502.

Hanks, L.M., and Sadof, C.S. (1990) The effect of ants on nymphal survivorship of *Coccus viridis* (Homoptera: Coccidae). *Biotropica 22*, 210–3.

Hannonen, M., and Sundström, L. (2003) Worker nepotism among polygynous ants. *Nature 421*, 910.

——Helanterä, H., and Sundström, L. (2004) Habitat age, breeding system and kinship in the ant *Formica fusca*. *Molecular Ecology 13*, 1579–88.

Hansen, M.C., Stehman, S.V, Potapov, P.V, Loveland, T.R., Townshend, J.R.G., DeFries, R.S., Pittman, K. W., Arunarwati, B., Stolle, F., Steininger, M.K., Carroll, M., and DiMiceli, C. (2008) Humid tropical forest clearing from 2000 to 2005 quantified by using multitemporal and multiresolution remotely sensed data. *Proceedings of the National Academy of Sciences USA 105*, 9439–44.

Hanzawa, F.M., Beattie, A.J., and Culver, D.C. (1988) Directed dispersal: demographic analysis of an ant-seed mutualism. *American Naturalist 131*, 1–13.

Harkness, Maroudas (1985) Central place foraging by an ant: a model of searching. *Animal Behaviour 33*, 916–28.

Harley, R. (1991) The greasy pole syndrome. In C.R. Huxley and D.F. Cutler, eds. *Ant-Plant Interactions*, pp. 430–3. Oxford University Press, Oxford.

Harris, M., Knutson, A., Calixto, A., Dean, A., Brooks, L., and Ree, B. (2003) Impact of red imported fire ant on foliar herbivores and natural enemies. *Southwestern Entomologist Supplement 27*, 123–4.

Harris, R.J., Abbott, K.L., Barton, K., Berry, J., Don, W., Gunawardana, D., Lester, P., Rees, J., Stanley, M., Sutherland, A., and Toft, R. (2005) Invasive ant pest risk assessment project for New Zealand. http://www.landcareresearch.co.nz/research/biocons/invertebrates/ants/ant_pest_risk.asp.

Hart, A.G., and Ratnieks, F.L.W. (2001) Task partitioning, division of labour and nest compartmentalization collectively isolate hazardous waste in the leafcutting ant *Atta cephalotes*. *Behavioral Ecology and Sociobiology 49*, 387–92.

Hartley, S., Harris, R., and Lester, P.J. (2006) Quantifying uncertainty in the potential distribution of an invasive species: climate and the Argentine ant. *Ecology Letters 9*, 1068–79.

Hartley, S., and Lester, P.J. (2003) Temperature-dependent development of the Argentine ant, *Linepithema humile* (Mayr) (Hymenoptera: Formicidae): a degree-day

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology OUP Oxford, Oxford, ISBN: 9780191574207

model with implications for range limits in New Zealand. *New Zealand Entomologist 26*, 91–100.

Hartmann, A., d'Ettorre, P., Jones, G.R., and Heinze, J. (2005) Fertility signaling – the proximate mechanism of worker policing in a clonal ant. *Naturwissenschaften 92*, 282–6.

Harvey, C.T., and Eubanks, M.D. (2005) Intraguild predation of parasitoids by *Solenopsis invicta*: a non-disruptive interaction. *Entomologia Experimentalis et Applicata 114*, 127–35.

Harvey, P.H., and Pagel, M.D. (1991) *The Comparative Method in Evolutionary Biology*. Oxford University Press, Oxford.

Hasegawa, E. (1993a) Caste specialization in food storage in the dimorphic ant *Colobopsis nipponicus* (Wheeler). *Insectes Sociaux 40*, 261–71.

——(1993b) Nest defense and early production of the major workers in the dimorphic ant *Colobopsis nipponicus* (Wheeler) (Hymenoptera, Formicidae). *Behavioral Ecology and Sociobiology 33*, 73–7.

Hashimoto, Y. (2003) Identification guide to the ant genera of Borneo. In Y. Hashimoto and H. Rahman, eds. *Inventory and Collection. Total protocol for understanding of biodiversity*, pp. 89–162. Research and Education Component, BBEC Programme (Universiti Malaysia Sabah), Universiti Malaysia Sabah, Kota Kinabalu.

Hastings, A. (1980) Disturbance, coexistence, history, and competition for space. *Theoretical Population Biology 18*, 363–73.

Hauser, C.E., and Possingham, H.P. (2008) Experimental or precautionary? Adaptive management over a range of time horizons. *Journal of Applied Ecology 45*, 72–81.

Hawai'i Ant Group (2001) A plan for prevention of establishment of new ant species in Hawai'i with special attention to the red imported fire ant (*Solenopsis invicta*). http://hbs.bishopmuseum.org/ants/Solenopsis/.

——(2007) A plan for prevention of establishment of new ant species in Hawaii with special attention to the red imported fire ant (*Solenopsis invicta*) and little fire ant (*Wasmannia auropunctata*). August 2007 revision. http://hbs.bishopmuseum.org/ants/Solenopsis/.

Hawkins, B.A. (2001) Ecology's oldest pattern? *Trends in Ecology and Evolution 16*, 470.

——Diniz, J.A.F. (2002) The mid-domain effect cannot explain the diversity gradient of Nearctic birds. *Global Ecology and Biogeography 11*, 419–26.

——Diniz, J.A.F., and Weis, A.E. (2005) The mid-domain effect and diversity gradients: is there anything to learn? *American Naturalist 166*, E140-3.

——Albuquerque, F.S., Araujo, M.B., Beck, J., Bini, L.M., Cabrero-Sanudo, F.J., Castro-Parga, I., Diniz, J.A.F., Ferrer-Castan, D., Field, R., Gomez, J.F., Hortal, J., Kerr, J.T., Kitching, I.J., Leon-Cortes, J.L., Lobo, J.M., Montoya, D., Moreno, J.C., Olalla-Tarraga, M.A., Pausas, J.G., Qian, H., Rahbek, C., Rodriguez, M. A., Sanders, N. J. and Williams, P. (2007) A global evaluation of metabolic theory as an explanation for terrestrial species richness gradients. *Ecology 88*, 1877–1888.

Hawkins, C.P., Norris, R.H., Hogue, J.N., and Feminella, J. W. (2000) Development and evaluation of predictive models for measuring the biological integrity of streams. *Ecological Applications 10*, 1456–77.

Hebert, P.D.N., and Gregory, T.R. (2005) The promise of DNA barcoding for taxonomy. *Systematic Biology 54*, 8582–859.

——Cywinska, A., Ball, S.L., deWaard, J.R. (2003) Biological identifications through DNA barcodes. *Proceedings of the Royal Society of London B 270*, 313–21.

Hee, J.J., Holway, D.A., Suarez, A.V., and Case, T.J. (2000) Role of propagule size in the success of incipient colonies of the invasive Argentine ant. *Conservation Biology 14*, 559–63.

Hefetz, A. (2007) The evolution of hydrocarbon pheromone parsimony in ants (Hymenoptera: Formicidae) – interplay of colony odor uniformity and odor idiosyncrasy. A review. *Myrmecological News 10*, 59–68.

——and Blum, M.S. (1978) Biosynthesis and accumulation of formic acid in the poison gland of the carpenter ant *Camponotus pennsylvanicus*. *Science 201*, 454–5.

Heil, M., and McKey, D. (2003) Protective ant-plant interactions as model systems in ecological and evolutionary research. *Annual Review of Ecology Evolution and Systematics 34*, 425–53.

——Rattke, J., and Boland, W. (2005) Postsecretory hydrolysis of nectar sucrose and specialization in ant/plant mutualism. *Science 308*, 560–3.

——Baumann, B., Krüger, R., and Linsenmair, K.E. (2004a) Main nutrient compounds in food bodies of Mexican *Acacia* ant-plants. *Chemoecology 14*, 45–52.

——Fiala, B., Kaiser, W., and Linsenmair, K.E. (1998) Chemical contents of *Macaranga* food bodies: adaptations to their role in ant attraction and nutrition. *Functional Ecology 12*, 117–22.

——Koch, T., Hilpert, A., Fiala, B., Boland, W., and Linsenmair, K.E. (2001) Extrafloral nectar production of the ant-associated plant, *Macaranga tanarius*, is an induced, indirect, defensive response elicited by jasmonic acid. *Proceedings of the National Academy of Sciences USA 98*, 1083–8.

——Greiner, S., Meimberg, H., Krüger, R., Heubl, G., Noyer, J.L., Linsenmair, K.E., and Boland, W. (2004b) Evolutionary change from induced to constitutive expression of an indirect plant resistance. *Nature 430*, 205–208.

——Hilpert, A., Fiala, B., bin Hashim, R., Strohm, E., Zotz, G., and Linsenmair, K. E. (2002) Nutrient allocation

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

of *Macaranga triloba* ant plants to growth, photosynthesis, and indirect defence. *Functional Ecology 16*, 475–83.

Heimpel, G.E., and De Boer, J.G. (2008) Sex determination in the Hymenoptera. *Annual Review of Entomoogyl 53*, 209–30.

Heinze, J. (2008) The demise of the standard ant (Hymenoptera: Formicidae). *Myrmecological News 11*, 9–20.

——and Buschinger, A. (1987) Queen polymorphism in a non-parasitic *Leptothorax* species (Hymenoptera, Formicidae). *Insectes Sociaux 34*, 28–43.

——and Buschinger, A. (1989) Queen polymorphism in *Leptothorax* spec. A: its genetic and ecological background (Hymenoptera: Formicidae). *Insectes Sociaux 36*, 139–55.

——and Hölldobler, B. (1994) Ants in the cold. *Memorabilia Zoologica 48*, 99–108.

——and Tsuji, K. (1995) Ant reproductive strategies. *Research in Population Ecology 37*, 135–49.

——Stengl, B., and Sledge, M.F. (2002b) Worker rank, reproductive status and cuticular hydrocarbon signature in the ant, *Pachycondyla* cf. *inversa*. *Behavioral Ecology and Sociobiology 52*, 59–65.

——Foitzik, S., Hippert, A., and Hölldobler, B. (1996) Apparent dear-enemy phenomenon and environment-based recognition cues in the ant. *Leptothorax nylanderi. Ethology 102*, 510–22.

————Kipyatkov, V.E., and Lopatina, E.B. (1998) Latitudinal variation in cold hardiness and body size in the boreal ant species *Leptothorax acervorum* (Hymenoptera: Formicidae). *Entomologia Generalis 22*, 305–12.

——Schrempf, A., Seifert, B., and Tinaut, A. (2002a) Queen morphology and dispersal tactics in the ant, *Cardiocondyla batesii*. *Insectes Sociaux 49*, 129–32.

——Trindl, A., Seifert, B., and Yamauchi, K. (2005) Evolution of male morphology in the ant genus *Cardiocondyla*. *Molecular Phylogenetics and Evolution 37*, 278–88.

——Trunzer, B., Hölldobler, B., and Delabie, J.H.C. (2001) Reproductive skew and queen relatedness in an ant with primary polygyny. *Insectes Sociaux 48*, 149–53.

——Foitzik, S., Fischer, B., Wanke, T., and Kipyatkov, V.E. (2003) The significance of latitudinal variation in body size in a holarctic ant, *Leptothorax acervorum*. *Ecography 26*, 349–55.

——Foitzik, S., Oberstadt, B., Rueppell, O., and Hölldobler, B. (1999) A female caste specialized for the production of unfertilized eggs in the ant *Crematogaster smithi*. *Naturwissenschaften 86*, 93–5.

Heithaus, E.R., and Humes, M. (2003) Variation in communities of seed-dispersing ants in habitats with different disturbance in Knox County, Ohio. *Ohio Journal of Science 103*, 89–97.

Helanterä, H., and Sundström, L. (2007) Worker reproduction in *Formica* ants. *American Naturalist 170*, E14-E25.

Heller, N.E. (2004) Colony structure in introduced and native populations of the invasive Argentine ant, *Linepithema humile*. *Insectes Sociaux 51*, 378–86.

——and Gordon, D.M. (2006) Seasonal spatial dynamics and causes of nest movement in colonies of the invasive Argentine ant (*Linepithema humile*). *Ecological Entomology 31*, 499–510.

——Sanders, N.J., and Gordon, D.M. (2006) Linking temporal and spatial scales in the study of an Argentine ant invasion. *Biological Invasions 8*, 501–7.

——Sanders, N.J., Shors, J.W., and Gordon, D.M. (2008) Rainfall facilitates the spread, and time alters the impact, of the invasive Argentine ant. *Oecologia 155*, 385–95.

Helms Cahan, S., and Vinson, S.B. (2003) Reproductive division of labor between hybrid and nonhybrid offspring in a fire ant hybrid zone. *Evolution 57*, 1562–70.

——Parker, J.D., and Rissing, S.W, Johnson, R.A., Polony, T.S., Weiser, M.D., and Smith, D.R. (2002) Extreme genetic differences between queens and workers in hybridizing *Pogonomyrmex* harvester ants. *Proceedings of the Royal Society of London B 269*, 1871–7.

Helms, K.R., and Vinson, S.B. (2001) Coexistence of native ants with the red imported fire ant, *Solenopsis invicta*. *Southwestern Naturalist 46*, 396–400.

——and Vinson, S.B. (2002) Widespread association of the invasive ant *Solenopsis invicta* with an invasive mealybug. *Ecology 83*, 2425–38.

——and Vinson, S.B. (2003) Apparent facilitation of an invasive mealybug by an invasive ant. *Insectes Sociaux 50*, 403–4.

——and Vinson, S.B. (2008) Plant resources and colony growth in an invasive ant: the importance of honeydew-producing Hemiptera in carbohydrate transfer across trophic levels. *Environmental Entomology 37*, 487–93.

Helmuth, B., Kingsolver, J.G., and Carrington, E. (2005) Biophysics, physiological ecology, and climate change: does mechanism matter? *Annual Review of Physiology 67*, 177–201.

Henderson, G., Wagner, R.O., and Jeanne, R.L. (1989) Prairie ant colony longevity and mound growth. *Psyche (Cambridge) 96*, 257–68.

Henin, J.-M., and Paiva, M. (2004) Interactions between *Orthotomicus erosus* (Woll.) (Col., Scolytidae) and the Argentine ant *Linepithema humile* (Mayr) (Hym., Formicidae). *Journal of Pest Science 77*, 113–7.

Hepper, P.G. (1991) *Kin recognition*. Cambridge University Press, Cambridge.

Herbers, J.M. (1981) Reliability theory and foraging by ants. *Journal of Theoretical Biology 89*, 175–89.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

——(1993) Ecological determinants of queen number in ants. In L. Keller, ed. *Queen Number and Sociality in Insects*, pp. 262–93. Oxford University Press, Oxford.
——and Choiniere, E. (1996) Foraging behaviour and colony structure in ants. *Animal Behaviour 51*, 141–53.
——and Johnson, C.A. (2007) Social structure and winter survival in acorn ants. *Oikos 116*, 829–35.
Hernandez, J.V., Goitia, W., Cabrera, A., Lopez, F., and Jaffe, K. (2006) Leaf-cutting ant species (Hymenoptera: *Atta*) differ in the types of cues used to differentiate between self and others. *Animal Behaviour 71*, 945–52.
Herz, H., Hölldobler, B., and Roces, F. (2008) Delayed rejection in a leaf-cutting ant after foraging on plants unsuitable for the symbiotic fungus. *Behavioral Ecology, 19*, 575–82.
Heterick, B. (1997) The interaction between the coastal brown ant, *Pheidole megacephala* (Fabricius), and other invertebrate fauna of Mt Coot-tha (Brisbane, Australia). *Australian Journal of Ecology 22*, 218–21.
——(2006) A revision of the Malagasy ants belonging to genus *Monomorium* Mayr, 1855 (Hymenoptera: Formicidae). *Proceedings of the California Academy of Sciences* (4) *57*, 69–202.
Hickman, J.C. (1974) Pollination by ants: A low-energy system. *Science 184*, 1290–2.
Higashi, S., and Yamauchi, K. (1979) Influence of a supercolonial ant *Formica* (*Formica yessensis* Forel) on the distribution of other ants in Ishikari Coast. *Japanese Journal of Ecology 29*, 257–64.
Hill, M., Holm, K., Vel, T., Shah, N.J., and Matyot, P. (2003) Impact of the introduced yellow crazy ant *Anoplolepis gracilipes* on Bird Island, Seychelles. *Biodiversity and Conservation 12*, 1969–84.
Hill, S.L., and Hoy, M.A. (2003) Interactions between the red imported fire ant *Solenopsis invicta* and the parasitoid *Lipolexis scutellaris* potentially affect classical biological control of the aphid *Toxoptera citricida*. *Biological Control 27*, 11–9.
Hillebrand, H. (2004) On the generality of the latitudinal diversity gradient. *American Naturalist 163*, 192–211.
Hobbs, R.J., Arico, S., Aronson, J., Baron, J.S., Bridgewater, P., Cramer, V.A., Epstein, P.R., Ewel, J.J., Klink, C.A., Lugo, A.E., Norton, D., Ojima, D., Richardson, D.M., Sanderson, E.W., Valladares, F., Vilà, M., Zamora, R., and Zobel, M. (2006) Novel ecosystems: theoretical and management aspects of the new ecological world order. *Global Ecology and Biogeography 15*, 1–7.
Hoffmann, B.D. (2000) Changes in ant species composition and community organisation along grazing gradients in semiarid rangelands of the Northern Territory. *Australian Rangeland Journal 22*, 171–89.
——(2004) *Pest ants and their management on Aboriginal lands in the Northern Territory*. CSIRO, Darwin.
——(2009) Ecological restoration following the local eradication of an invasive ant in northern Australia. *Biological Invasions*, doi 10.1007/s10530-009-9516-2.
——and Andersen, A.N. (2003) Responses of ants to disturbance in Australia, with particular reference to functional groups. *Austral Ecology 28*, 444–64.
——and O'Connor, S. (2004) Eradication of two exotic ants from Kakadu National Park. *Ecological Management and Restoration 5*, 98–105.
——and Parr, C.L. (2008) An invasion revisited: the African big-headed ant (*Pheidole megacephala*) in northern Australia. *Biological Invasions 10*, 1171–81.
——Andersen, A.N., and Hill, G.J.E. (1999) Impact of an introduced ant on native rain forest invertebrates: *Pheidole megacephala* in monsoonal Australia. *Oecologia 120*, 595–604.
Holland, B.R., Penny, D., and Hendy, M.D. (2003) Outgroup misplacement and phylogenetic inaccuracy under a molecular clock: a simulation study. *Systematic Biology 52*, 229–38.
Hölldobler, B. (1974) Home range orientation and territoriality in harvesting ants. *Proceedings of the National Academy of Sciences USA 71*, 3274–7.
——and Wilson, E.O. (1977) The number of queens: an important trait in ant evolution. *Naturwissenschaften 64*, 8–15.
——(1982) Communication, raiding behaviour and prey storage in *Cerapachys* (Hymenoptera: Formicidae). *Psyche (Cambridge) 89*, 3–23.
——(1983) Territorial behavior in the green tree ant (*Oecophylla smaragdina*). *Biotropica 15*, 241–50.
——(1986) Food robbing in ants, a form of interference competition. *Oecologia 69*, 12–5.
——and Carlin, N.F. (1985) Colony founding, queen dominance and oligogyny in the Australian meat ant *Iridomyrmex purpureus*. *Behavioral Ecology and Sociobiology 18*, 45–58.
————(1990) *The Ants*. The Belknap Press of Harvard University Press, Cambridge, MA.
————(1994) *Journey to the Ants: a story of scientific exploration*. The Belknap Press of Harvard University Press, Cambridge, MA.
————(2008) *The Superorganism: the beauty, elegance, and strangeness of insect societies*. W.W. Norton & Company, New York.
Holmes, W.G. (2004) The early-history of Hamilton-based research on kin recognition. *Annales Zoologici Fennici 41*, 691–711.
——and Sherman, P.W. (1983) Kin recognition in animals. *American Scientist, 46–55*.
Holt, S.J. (1955) On the foraging activity of the wood ant. *Journal of Animal Ecology 24*, 1–34.
Holway, D.A. (1995) Distribution of the Argentine ant (*Linepithema humile*) in northern California. *Conservation Biology 9*, 1634–7.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

——(1998a) Effect of Argentine ant invasions on ground-dwelling arthropods in northern California riparian woodlands. *Oecologia 116*, 252–8.

——(1998b) Factors governing rate of invasion: a natural experiment using Argentine ants. *Oecologia 115*, 206–12.

——(1999) Competitive mechanisms underlying the displacement of native ants by the invasive Argentine ant. *Ecology 80*, 238–51.

——(2005) Edge effects of an invasive species across a natural ecological boundary. *Biological Conservation 121*, 561–7.

——and Case, T.J. (2000) Mechanisms of dispersed central-place foraging in polydomous colonies of the Argentine ant. *Animal Behaviour 59*, 433–41.

————(2001) Effects of colony-level variation on competitive ability in the invasive Argentine ant. *Animal Behaviour 61*, 1181–92.

——and Suarez, A.V. (2004) Colony-structure variation and interspecific competitive ability in the invasive Argentine ant. *Oecologia 138*, 216–22.

————(2006) Homogenization of ant communities in Mediterranean California: the effects of urbanization and invasion. *Biological Conservation 127*, 319–26.

————and Case, T.J. (1998) Loss of intraspecific aggression in the success of a widespread invasive social insect. *Science 282*, 949–52.

————————(2002b) Role of abiotic factors in governing susceptibility to invasion: a test with Argentine ants. *Ecology 83*, 1610–9.

——Lach, L., Suarez, A.V., Tsutsui, N.D., and Case, T.J. (2002a) The causes and consequences of ant invasions. *Annual Review of Ecology and Systematics 33*, 181–233.

Holzer, B., Kummerli, R., Keller, L., and Chapuisat, M. (2006b) Sham nepotism as a result of intrinsic differences in brood viability in ants. *Proceedings of the Royal Society of London B 273*, 2049–52.

——Chapuisat, M., Kremer, N., Finet, N., and Keller, L. (2006a) Unicoloniality, recognition and genetic differentiation in a native *Formica* ant. *Journal of Evolutionary Biology 19*, 2031–9.

Hook, A.W., and Porter, S.D. (1990) Destruction of harvester ant colonies by invading fire ants in south-central Texas (Hymenoptera: Formicidae). *Southwest Naturalist 35*, 477–8.

Hopper, K.R. (1999) Risk-spreading and bet-hedging in insect population biology. *Annual Review of Entomology 44*, 535–60.

Horstmann, K. (1974) Untersuchungen uber den Nahrungserwerb der Waldameisen (*Formica polyctena* Foerster) im Eichenwald. III. Jahresbilanz. *Oecologia 15*, 187–204.

Horvitz, C.C., and Schemske, D.W. (1984) Effects of ants and an ant-tended herbivore on seed production of a neotropical herb. *Ecology 65*, 1369–78.

————(1986) Seed dispersal of a neotropical myrmecochore: variation in removal rates and dispersal distance. *Biotropica 18*, 319–23.

————(1990) Spatiotemporal variation in insect mutualists of a neotropical herb. *Ecology 71*, 1085–97.

Hosoishi, S., and Ogata, K. (2008) The ant genus *Crematogaster* Lund, subgenus *Physocrema* Forel, in the Indochinese Peninsula (Hymenoptera: Formicidae). *Asian Myrmecology 2*, 1–10.

Howard, D.F., Blum, M.S., Jones, T.H., and Tomalski, M. D. (1982) Behavioral responses to an alkylpyrazine from the mandibular gland of the ant *Wasmannia auropunctata. Insectes Sociaux 29*, 369–74.

Howard, J.J. (1988) Leafcutting ant diet selection – relative influence of leaf chemistry and physical features. *Ecology 69*, 250–60.

Howard, K.J. (2006) Three queen morphs with alternative nest-founding behaviors in the ant, *Temnothorax longispinosus*. *Insectes Sociaux 53*, 480–8.

Howse, P.E. (1975) Chemical defenses of ants, termites and other insects: some outstanding questions. In C. Noirot, P. E. Howse, and G. Le Masne, eds. *Pheromones and Defensive Secretions in Social Insects*, p. 23. University Dijon, France.

Huang, H.T., and Yang, P. (1987) The ancient cultured citrus ant. *BioScience 37*, 665–71.

Hubbard, M.D., and Cunningham, W.G. (1977) Orientation of mounds in the ant *Solenopsis invicta* (Hymenoptera, Formicidae, Myrmicinae). *Insectes Sociaux 24*, 3–7.

Hubbell, S.P. (2001) *The Unified Neutral Theory of Biodiversity and Biogeography*. Princeton University Press, Princeton, NJ.

——Foster, R.B., O'Brien, S.T., Harms, K.E., Condit, R., Wechsler, B., Wright, S.J., and Loo de Lao, S. (1999) Light-gap disturbances, recruitment limitation, and tree diversity in a Neotropical forest. *Science 283*, 554–57.

Hudson, R.R., and Coyne, J.A. (2002) Mathematical consequences of the genealogical species concept. *Evolution 56*, 1557–65.

Hughes, D.P., Kronauer, D.J.C., and Boomsma, J.J. (2008) Extended phenotype: nematodes turn ants into bird-dispersed fruits. *Current Biology 18*, 294–5.

Hughes, L. (2000) Biological consequences of global warming: is the signal already apparent? *Trends in Ecology and Evolution 15*, 56–61.

——and Westoby, M. (1992) Capitula on stick insect eggs and elaiosomes on seeds: convergent adaptations for burial by ants *Functional Ecology 6*, 642–8.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

————and Jurado, E. (1994) Convergence of elaiosomes and insect prey: evidence from ant foraging behaviour and fatty acid composition. *Functional Ecology 8*, 358–65.

Hughes, W.O.H., and Boomsma, J.J. (2004) Genetic diversity and disease resistance in leaf-cutting ant societies. *Evolution 58*, 1251–60.

————(2006) Does genetic diversity hinder parasite evolution in social insect colonies? *Journal of Evolutionary Biology 19*, 132–43.

Hulme, P.E. (2003) Biological invasions: winning the science battles but losing the conservation war? *Oryx 37*, 178–93.

Human, K.G., and Gordon, D.M. (1996) Exploitation and interference competition between the invasive Argentine ant, *Linepithema humile*, and native ant species. *Oecologia 105*, 405–12.

————(1997) Effects of Argentine ants on invertebrate biodiversity in northern California. *Conservation Biology 11*, 1242–8.

————(1999) Behavioral interactions of the invasive Argentine ant with native ant species. *Insectes Sociaux 46*, 159–63.

——Weiss, S., Weiss, A., Sandler, B., and Gordon, D.M. (1998) Effects of abiotic factors on the distribution and activity of the invasive Argentine ant (Hymenoptera: Formicidae). *Environmental Entomology 27*, 822–33.

Hunt, J.H. (1983) Foraging and morphology in ants: the role of vertebrate predators as agents of natural selection. In P. Jaisson, ed. *Social insects in the tropics*., pp. 83–104. Presses de l'Université Paris XIII, Paris.

Hunter, M.D., and Price, P.W. (1992) Playing chutes and ladders – heterogeneity and the relative roles of bottom-up and top-down forces in natural communities. *Ecology 73*, 724–32.

Hurlbert, A.H., Ballantyne, F.I., and Powell, S. (2008) Shaking a leg and hot to trot: the effects of body size and temperature on running speed in ants. *Ecological Entomology 33*, 144–54.

Hutchinson, G.E. (1959) Homage to Santa Rosalia or Why are there so many kinds of animals? *American Naturalist 93*, 145–58.

Huxley, C.R. (1991) Ants and plants: a diversity of interactions. In C.R. Huxley and D.F. Cutler, eds. *Ant-Plant Interactions*, pp. 1–11. Oxford University Press, Oxford.

Ichinose, K., Cerda, X., Christides, J.-P., and Lenoir, A. (2005) Detecting nestmate recognition patterns in the fission-performing ant *Aphaenogaster senilis*: a comparison of different indices. *Journal of Insect Behavior 18*, 633–50.

Imai, H.T., Kihara, A., and Kondoh, M., Kubota, M., Kuribayashi, S., Ogata, K., Onoyama, K., Taylor, R.W., Terayama, M., Tsukii, Y., Yoshimura, M., and Ugava, Y. (2003) *Ants of Japan*. Gakken, Tokyo.

——Taylor, R.W., Kubota, M., Ogata, K., and Wada, M.Y. (1990) Notes on the remarkable karyology of the primitive ant *Nothomyrmecia macrops* Clark, and of the related genus *Myrmecia* Fabricius (Hymenoptera: Formicidae). *Psyche (Cambridge) 97*, 133–40.

Ingraham, W., and Foster, S. (2008) The value of ecosystem services provided by the US National Wildlife Refuge System in the contiguous US. *Ecological Economics 67*, 608–18.

Inouye, B.D., and Agrawal, A.A. (2004) Ant mutualists alter the composition and attack rate of the parasitoid community for the gall wasp *Disholcaspis eldoradensis* (Cynipidae). *Ecological Entomology 29*, 692–6.

International Commission on Zoological Nomenclature (1999) *International Code of Zoological Nomenclature, Fourth edition*. International Trust for Zoological Nomenclature, London.

IPCC (2007) Summary for Policymakers. In *Climate Change 2007: the Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor, and H.L. Miller, eds. Cambridge University Press, Cambridge and New York.

Isaac, N.J.B., Turvey, S.T., Collen, B., Waterman, C., Baillie, J.E.M. (2007) Mammals on the EDGE: conservation priorities based on threat and phylogeny. *PLoS ONE 2*, e296. doi:10.1371/journal.pone.0000296.

Itino, T., Itioka, T., Hatada, A., and Hamid, A.A. (2001) Effects of food rewards offered by ant—plant *Macaranga* on the colony size of ants. *Ecological Research 16*, 775–86.

Ito, F. (1996) Colony characteristics of the Indonesian myrmicine ant *Myrmecina* sp. (Hymenoptera, Formicidae, Myrmicinae): polygynous reproduction by ergatoid queens. *Annals of the Entomological Society of America 89*, 550–4.

——(1997) Colony composition and morphological caste differentiation between ergatoid queens and workers in the ponerine ant genus *Leptogenys* in the oriental tropics. *Ethology Ecology and Evolution 9*, 335–43.

Ito, Y., Takamine, H., and Yamauchi, K. (1998) Abundance and species diversity of ants in forests of Yanbaru, the Northern Part of Okinawa Honto with special reference to effects of undergrowth removal. *Entomological Science 1*, 347–55.

IUCN (2008) *IUCN Red List of Threatened Species*. www.iucnredlist.org.

Jablonski, D., Roy, K., and Valentine, J.W. (2006) Out of the tropics: evolutionary dynamics of the latitudinal diversity gradient. *Science 314*, 102–6.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Jackson, D.E., Holcombe, M., Ratnieks, F.L.W. (2004) Trail geometry gives polarity to ant foraging networks. *Nature 432*, 907–9.

——Martin, S.J., Ratnieks, F.L.W., and Holcombe, M. (2007) Spatial and temporal variation in pheromone composition of ant foraging trails. *Behavioral Ecology 18*, 444–50.

Jaffé, K. (1993) Surfing ants. *Florida Entomologist 76*, 182–3.

——and Deneubourg, J.L. (1992) On foraging, recruitment systems and optimum number of scouts in eusocial colonies. *Insectes Sociaux 39*, 201–13.

——Caetano, F.H., Sanchez, P., Hernandez, J., Caraballo, L., Vitelli-Flores, J., Monsalve, W., Dorta, B., and Lemoine, V.R. (2001) Sensitivity of ant (*Cephalotes*) colonies and individuals to antibiotics implies feeding symbiosis with gut microorganisms. *Canadian Journal of Zoology 79*, 1120–4.

Jaisson, P. (1991) Kinship and fellowship in ants and social wasps. In P.G. Hepper, ed. *Kin Recognition*, pp. 60–93. Cambridge University Press, Cambridge.

James, F.C. (1970) Geographic size variation in birds and its relation to climate. *Ecology 51*, 361–90.

Jansen, V.A.A., and van Baalen, M. (2006) Altruism through beard chromodynamics. *Nature 440*, 663–6.

Jansson, R., and Dynesius, M. (2002) The fate of clades in a world of recurrent climatic change: Milankovitch oscillations and evolution. *Annual Review of Ecology, Evolution and Systematics 33*, 741–77.

Janzen, D.H. (1966) Coevolution of mutualism between ants and acacias in Central America. *Evolution 20*, 249–75.

——(1967a) Fire, vegetation structure, and the ant x *Acacia* interaction in Central America. *University of Kansas Scientific Bulletin 47*, 315–558.

——(1967b) Why mountain passes are higher in the tropics. *American Naturalist 101*, 233–49.

——(1973) Sweep samples of the tropical foliage insects: effects of seasons, vegetation types, elevation, time of day, and insularity. *Ecology 54*, 687–708.

——(1977) Why don't ants visit flowers? *Biotropica 9*, 252.

——Ataroff, M., Farinas, M., Reyes, S., Rincon, N., Soler, A., Soriano, P., and Vera, M. (1976) Changes in the arthropod community along an elevational transect in the Venezuelan Andes. *Biotropica 8*, 193–203.

——Hallwachs, W., Jimenez, J., and Gamez, R. (1993). The role of the parataxonomists, inventory managers, and taxonomists in Costa Rica's national biodiversity inventory. In Reid WV, Laird SA, Meyer CA, Gamez R, Sittenfeld A, Janzen DH, Gollin MA, Juma C, (eds). *Biodiversity Prospecting: using generic resources for sustainable development*. pp. 223–254. World Resources Institute, Washington, DC.

Jeanne, R.L. (1979) A latitudinal gradient in rates of ant predation *Ecology 60*, 1211–24.

Jetter, K.M., Hamilton, J., and Klotz, J.H. (2002) Red imported fire ants threaten agriculture, wildlife, and homes. *California Agriculture 56*, 26–34.

Jetz, W., and Rahbek, C. (2001) Geometric constraints explain much of the species richness pattern in African birds. *Proceedings of the National Academy of Sciences USA 98*, 5661–6.

——Carbone, C., Fulford, J., and Brown, J. (2004) The scaling of animal space use. *Science 306*, 266–8.

Jiménez, E., Fernández, F., Arias, T.M., and Lozano-Zambrano, F. H. (2008) *Sistemática, Biogeografía y Conservación de las Hormigas Cazadoras de Colombia*. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Bogotá, Colombia.

Johnson, H.B. (1975) Plant pubescence: an ecological perspective. *The Botanical Review 41*, 233–58.

Johnson, R.A. (1994) Distribution and natural history of the workerless inquiline ant *Pogonomyrmex anergismus* Cole (Hymenoptera: Formicidae). *Psyche (Cambridge) 101*, 257–62.

——(2002) Semi-claustral colony founding in the seed-harvester ant *Pogonomyrmex californicus*: a comparative analysis of colony founding strategies. *Oecologia 132*, 60–7.

——(2004) Colony founding by pleometrosis in the semi-claustral seed-harvester ant *Pogonomyrmex californicus* (Hymenoptera: Formicidae). *Animal Behavior 68*, 1189–200.

——(2006) Capital and income breeding and the evolution of colony founding strategies in ants. *Insectes Sociaux 53*, 316–22.

——and Ward, P.S. (2002) Biogeography and endemism of ants (Hymenoptera: Formicidae) in Baja California, Mexico: a first overview. *Journal of Biogeography 29*, 1009–26.

Johnson, R.N., Agapow, P.M., and Crozier, R.H. (2003) A tree island approach to inferring phylogeny in the ant subfamily Formicinae, with special reference to the evolution of weaving. *Molecular Phylogenetics and Evolution 29*, 317–30.

Jones, G. (2005) Is the management plan achieving its objectives? In G. Worboys, M. Lockwood, and T. DeLacy, eds. *Protected Area Management Principles and Practice*, pp. 555–7. Oxford University Press, Oxford.

Jouquet, P., Dauber, J., Lagerlöf, J., Lavelle, P., and Lepage, M. (2006) Soil invertebrates as ecosystem engineers: intended and accidental effects on soil and feedback loops. *Applied Soil Ecology 32*, 153–64.

Jourdan, H. (1997) Are serpentine biota free from biological invasions? An example of an ant community

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

from southern New Caledonia. In T. Jaffré, R.D. Reeves, and T. Becquer, eds. *The ecology of ultramafic and metalliferous areas*. Centre ORSTOM, New Caledonia.

Judd, T.M. (2006) Relationship between food stores and foraging behavior in *Pheidole ceres* (Hymenoptera: Formicidae). *Annals of the Entomological Society of America 99*, 398–406.

——and Fasnacht, M.P. (2007) Distribution of micronutrients in social insects: a test in the termite *Reticulitermes flavipes* (Isoptera: Rhinotermitidae) and the ant *Myrmica punctiventris* (Hymenoptera: Formicidae). *Annals of the Entomological Society of America 100*, 893–9.

Junker, R.R., and Blüthgen, N. (2008) Floral scents repel potentially nectar-thieving ants. *Evolutionary Ecology Research 10*, 295–308.

Jutsum, A.R., Saunders, T.S., and Cherrett, J.M. (1979) Intraspecific aggression in the leaf-cutting ant *Acromyrmex octospinosus*. *Animal Behavior 27*, 839–44.

Kalisz, S., Hanzawa, F.M., Tonsor, S.J., Thiede, D.A., and Voigt, S. (1999) Ant-mediated seed dispersal alters pattern of relatedness in a population of *Trillium grandiflorum*. *Ecology 80*, 2620–34.

Kaplan, I., and Eubanks, M.D. (2002) Disruption of cotton aphid (Homoptera: Aphididae): natural enemy dynamics by red imported fire ants (Hymenoptera: Formicidae). *Environmental Entomology 31*, 1175–83.

————(2005) Aphids alter the community-wide impact of fire ants. *Ecology 86*, 1640–9.

Karmaly, K.A. (2004) A new species and a key to species of *Polyrhachis* Smith (Hymenoptera: Formicidae) from India. In K. Rajmohana, K. Sudheer, P. Girish Kumar, and S. Santhosh, eds. *Perspectives on Biosystematics and Biodiversity. Prof. T.C. Narendran commemoration volume*, pp. 539–51. Systematic Entomology Research Scholars Association, Kerala.

Kaspari, M. (1993) Removal of seeds from neotropical frugivore droppings – ant responses to seed number. *Oecologia 95*, 81–8.

——(1996) Litter ant patchiness at the 1-m^2 scale: disturbance dynamics in three Neotropical forests. *Oecologia 107*, 265–73.

——(2000) A primer on ant ecology. In D. Agosti, J.-D. Majer, L.E. Alonso, and T.R. Schultz, eds. *Ants: standard methods for measuring and monitoring biodiversity*, pp. 9–24. Smithsonian Institution Press, Washington, DC.

——(2004) Using the metabolic theory of ecology to predict global patterns of abundance. *Ecology 85*, 1800–2.

——and Majer, J.D. (2000) Using ants to monitor environmental change. In D. Agosti, J.D. Majer, L. Alonso, and T. Shultz, eds. *Ants: standard methods for measuring and monitoring biodiversity*, pp. 89–98. Smithsonian Institution Press, Washington, DC.

——and Vargo, E. (1994) Colony size as a buffer against seasonality: bergmann's rule in social insects. *Bulletin of the Ecological Society of America 75*, 105–6.

——and Weiser, M.D. (1999) The size-grain hypothesis and interspecific scaling in ants. *Functional Ecology 13*, 530–8.

——O'Donnell, S., and Alonso, L. (2000a) Three energy variables predict ant abundance at a geographic scale. *Proceedings of the Royal Society of London B 267*, 485–90.

————and Kercher, J.R. (2000b) Energy, density, and constraints to species richness: ant assemblages along a productivity gradient. *American Naturalist 155*, 280–93.

——Pickering, J., and Windsor, D. (2001b) The reproductive flight phenology of a neotropical ant assemblage. *Ecological Entomology 26*, 245–57.

——Ward, P.S., and Yuan, M. (2004) Energy gradients and the geographic distribution of local ant diversity. *Oecologia 140*, 407–13.

——Yanoviak S.P., and Dudley R. (2008) On the biogeography of salt limitation: a study of ant communities. *Proceedings of the National Academy of Sciences USA 105*, 17848–51.

——Yuan, M., and Alonso, L. (2003) Spatial grain and the causes of regional diversity gradients in ants. *American Naturalist 161*, 459–77.

——Pickering, J., Longino, J.T., and Windsor, D. (2001a) The phenology of a Neotropical ant assemblage: evidence for continuous and overlapping reproduction. *Behavioral Ecology and Sociobiology 50*, 382–90.

Katzav-Gozansky, T., Boulay, R., Ionesko, A., and Hefetz, A. (2008) Nest volatiles as modulators of nestmate recognition in the ant *Camponotus fellah*. *Journal of Insect Physiology 54*, 378–85.

————Vander Meer, R.K., and Hefetz, A. (2004) In-nest environment modulates nestmate recognition in the ant *Camponotus fellah*. *Naturwissenschaften 91*, 186–90.

Katzerke, A., Neumann, P., Pirk, C.W.W., Bliss, P., and Moritz, R.F.A. (2006) Seasonal nestmate recognition in the ant *Formica exsecta*. *Behavioral Ecology and Sociobiology 61*, 143–50.

Kaufmann, E., and Maschwitz, U. (2006) Ant-gardens of tropical Asian rainforests. *Naturwissenschaften 93*, 216–27.

——Malsch, A.K.F., Erle, M., and Maschwitz, U. (2003) Compound nesting of *Strumigenys* sp. (Myrmicinae) and *Diacamma* sp. (Ponerinae), and other nesting symbioses of myrmicine and ponerine ants in Southeast Asia. *Insectes Sociaux 50*, 88–97.

Kay, A. (2002) Applying optimal foraging theory to assess nutrient availability ratios for ants. *Ecology 83*, 1935–44.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

——Rostampour, S., and Sterner, R.W. (2006) Ant stoichiometry: elemental homeostasis in stage-structured colonies. *Functional Ecology 20*, 1037–44.

——Scott, S., Schade, J., and Hobbie, S. (2004) Stoichiometric relations in an ant-treehopper mutualism. *Ecology Letters 7*, 1024–8.

Keller, L. (1991) Queen number, mode of colony founding, and queen reproductive success in ants (Hymenoptera Formicidae). *Ethology Ecology and Evolution 3*, 307–16.

——(1997) Indiscriminate altruism: unduly nice parents and siblings. *Trends in Ecology and Evolution 12*, 186–90.

——(1998) Queen lifespan and colony characteristics in ants and termites. *Insectes Sociaux 45*, 235–46.

——(2007) Uncovering the biodiversity of genetic and reproductive systems: time for a more open approach. *American Naturalist 169*, 1–8.

——and Genoud, M. (1997) Extraordinary lifespans in ants: a test of evolutionary theories of ageing. *Nature 389*, 958–60.

——and Passera, L. (1989) Size and fat content of gynes in relation to the mode of colony founding in ants (Hymenoptera; Formicidae). *Oecologia 80*, 236–40.

——and Ross, K.G. (1998) Selfish genes: a green beard in the red fire ant. *Nature 394*, 573–5.

Kellner, K., Trindl, A., Heinze, J., and d'Ettorre, P. (2007) Polygyny and polyandry in small ant societies. *Molecular Ecology 16*, 1263–2369.

Kemel, K., Azevedo-Ramos, C., Moutinho, P., and Malcher, S. (2001) The effects of logging on the ground-foraging ant community in eastern Amazonia. *Studies on Neotropical Fauna and Environment 36*, 215–9.

Kenis, M., Auger-Rozenberg, M.A., Roques, A., Timms, L., Péré, C., Cock, M., Settele, J., Augustin, S., and Lopez-Vaamonde, C. (2009) Ecological effects of invasive alien insects. *Biological Invasions 11*, 21–45.

Kenne, M., and Dejean, A. (1999) Spatial distribution, size and density of nests of *Myrmicaria opaciventris* Emery (Formicidae: Myrmicinae). *Insectes Sociaux 46*, 179–85.

Kerner, A. (1878) *Flowers and their unbidden guests*. C. Kegan Paul & Co., London.

Ketterl, J., Verhaagh, M., and Dietz, B.H. (2004) *Eurhopalothrix depressa* sp. n. (Hymenoptera: Formicidae) from southern Brazil with a key to the Neotropical taxa of the genus. *Studies on the Neotropical Fauna and Environment 39*, 45–8.

Khila, A., and Abouheif, E. (2008) Reproductive constraint is a developmental mechanism that maintains social harmony in ants. *Proceedings of the National Academy of Sciences USA 105*, 17884–9.

Kier, G., Mutke, J., Dinerstein, E., Ricketts, T.H., Kuper, W., Kreft, H., and Barthlott, W. (2005) Global patterns of plant diversity and floristic knowledge. *Journal of Biogeography 32*, 1107–16.

King, J.R., and Porter, S.D. (2007) Body size, colony size, abundance, and ecological impact of exotic ants in Florida's upland ecosystems. *Evolutionary Ecology Research 9*, 757–74.

——and Tschinkel, W.R. (2006) Experimental evidence that the introduced fire ant, *Solenopsis invicta*, does not competitively suppress co-occurring ants in a disturbed habitat. *Journal of Animal Ecology 75*, 1370–8.

——(2008) Experimental evidence that human impacts drive fire ant invasions and ecological change. *Proceedings of the National Academy of Sciences USA 105*, 20339–43.

——Andersen, A.N., and Cutter, A.D. (1998) Ants as bioindicators of habitat disturbance: validation of the functional group model for Australia's humid tropics. *Biodiversity and Conservation 7*, 1627–38.

Kingsland, S.E. (1991) Defining ecology as a science. In L. A. Real and J.H. Brown, eds. *Foundations of Ecology*, pp. 1–13. University of Chicago Press, Chicago.

Kistner, D.H., Chong, K.F., Lee, C.Y. (2007) A new Malaysian myrmecophilous cricket (Orthoptera: Myrmecophilidae). *Sociobiology 50*, 173–82.

Kjar, D.S., and Sunian, T.W. (2007) First records of invasion by the myrmicine Japanese ant *Vollenhovia emeryi* W. M. Wheeler (Hymenoptera: Formicidae) in the United States. *Proceedings of the Entomological Society of Washington 109*, 596–604.

Klein, R.W., Maschwitz, U., and Kovac, D. (1993) Flood-control by ants – a Southeast-Asian bamboo-dwelling *Tetraponera* (Formicidae, Pseudomyrmecinae) bails water from its internode nests. *Insectes Sociaux 40*, 115–8.

Kleineidam, C., and Roces, F. (2000) Carbon dioxide concentrations and nest ventilation in nests of the leaf-cutting ant *Atta vollenweideri*. *Insectes Sociaux 47*, 241–8.

Klingenberg, C., and Verhaagh, M. (2005) Myrmecology in the Internet: possibilities of information gathering. *Beitraege zur Entomologie 55*, 485–98.

Klopfer, P.H., and Macarthur, R.H. (1961) On the causes of tropical species diversity – niche overlap. *American Naturalist 95*, 223–6.

Knaden, M., Tinaut, A., Cerda, X., Wehner, S., and Wehner, R. (2005) Phylogeny of three parapatric species of desert ants, *Cataglyphis bicolor, C. viatica* and *C. savignyi*: a comparison of mitochondrial DNA, nuclear DNA and morphological data. *Zoology 108*, 169–77.

Knaden, M., and Wehner, R. (2003) Nest defense and conspecific recognition in the desert ant *Cataglyphis fortis*. *Journal of Insect Behavior 16*, 717–30.

Kneitel, J.M., and Chase, J.M. (2004) Trade-offs in community ecology: linking spatial scales and species coexistence. *Ecology Letters 7*, 69–80.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Knoch, T.R., Faeth, S.H., and Arnott, D.L. (1993) Endophytic fungi alter foraging and dispersal by desert seed-harvesting ants. *Oecologia 95*, 47–473.

Kobayashi, K., Hasegawa, E., and Ohkawara, K. (2008) Clonal reproduction by males of the ant *Vollenhovia emeryi* (Wheeler). *Entomological Science 11*, 167–72.

Koh, L.P., Dunn, R.R., Sodhi, N.S., Colwell, R.S., Proctor, H.S., and Smith, V.S. (2004) Species coextinctions and the biodiversity crisis. *Science 305*, 1632–4.

Kohout, R.J. (1988) A new species of *Polyrhachis* from Papua New-Guinea with a review of the New Guinean and Australian species (Hymenoptera: Formicidae: Formicinae). *Memoirs of the Queensland Museum 25*, 417–28.

——(2006) Review of *Polyrhachis* (*Cyrtomyrma*) Forel (Hymenoptera: Formicidae: Formicinae) of Australia, Borneo, New Guinea and the Solomon Islands with descriptions of new species. *Memoirs of the Queensland Museum 52*, 87–146.

——(2007a) A review of the subgenus *Polyrhachis* (*Campomyrma*) Wheeler from Borneo with descriptions of new species (Hymenoptera: Formicidae: Formicinae). *Asian Myrmecology 1*, 7–17.

——(2007b) Revision of the subgenus *Aulacomyrma* Emery of the genus *Polyrhachis* F. Smith, with descriptions of new species. *Memoirs of the American Entomological Institute 80*, 186–253.

Kohout, R. J. (2008a) A new species of the *Polyrhachis (Myrmhopla) flavoflagellata*-group (Hymenoptera: Formicidae: Formicinae) from Borneo. *Asian Myrmecology 2*, 11–16.

——(2008b) A review of the *Polyrhachis* ants of Sulawesi with keys and descriptions of new species (Hymenoptera: Formicidae: Formicinae). *Memoirs of the Queensland Museum 52*, 255–317.

Koptur, S. (1979) Facultative mutualism between weedy vetches bearing extrafloral nectaries and weedy ants in California. *American Journal of Botany 66*, 1016–20.

——(1992) Extrafloral nectary mediated interactions between insects and plants. In E. Bernays, ed. *Insect-Plant Interactions*, pp. 81–129. CRC Press, Boca Raton.

——and Truong, N. (1998) Facultative ant-plant interactions: nectar sugar preferences of introduced pest ant species in South Florida. *Biotropica 30*, 179–89.

Korb, J., and Heinze, J. (2008) *Ecology of Social Evolution*. Springer, Heidelberg.

Korzukhin, M.D., Porter, S.D., Thompson, L.C., and Wiley, S. (2001) Modeling temperature-dependent range limits of the red imported fire ant (Hymenoptera: Formicidae: *Solenopsis invicta*) in the United States. *Environmental Entomology 30*, 645–55.

Kost, C., Lakatos, T., Böttcher, I., Arendholz, W.-R., Redenbach, M., and Wirth, R. (2007) Non-specific association between filamentous bacteria and fungus-growing ants. *Naturwissenschaften 94*, 821–8.

Kot, M., Lewis, M.A., and van der Driessche, P. (1996) Dispersal data and the spread of invading organisms. *Ecology 77*, 2027–42.

Krebs, C.J. (2000) *Ecology: the experimental analysis of distribution and abundance*. Benjamin Cummings, USA.

Kreft, H., and Jetz, W. (2007) Global patterns and determinants of vascular plant diversity. *Proceedings of the National Academy of Sciences USA 104*, 5925–30.

Kremen, C., Cameron, A., and Moilanen, A. (2008) Aligning conservation priorities across taxa in Madagascar with high-resolution planning tools. *Science 320*, 222–6.

Krieger, M.J.B., and Ross, K.G. (2002) Identification of a major gene regulating complex social behavior. *Science 295*, 328–32.

Krombein, K.V., Norden, B.B., Rickson, M.M., and Rickson, F.R. (1999) Biodiversity of the domatia occupants (ants, wasps, bees, and others) of the Sri Lankan myrmecophyte *Humboldtia laurifolia* Vahl (Fabaceae). *Smithsonian Contributions to Zoology 0*, i–iv, 1–34.

Kronauer, D.J.C. (2008) Recent advances in army ant biology (Hymenoptera: Formicidae). *Myrmecological News 12*, 51–65.

——Johnson, R.A., and Boomsma, J.J. (2007a) The evolution of multiple mating in army ants. *Evolution 61*, 413–22.

——Schöning, C., Vilhelmsen, L.B., and Boomsma, J.J. (2007b) A molecular phylogeny of *Dorylus* army ants provides evidence for multiple evolutionary transitions in foraging niche. *BMC Evolutionary Biology 7*, 56, doi:10.1186/1471-2148-7-56.

Krushelnycky, P.D., and Gillespie, R.G. (2008) Compositional and functional stability of arthropod communities in the face of ant invasions. *Ecological Applications 18*, 1547–62.

——Loope, L.L., and Joe, S.M. (2004) Limiting spread of a unicolonial invasive insect and characterization of seasonal patterns of range expansion. *Biological Invasions 6*, 47–57.

————and Reimer, N.J. (2005b) The ecology, policy, and management of ants in Hawaii. *Proceedings of the Hawaiian Entomological Society 37*, 1–25.

——Joe, S.M., Medeiros, A.C., Daehler, C.C., and Loope, L. L. (2005a) The role of abiotic conditions in shaping the long-term patterns of a high-elevation Argentine ant invasion. *Diversity and Distributions 11*, 319–31.

Kugler, C. (1979) Evolution of the sting apparatus in the myrmicine ants. *Evolution 33*, 117–30.

——(1984) Ecology of the ant *Pogonomyrmex mayri* – foraging and competition. *Biotropica 16*, 227–34.

Kumar, A., and O'Donnell, S. (2009) Elevation and forest clearing effects on foraging differ between surface – and subterranean – foraging army ants (Formicidae: Ecitoninae) *Journal of Animal Ecology 78*, 91–7.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Kümmerli, R., and Keller, L. (2007) Contrasting population genetic structure for workers and queens in the putatively unicolonial ant *Formica exsecta. Molecular Ecology 16*, 4493–503.

Kunin, E., and Gaston, K.J. (1997) *The Biology of Rarity*. Chapman & Hall, London.

Kusnezov, N. (1957) Numbers of species of ants in faunae of different latitudes. *Evolution 11*, 298–9.

Laakso, J., and Setälä, H. (1998) Composition and trophic structure of detrital food web in ant nest mounds of *Formica aquilonia* and in the surrounding forest soil. *Oikos 81*, 266–78.

————(2000) Impacts of wood ants (*Formica aquilonia* Yarr.) on the invertebrate food web of the boreal forest floor. *Annales Zoologici Fennici 37*, 93–100.

Lach, L. (2003) Invasive ants: unwanted partners in ant-plant interactions? *Annals of the Missouri Botanical Garden 90*, 91–108.

——(2005) Interference and exploitation competition of three nectar-thieving invasive ant species. *Insectes Sociaux 52*, 257–62.

——(2007) A mutualism with a native membracid facilitates pollinator displacement by Argentine ants. *Ecology 88*, 1994–2004.

——(2008a) Argentine ants displace floral arthropods in a biodiversity hotspot. *Diversity and Distributions 14*, 281–90.

——(2008b) Floral visitation patterns of two invasive ant species and their effects on other hymenopteran visitors. *Ecological Entomology 33*, 155–60.

——and Thomas, M.L. (2008) Invasive ants in Australia: documented and potential ecological consequences. *Australian Journal of Entomology 47*, 275–88.

——Hobbs, R.J., and Majer, J.D. (2009) Herbivory-induced extrafloral nectar increases native and invasive ant worker survival. *Population Ecology 51*, 237–43.

Lachaud, J.P., Cadena, A., Schatz, B., Pérez-Lachaud, G., and Ibarra-Núñez, G. (1999) Queen dimorphism and reproductive capacity in the ponerine ant, *Ectatomma ruidum* Roger. *Oecologia 120*, 515–23.

Lack, D. (1947) The significance of clutch-size. *Ibis 89*, 302–52.

Lafleur, B., Hooper-Búi, L.M., Mumma, E.P., and Geaghan, J.P. (2005) Soil fertility and plant growth in soils from pine forests and plantations: effect of invasive red imported fire ants *Solenopsis invicta* (Buren). *Pedobiologia 49*, 415–23.

Lake, P.S., and O'Dowd, D.J. (1991) Red crabs in rainforest, Christmas Island: biotic resistance to invasion by an exotic snail. *Oikos 62*, 25–9.

Lambardi, D., Dani, F.R., Turillazzi, S., and Boomsma, J.J. (2007) Chemical mimicry in an incipient leaf-cutting ant social parasite. *Behavioral Ecology and Sociobiology 61*, 843–51.

Lane, D.R., and BassiriRad, H. (2005) Diminishing effects of ant mounds on soil heterogeneity across a chronosequence of prairie restoration sites. *Pedobiologia 49*, 359–66.

Langhammer, P.F., Bakarr, M.I., Bennun, L.A and Brooks, T.M. (2007) *Identification and Gap Analysis of Key Biodiversity Areas: targets for comprehensive protected area systems*. IUCN, Gland, Switzerland and Cambridge, UK.

Langkilde, T. (2009) Invasive fire ants alter behavior and morphology of native lizards. *Ecology 90*, 208–17.

Lanza, J., Vargo, E.L., Pulim, S., and Chang, Y.Z. (1993) Preferences of the fire ants *Solenopsis invicta* and *S. geminata* (Hymenoptera: Formicidae) for amino acid and sugar components of extrafloral nectars. *Environmental Entomology 22*, 411–7.

LaPolla, J.S. (2004) *Acropyga* (Hymenoptera: Formicidae) of the world. *Contributions of the American Entomological Institute 33(4)*, 1–130.

——and Fisher, B.L. (2005) A remarkable new species of *Acropyga* (Hymenoptera: Formicidae) from Gabon, with a key to the Afrotropical species. *Proceedings of the California Academy of Sciences* (4) *56*, 601–5.

Lapolla, J.S., and Sosa-Calvo, J. (2006) Review of the ant genus *Rogeria* (Hymenoptera: Formicidae) in Guyana. *Zootaxa 1330*, 59–68.

Lattke, J.E. (1995) Revision of the ant genus *Gnamptogenys* in the New World (Hymenoptera: Formicidae). *Journal of Hymenoptera Research 4*, 137–93.

——(2004) A taxonomic revision and phylogenetic analysis of the ant genus *Gnamptogenys* Roger in Southeast Asia and Australasia (Hymenoptera: Formicidae: Ponerinae). *University of California Publications in Entomology 122*, 1–266.

——Fernández, F., and Palacio, E.E. (2007) Identification of the species of *Gnamptogenys* Roger in the Americas. *Memoirs of the American Entomological Institute 80*, 254–70.

Laurence, W.F., Lovejoy, T.E., and Vasconcelos, H.L. (2002) Ecosystem decay of Amazonian forest fragments: a 22-year investigation. *Conservation Biology 16*, 605–18.

Leal, I.R., and Oliveira, P.S. (1995) Behavioral ecology of the neotropical termite-hunting ant *Pachycondyla* (=*Termitopone*) *marginata*: colony founding, group-raiding and migratory patterns. *Behavioral Ecology and Sociobiology 37*, 373–83.

Le Breton, J., Chazeau, J., and Jourdan, H. (2003) Immediate impacts of invasion by *Wasmannia auropunctata* (Hymenoptera: Formicidae) on native litter ant fauna in a New Caledonian rainforest. *Austral Ecology 28*, 204–9.

——Delabie, J.H.C., Chazeau, J., Dejean, A., and Jourdan, H. (2004) Experimental evidence of large-scale

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

unicoloniality in the tramp ant *Wasmannia auropunctata* (Roger). *Journal of Insect Behaviour 17*, 263–71.

——Orivel, J., Chazeau, J., and Dejean, A. (2007) Unadapted behaviour of native, dominant ant species during the colonization of an aggressive, invasive ant. *Ecological Research 22*, 107–14.

——Jourdan, H., Chazeau, J., Orivel, J., and Dejean, A. (2005) Niche opportunity and ant invasion: the case of *Wasmannia auropunctata* in a New Caledonian rain forest. *Journal of Tropical Ecology 21*, 93–8.

LeBrun, E.G. (2005) Who is the top dog in ant communities? Resources, parasitoids, and multiple competitive hierarchies. *Oecologia 142*, 643–52.

——and Feener, D.H. (2002) Linked indirect effects in antphorid interactions: impacts on ant assemblage structure. *Oecologia 133*, 599–607.

————(2007) When trade-offs interact: balance of terror enforces dominance discovery trade-off in a local ant assemblage. *Journal of Animal Ecology 76*, 58–64.

——Plowes, R.M., and Gilbert, L.E. (2008) Dynamic expansion in recently introduced populations of fire ant parasitiods (Diptera: Phoridae). *Biological Invasions 10*, 989–99.

——Tillberg, C.V., Suarez, A.V., Folgarait, P.J., Smith, C. R., and Holway, D.A. (2007) An experimental study of competition between fire ants and Argentine ants in their native range. *Ecology 88*, 63–75.

Le Conte, Y., and Hefetz, A. (2008) Primer pheromones in social Hymenoptera. *Annual Review of Entomology 53*, 523–42.

Ledoux, A. (1973) A propos du bouturage de societe chez la fourmi *Aphaenogaster senilis* Mayr. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences D 277*, 2199–200.

Lengyel, F., Westerlund, S.A., and Kaib, M. (2007) Juvenile hormone III influences task-specific cuticular hydrocarbon profile changes in the ant *Myrmicaria eumenoides*. *Journal of Chemical Ecology 33*, 167–81.

Lenoir, A., Malosse, C., and Yamaoka, R. (1997) Chemical mimicry between parasites of the genus *Formicoxenus* and their host *Myrmica* (Hymenoptera, Formicidae). *Biochemical Systematics and Ecology 25*, 379–89.

——d'Ettorre, P., Errard, C., and Hefetz, A. (2001) Chemical ecology and social parasitism in ants. *Annual Review of Entomology 46*, 573–99.

——Fresneau, D., Errard, C., and Hefetz, A. (1999) The individuality and the colonial identity in ants: the emergence of the social representation concept. In C. Detrain, J.L. Deneubourg, and J. Pasteels, eds. *Information Processing in Social Insects*, pp. 219–37. Birkhäuser Verlag, Basel.

——Querard, L., Pondicq, N., and Berton, F. (1988) Reproduction and dispersal in the ant *Cataglyphis cursor* (Hymenoptera, Formicidae). *Psyche (Cambridge) 95*, 21–44.

——Nowbahari, E., Quérard, L., Pondicq, N., and Delalande, C. (1990) Habitat exploitation and intercolonial relationships in the ant *Cataglyphis cursor* (Hymenoptera: Formicidae). *Acta Oecologica 11*, 3–18.

Lenoir, J.-C., Schrempf, A., Lenoir, A., Heinze, J., and Mercier, J.L. (2007) Genetic structure and reproductive strategy in the ant *Cardiocondyla elegans*: strictly monogynous nests invaded by unrelated sexuals. *Molecular Ecology 16*, 345–54.

Leonhardt, S.D., Brandstaetter, A.S., and Kleineidam, C.J. (2007) Reformation process of the neuronal template for nestmate-recognition cues in the carpenter ant *Camponotus floridanus*. *Journal of Comparative Physiology A 193*, 993–1000.

Lessard, J.P., and Buddle, C.M. (2005) The effects of urbanization on ant assemblages (Hymenoptera: Formicidae) associated with the Molson Nature Reserve, Quebec. *Canadian Entomologist 137*, 215–25.

——Dunn, R.R., Parker, C.R., and Sanders, N.J. (2007) Rarity and diversity in forest ant assemblages of Great Smoky Mountains National Park. *Southeastern Naturalist Special Issue 1*, 215–28.

Lester, P.J. (2005) Determinants for the successful establishment of exotic ants in New Zealand. *Diversity and Distributions 11*, 279–88.

——and Keall, J.B. (2005) The apparent establishment and subsequent eradication of the Australian giant bulldog ant *Myrmecia brevinoda* Forel (Hymenoptera: Formicidae) in New Zealand. *New Zealand Journal of Zoology 32*, 353–7.

——and Tavite, A. (2004) Long-legged ants, *Anoplolepis gracilipes* (Hymenoptera: Formicidae), have invaded Tokelau, changing composition and dynamics of ant and invertebrate communities. *Pacific Science 58*, 391–401.

——Abbott, K.L., Sarty, M., and Burns, K.C. (2009) Competitive assembly of South Pacific invasive ant communities. *BMC Ecology 9*, doi:10.1186/1472–6785–1189–1183.

Leston, D. (1973) The ant mosaic-tropical tree crops and the limiting of pests and diseases. *Articles and News Summaries 19*, 311–41.

Letourneau, D.K. (1983) Passive aggression: an alternative hypothesis for the *Piper-Pheidole* association. *Oecologia 60*, 122–6.

Letourneau, D.K., Dyer, L.A., and Vega, G. (2004) Indirect effects of a top predator on a rain forest understory plant community *Ecology 85*, 2144–52.

Leung, B., Lodge, D.M., Finnoff, D., Shogren, J.F., Lewis, M.A., and Lamberti, G. (2002) An ounce of prevention or a pound of cure: bioeconomic risk analysis of invasive species. *Proceedings of the Royal Society of London B 269*, 2407–13.

Levia, D.F., and Frost, E.E. (2004) Assessment of climatic suitability for the expansion of *Solenopsis invicta* Buren

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

in Oklahoma using three general circulation models. *Theoretical and Applied Climatology 79*, 23–30.

Levin, S.A. (1992) The problem of pattern and scale in ecology. *Ecology 73*, 1943–67.

Levins, R. (2008) Predacious ants patrol sweet potatoes in Cuba. http:/www.fadr.msu.ru/rodale/agsieve/txt/vol3/1/a6.html.

——and Culver, D. (1971) Regional coexistence of species and competition between rare species (mathematical model/habitable patches). *Proceedings of the National Academy of Sciences USA 68*, 1246–8.

Lewis, T., Cherrett, J.M., Haines, I., Haines, J.B., and Mathias, P.L. (1976) The crazy ant (*Anoplolepis longipes* (Jerd.) (Hymenoptera, Formicidae) in Seychelles, and its chemical control. *Bulletin of Entomological Research 66*, 97–111.

Li, H.W., Medina, F., Vinson, S.B., and Coates, C.J. (2005) Isolation, characterization, and molecular identification of bacteria from the red imported fire ant (*Solenopsis invicta*) midgut. *Journal of Invertebrate Pathology 89*, 203–9.

Liang, D., and Silverman, J. (2000) 'You are what you eat': diet modifies cuticular hydrocarbons and nestmate recognition in the argentine ant, *Linepithema humile*. *Naturwissenschaften 87*, 412–416.

Liautard, C., and Keller, L. (2001) Restricted effective queen dispersal at a microgeographic scale in polygynous populations of the ant *Formica exsecta*. *Evolution 55*, 2484–92.

——Brown, W.D., Helms, K.R., and Keller, L. (2003) Temporal and spatial variations of gyne production in the ant *Formica exsecta*. *Oecologia 136*, 558–64.

Liebert, A.E., and Starks, P.T. (2004) The action component of recognition systems: a focus on the response. *Annales Zoologici Fennici 41*, 747–64.

Liebherr, J.K., and Krushelnycky, P.D. (2007) Unfortunate encounters? Novel interactions of native *Mecyclothorax*, alien *Trechus obtusus* (Coleoptera: Carabidae) and Argentine ant (*Linepithema humile*) (Hymenoptera: Formicidae) across a Hawaiian landscape. *Journal of Insect Conservation 11*, 61–73.

Liebig, J., and Poethke, H.J. (2004) Queen lifespan and colony longevity in the ant *Harpegnathos saltator*. *Ecological Entomology 29*, 203–7.

Liefke, C.W, Dorow, H.O., Hölldobler, B., and Maschwitz, U. (1998) Nesting and food resources of syntopic species of the ant genus *Polyrhachis* (Hymenoptera, Formicidae) in West-Malaysia. *Insectes Sociaux 45*, 411–25.

Lin, C.C., and Wu, W.J. (2003) The ant fauna of Taiwan (Hymenoptera: Formicidae), with keys to subfamilies and genera. *Guoli Taiwan Bowuguan Niankan 46*, 5–69.

Linnaeus, C. (1758) *Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio decima, reformata*. L. Salvii, Stockholm.

Litsinger, J.A., Cruz, C.G.D., Canapi, B.L., and Barrion, A. T. (2007) Maize planting time and arthropod abundance in southern Mindanao, Philippines. II. Population dynamics of natural enemies. *International Journal of Pest Management 53*, 161–73.

Little, A.E.F., and Currie, C.R. (2008) Black yeast symbionts compromise the efficiency of antibiotic defenses in fungus-growing ants. *Ecology 89*, 1216–22.

Lockwood, J.L. (1999) Using taxonomy to predict success among introduced avifauna: relative importance of transport and establishment. *Conservation Biology 13*, 560–7.

Lodge, D.M., Williams, S., MacIsaac, H.J., Hayes, K.R., Leung, B., Reichard, S., Mack, R.N., Moyle, P.B., Smith, M.A., Andow, O.A., Carlton, J.T., and McMichael, A. (2006) Biological invasions: recommendations for U.S. policy and management. *Ecological Applications 16*, 2035–54.

Lofgren, C.S., Banks, W.A., and Glancey, B.M. (1975) Biology and control of imported fire ant. *Annual Review of Entomology 20*, 1–30.

Longhurst, C., and Howse, P.E. (1979) Foraging, recruitment and emigration in *Megaponera foetens* (Fab.) (Hymenoptera: Formicidae) from the Nigerian Guinea savanna. *Insectes Sociaux 26*, 204–15.

Longino, J.T. (1989) Geographic variation and community structure in an ant-plant mutualism: *Azteca* and *Cecropia* in Costa Rica. *Biotropica 21*, 126–32.

——(2003) The *Crematogaster* (Hymenoptera, Formicidae, Myrmicinae) of Costa Rica. *Zootaxa 151*, 1–150.

——(2006) A taxonomic review of the genus *Myrmelachista* (Hymenoptera: Formicidae) in Costa Rica. *Zootaxa 1141*, 1–54.

——(2007) A taxonomic review of the genus *Azteca* (Hymenoptera: Formicidae) in Costa Rica and a global revision of the *aurita* group. *Zootaxa 1491*, 1–63.

——(2008) *Leaf Litter Arthropods of Mesoamerica: LLAMA.* http://llama.evergreen.edu/.

——and Fernández, F. (2007) Taxonomic review of the genus *Wasmannia*. *Memoirs of the American Entomological Institute 80*, 271–89.

——Colwell, R.K., and Coddington, J.A. (2002) The ant fauna of a tropical rainforest: estimating species richness three different ways. *Ecology 83*, 689–702.

Losey, J., and Vaughan, M. (2006) The economic value of ecological services provided by insects. *BioScience 56*, 311–23.

Lowe, S. (2000) *100 of the world's worst invasive alien species: a selection from the Global Invasive Species Database* http://www.issg.org/database. The Invasive Species Specialist Group (ISSG) New Zealand.

Lucas, C., Pho, D.B., Fresneau, D., and Jallon, J.M. (2004) Hydrocarbon circulation and colonial signature in *Pachycondyla villosa*. *Journal of Insect Physiology 50*, 595–607.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

————Jallon, J.M., and Fresneau, D. (2005) Role of cuticular hydrocarbons in the chemical recognition between ant species in the *Pachycondyla villosa* species complex. *Journal of Insect Physiology 51*, 1148–51.

——Fresneau, D., Kolmer, K., Heinze, J., Delabie, J.H.C., and Pho, D.B. (2002) A multidisciplinary approach to discriminating different taxa in the species complex *Pachycondyla villosa* (Formicidae). *Biological Journal of the Linnean Society 75*, 249–59.

Lude, A., Reich, M., and Plachter, H. (1999) Life strategies of ants in unpredictable floodplain habitats of Alpine rivers (Hymenoptera: Formicidae). *Entomologia Generalis 24*, 75–91.

Lugo, A.E., Farnworth, E.G., Pool, D., Jerez, P., and Kaufman, G. (1973) The impact of the leaf cutter ant, *Atta columbica*, on the energy flow of a tropical rain forest. *Ecology 54*, 1292–301.

Lutz, H. (1986) Eine neue Unterfamilie der Formicidae (Insecta: Hymenoptera) aus dem mittel-eozänen Ölschiefer der 'Grube Messel' bei Darmstadt (Deutschland, S-Hessen). *Senckenbergiana Lethae 67*, 177–218.

——(1990) Systematische und palökologische Untersuchungen an Insekten aus dem Mittel-Eozän der Grube Messel bei Darmstadt. *Courier Forschungsinstitut Senckenberg 124*, 1–165.

——(1992) Giant ants and other rarities: the insect fauna. In S. Schaal and W. Ziegler, eds. *Messel-An Insight into the History of Life and of the Earth*, pp. 53–67. Clarendon Press, Oxford.

Lyu, D.-P. (2006) *Myrmica* in Korea (Hymenptera: Formicidae). *Journal of Asia-Pacific Entomology 9*, 189–202.

Mabelis, A.A. (1979) Wood ant wars: the relationship between aggression and predation in the red wood ant (*Formica polyctena* Forst.). *Netherlands Journal of Zoology 29*, 451–520.

——(2007) Do ants need protecting? *Entomologische Berichten 67*, 145–9.

MacArthur, R.H. (1972) *Geographical Ecology: patterns in the distribution of species*. Harper and Row, New York.

——and Wilson, E.O. (1967) *The Theory of Island Biogeography*. Princeton University Press, Princeton, NJ.

MacGown, J.A., Brown, R.L., Hill, J.G., and Layton, B. (2007) Carpenter ants (Hymenoptera: Formicidae: *Camponotus*) of Mississippi. *Mississippi Agricultural and Forestry Experiment Station Technical Bulletin 1158*, 28.

Macintosh, J.A., Veal, D.A., Beattie, A.J., and Gooley, A.A. (1998) Isolation from an ant *Myrmecia gulosa* of two inducible O-glycosylated proline-rich antibacterial peptides. *Journal of Biological Chemistry 273*, 6139–43.

MacIntyre, R.J., ed. (1985) *Molecular Evolutionary Genetics*. Plenum Press, New York.

Mackay, W.P., and Mackay, E.E. (1984) Why do harvester ants store seeds in their nests? *Sociobiology 9*, 31–47.

——Porter, S., and Gonzalez, D. (1990) A comparison of monogyne and polygyne populations of the tropical fire ant, *Solenopsis geminata* (Hymenoptera: Formicidae) in Mexico. *Journal of the Kansas Entomological Society 63*, 611–5.

——Maes, J.-M., Rojas Fernández, P., and Luna, G. (2004) The ants of North and Central America: the genus *Mycocepurus* (Hymenoptera: Formicidae). *Journal of Insect Science 4*(27), available online: insectscience.org/4.27. 7.

——Rebeles, A., Arredondo, H.C., Rodriguez, A.Z., Gonzales, D.A., and Vinson, S.B. (1991) Impact of the slash and burning of a tropical rain forest on the native ant fauna (Hymenoptera: Formicidae). *Sociobiology 18*, 257–68.

Macom, T.E., and Porter, S.D. (1996) Comparison of polygyne and monogyne red imported fire ant (Hymenoptera: Formicidae) population densities. *Annals of the Entomological Society of America 89*, 535–43.

Magallón, S. (2004) Dating lineages: molecular and paleontological approaches to the temporal framework of clades. *International Journal of Plant Science 165* (4 Suppl), S7-S21.

Mailleux, A.-C., Deneubourg J.-L., Detrain C. (2003) How does colony growth influence communication in ants? *Insectes Sociaux 50*, 24–31.

Majer, J.D. (1972) The ant mosaic in Ghana cocoa farms. *Bulletin of Entomological Research 62*, 151–60.

——(1976) Influence of ants and ant manipulation on cocoa farm fauna. *Journal of Applied Ecology 13*, 157–75.

——(1994) Spread of Argentine ants (*Linepithema humile*), with special reference to Western Australia. In D.F. Williams, ed. *Exotic Ants: biology, impact, and control of introduced species*, pp. 163–73. Westview Press, Boulder, CO.

——and Beeston, G. (1996) The Biodiversity Integrity Index: an illustration using ants in Western Australia. *Conservation Biology 10*, 65–73.

——and Delabie, J.H.C. (1994) Comparison of the ant communities of annually inundated and terra-firme forests at Trombetas in the Brazilian Amazon. *Insectes Sociaux 41*, 343–59.

————(1999) Impact of tree isolation on arboreal and ground ant communities in cleared pasture in the Atlantic rain forest region of Bahia, Brazil. *Insectes Sociaux 46*, 281–90.

————and McKenzie, N.L. (1997) Ant litter fauna of forest, forest edges and adjacent grassland in the Atlantic rain forest region of Bahia, Brazil. *Insectes Sociaux 44*, 255–66.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

————and Smith, R.B. (1994) Arboreal ant community patterns in Brazilian cocoa farms. *Biotropica 26*, 73–83.

——Orabi, G., and Bisevac, L. (2007) Ants (Hymenoptera: Formicidae) pass the bioindicator scorecard. *Myrmecological News 10*, 69–76.

——Day, J.E., Kabay, E.D., and Perriman, W.S. (1984) Recolonization by ants in bauxite mines rehabilitated by a number of different methods. *Journal of Applied Ecology 21*, 355–75.

——Kitching, R.L., Heterick, B.E., Hurley, K., and Brennan, K.E.C. (2001) North-South patterns within arboreal ant assemblages from rain forests in eastern Australia. *Biotropica 33*, 643–61.

Mallon, E., and Franks, N. (2000) Ants estimate area using Buffon's needle. *Proceedings of the Royal Society of London B 267*, 765–70.

Maloof, J.E., and Inouye, D.W. (2000) Are nectar robbers cheaters or mutualists? *Ecology 81*, 2651–61.

Malsch, A.K.F., Fiala, B., Maschwitz, U., Mohamed, M., Nais, J., and Linsenmair, K.E. (2008) An analysis of declining ant species richness with increasing elevation at Mount Kinabalu, Sabah, Borneo. *Asian Myrmecology 2*, 33–49.

Manly, B.F.J. (1995) A note on the analysis of species co-occurrences. *Ecology 76*, 1109–15.

Mark, S., and Oleson, J.M. (1996) Importance of elaiosome size to the removal of ant-dispersed seeds *Oecologia 107*, 95–101.

Markin, G.P. (1970a) Food distribution within laboratory colonies of the Argentine ant, *Iridomyrmex humilis* (Mayr). *Insectes Sociaux 17*, 127–58.

——(1970b) The seasonal life cycle of the Argentine ant, *Iridomyrmex humilis* in southern California. *Annals of the Entomological Society of America 635*, 1238–42.

——Oneal, J., and Collins, H.L. (1974) Effects of mirex on general ant fauna of a treated area in Louisiana. *Environmental Entomology 3*, 895–8.

——Dillier, J.H., Hill, S.O., Blum, M.S., and Hermann, H. R. (1971) Nuptial flight and flight ranges of the imported fire ant, *Solenopsis saevissima richteri* (Hymenoptera: Formicidae). *Journal of the Georgia Entomological Society 6*, 145–56.

Marlier, J.F., Quinet, Y., and De Biseau, J.C. (2004) Defensive behaviour and biological activities of the abdominal secretion in the ant *Crematogaster scutellaris* (Hymenoptera: Myrmicinae). *Behavioural Processes 67*, 427–40.

Marr, R. (2003) *Toxic baiting of the yellow crazy ant*, Anoplolepis gracilipes, *on Christmas Island: impacts on non-target litter invertebrates*. Honours thesis, School of Biological Science, Monash University, Melbourne.

Marti, O.G., and Olson, D.M. (2007) Effect of tillage on cotton aphids (Homoptera: Aphididae), pathogenic fungi, and predators in south central Georgia cotton fields. *Journal of Entomological Science 42*, 354–67.

Martin, M.M. (1970) The biochemical basis of the fungus-attine ant symbiosis. *Science 169*, 16–20.

——(1991) The evolution of cellulose digestion in insects. *Philosophical Transactions of the Royal Society B 333*, 281–8.

Martin, S.J., Helanterä, H., and Drijfhout, F.P. (2008a) Evolution of species-specific cuticular hydrocarbon patterns in *Formica* ants. *Biological Journal of the Linnean Society*, *95*, 131–40.

——Vitikainen, E., Helanterä, H., and Drijfhout, F.P. (2008b) Chemical basis of nestmate dsicrimination in the ant *Formica exsecta*. *Proceedings of the Royal Society of London B 275*, 1271–8.

Martinez-Ferrer, M.T., Grafton-Cardwell, E.E., and Shorey, H.H. (2003) Disruption of parasitism of the California red scale (Homoptera: Diaspdidae) by three ant species (Hymenoptera: Formicidae). *Biological Control 26*, 279–86.

Martins Jr., J., Solomon, S.E., Mikheyev, A.S., Mueller, U. G., Ortiz, A., and Bacci Jr., M., (2007) Nuclear mitochondrial-like sequences in ants: evidence from *Atta cephalotes* (Formicidae: Attini). *Insect Molecular Biology 16*, 777–84.

Maschwitz, U., and Hänel, H. (1985) The migrating herdsman *Dolichoderus* (*Diabolus*) *cuspidatus*: an ant with a novel mode of life. *Behavioral Ecology and Sociobiology 17*, 171–84.

——and Moog, J. (2000) Communal peeing: a new mode of flood control in ants. *Naturwissenschaften 87*, 563–5.

——and Steghaus-Kovac, S. (1991) Individualism versus cooperation – conflicting hunting and recruiting strategies among tropical Ponerine ants (Hymenpotera, Formicidae). *Naturwissenschaften 78*, 103–13.

——Lenz, S., and Buschinger, A. (1986) Individual specific trails in the ant *Leptothorax affinis* (Formicidae: Myrmicinae). *Experientia 42*, 1173–4.

——Steghaus-Kovac, S., Gaube, R., and Hänel, H. (1989) A South East Asian ponerine ant of the genus *Leptogenys* (Hym., Form.) with army ant habits. *Behavioral Ecology and Sociobiology 24*, 305–16.

Masuko, K. (1986) Larval hemolymph feeding: a nondestructive parental cannibalism in the primitive ant *Amblyopone silvestrii* Wheeler (Hymenoptera: Formicidae). *Behavioral Ecology and Sociobiology 19*, 249–55.

——(1989) Larval hemolymph feeding in the ant *Leptanilla japonica* by use of a specialized duct organ, the "larval hemolymph tap" (Hymenoptera: Formicidae). *Behavioral Ecology and Sociobiology 24*, 127–32.

——(1990) Behavior and ecology of the enigmatic ant *Leptanilla japonica* Baroni Urbani (Hymenoptera: Formicidae: Leptanillinae). *Insectes Sociaux 37*, 31–57.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Mateo, J.M. (2004) Recognition systems and biological organization: the perception component of social recognition. *Annales Zoologici Fennici 41*, 729–46.

Matsuura, K., Tamura, T., Kobayashi, N., and Tatsumi, S. (2007) The antibacterial protein lysozyme identified as the termite egg recognition pheromone. *PLoS ONE 2*, e813. doi:810.1371/journal.pone.0000813.

May, R.M. (1988) How many species are there on earth? *Science 247*, 1441–9.

Mayade, S., Cammaerts, M.C., and Suzzoni, J.P. (1993) Home range marking and territorial marking in *Cataglyphis cursor* (Hymenoptera: Formicidae). *Behavioural Processes 30*, 131–42.

Mayhé-Nunes, A.J., and Brandão, C.R.F. (2005) Revisionary studies on the attine ant genus *Trachymyrmex* Forel. Part 2: the Iheringi group (Hymenoptera: Formicidae). *Sociobiology 45*, 271–305.

————(2006) Revisionary notes on the fungus-growing ant genus *Mycetarotes* Emery (Hymenoptera, Formicidae). *Revista Brasileira de Entomologia 50*, 463–72.

————(2007) Revisionary studies on the attine ant genus *Trachymyrmex* Forel. Part 3: the Jamaicensis group (Hymenoptera: Formicidae). *Zootaxa 1444*, 1–21.

Maynard Smith, J. (1998) *Evolutionary Genetics*. Oxford University Press, Oxford.

Mbanyana, N., and Robertson, H.G. (2008) Review of the ant genus *Nesomyrmex* (Hymenoptera: Formicidae: Myrmicinae) in southern Africa. *African Natural History 4*, 35–55.

McArdle, B. (1990) When are rare species not there? *Oikos 57*, 276–7.

McArthur, A.J. (2007) A key to *Camponotus* Mayr of Australia. *Memoirs of the American Entomological Institute 80*, 290–351.

McCabe, S., Farina, W.M., and Josens, R.B. (2006) Antennation of nectar-receivers encodes colony needs and food-source profitability in the ant *Camponotus mus*. *Insectes Sociaux 53*, 356–61.

McCarthy, M.A., and Possingham, H.P. (2007) Active adaptive management for conservation. *Conservation Biology 21*, 956–63.

McCutchan, J.H., Lewis, W.M., Kendall, C., and McGrath, C.C. (2003) Variation in trophic shift for stable isotope ratios of carbon, nitrogen, and sulfur. *Oikos 102*, 378–90.

McDonald, K.A., and Brown, J.H. (1992) Using montane mammals to model extinctions due to global change. *Conservation Biology 6*, 409–16.

McGlynn, T.P. (1999a) Non-native ants are smaller than related native ants. *American Naturalist 154*, 690–9.

——(1999b) The worldwide transfer of ants: geographic distribution and ecological invasions. *Journal of Biogeography 26*, 535–48.

——(2000) Do Lanchester's laws of combat describe competition in ants? *Behavioral Ecology 11*, 686–90.

——(2006) Ants on the move: resource limitation of a litter-nesting ant community in Costa Rica. *Biotropica 38*, 419–27.

——(2007) Serial monodomy in ants: an antipredator strategy? *Ecological Entomology 32*, 621–6.

——Carr, R.A., Carson, J.H., and Buma, J. (2004) Frequent nest relocation in the ant *Aphaenogaster araneoides*: resources, competition, and natural enemies. *Oikos 106*, 611–21.

McInnes, D.A. (1994) *Comparative ecology and factors affecting the distribution of north Florida fire ants*. Doctoral dissertation, Florida State University, Tallahassee.

McKinney, M. L., and Lockwood, J.L. (1999) Biotic homogenization: a few winners replacing many losers in the next mass extinction. *Trends in Ecology and Evolution 14*, 450–3.

McNamara, J.M., Barta, Z., Wikelski, M., and Houston, A. I. (2008) A theoretical investigation of the effect of latitude on avian life histories. *American Naturalist 172*, 331–45.

McNatty, A., Abbott, K.L., and Lester, P.J. (2009) Invasive ants compete with and modify the trophic ecology of hermit crabs on tropical islands. *Oecologia 160*, 187–94.

McNicol, C. (2006) Surveillance methodologies used within Australia: various methods including visual surveillance and extraordinary detections – above ground and in ground lures. In L.C. Graham, ed. *Proceedings of the Red Imported Fire Ant Conference, March 28–30, 2006, Mobile, AL*, pp. 69–73. Department of Entomology and Plant Pathology, Auburn University, Auburn, AL.

Mehdiabadi, N.J., and Gilbert, L.E. (2002) Colony-level impacts of parasitoid flies on fire ants. *Proceedings of the Royal Society of London B 269*, 1695–9.

Mehlhop, P., and Scott, N.J. (2008) Temporal patterns of seed use and availability in a guild of desert ants. *Ecological Entomology 8*, 69–85.

Melbourne, B.A. (1999) Bias in the effect of habitat structure on pitfall traps: an experimental evaluation. *Australian Journal of Ecology 24*, 228–39.

Menke, S.B., and Holway, D.A. (2006) Abiotic factors control invasion by Argentine ants at the community scale. *Journal of Animal Ecology 75*, 368–76.

——Fisher, R.N., Jetz, W., and Holway, D.A. (2007) Biotic and abiotic controls of Argentine ant invasion success at local and landscape scales. *Ecology 88*, 3164–73.

Menzel, F., Blüthgen, N., and Schmitt, T. (2008) Tropical parabiotic ants: highly unusual cuticular substances and low interspecific discrimination. *Frontiers in Zoology 5*, 16.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Menzel, R., De Marco, R.J., and Greggers, U. (2006) Spatial memory, navigation and dance behaviour in *Apis mellifera*. *Journal of Comparative Physiology a-Neuroethology Sensory Neural and Behavioral Physiology 192*, 889–903.

Mercier, J.L., and Dejean, A. (1996) Ritualized behaviour during competition for food between two Formicinae. *Insectes Sociaux 43*, 17–29.

Meyers, J. (2008) Exotic Texas ant, *Paratrechina* sp. near *pubens*. http://antinstitute.org/PDF/Crazy-Rasberry-Ants.pdf.

Mikheyev, A.S., and Mueller, U.G. (2007) Genetic relationships between native and introduced populations of the little fire ant *Wasmannia auropunctata*. *Diversity and Distributions 13*, 573–9.

——and Tschinkel, W.R. (2004) Nest architecture of the ant *Formica pallidefulva*: structure, costs and rules of excavation. *Insectes Sociaux 51*, 30–6.

——Mueller, U.G., and Abbot, P. (2006) Cryptic sex and many-to-one coevolution in the fungus-growing ant symbiosis. *Proceedings of the National Academy of Sciences USA 103*, 10702–6.

Milford, E.R. (1999) Ant communities in flooded and unflooded riparian forest of the middle Rio Grande. *Southwest Naturalist 44*, 278–86.

Miller, S.E. (2007a) DNA barcoding and the renaissance of taxonomy. *Proceedings of the National Academy of Sciences USA 104*, 4775–6.

Miller, T.E.X. (2007b) Does having multiple partners weaken the benefits of facultative mutualism? A test with cacti and cactus-tending ants. *Oikos 116*, 500–12.

Mittermeier, R.A., Robles Gil, P., Hoffmann, M., Pilgrim, J., Brooks, T., Mittermeier, C.G., Lamoreux, J., and da Fonseca, G.A.B. (2004) *Hotspots Revisited*. CEMEX, Mexico City.

Miyata, H., Shimamura, T., Hirosawa, H., and Higashi, S. (2003) Morphology and phenology of the primitive ponerine army ant *Onychomyrmex hedleyi* (Hymenoptera: Formicidae: Ponerinae) in a highland rainforest of Australia. *Journal of Natural History 37*, 115–25.

Moeller, B.A., Hellgren, E.C., Ruthven III, D.C., Kazmaier, R.T., and Synatzske, D.R. (2005) Temporal differences in activity patterns of male and female Texas horned lizards (*Phrynosoma coronutum*) in southern Texas. *Journal of Herpetology 39*, 336–9.

Möglich, M., and Hölldobler, B. (1974) Social carrying behavior and division of labor during nest moving in ants. *Psyche (Cambridge) 81*, 219–35.

Molet, M., Peeters, C., and Fisher, B.L. (2007a) Permanent loss of wings in queens of the ant *Odontomachus coquereli* from Madagascar. *Insectes Sociaux 54*, 174–82.

————————(2007b) Winged queens replaced by reproductives smaller than workers in *Mystrium* ants. *Naturwissenschaften 94*, 280–7.

——Van Baalen, M., and Peeters, C. (2008) Shift in colonial reproductive strategy associated with a tropical-temperate gradient in *Rhytidoponera* ants. *American Naturalist 172*, 75–87.

——Fisher, B.L., Ito, F., and Peeters, C. (2009) Shift from independent to dependent colony foundation and evolution of 'multi-purpose' ergatoid queens in *Mystrium* ants (subfamily Amblyoponinae). *Biological Journal of the Linnean Society*, in press.

Mondor, E., and Addicott, J. (2007) Do exaptations facilitate mutualistic associations between invasive and native species? *Biological Invasions 9*, 623–8.

Monnin, T., and Peeters, C. (2008) How many gamergates is an ant queen worth? *Naturwissenschaften 95*, 109–16.

——Malosse, C., and Peeters, C. (1998) Solid-phase microextraction and cuticular hydrocarbon differences related to reproductive activity in queenless ant *Dinoponera quadriceps*. *Journal of Chemical Ecology 24*, 473–90.

——Ratnieks, L.W.F., Jones, G.R., and Beard, R. (2002) Pretender punishment induced by chemical signalling in a queenless ant. *Nature 419*, 61–4.

Monteiro, A.F.M., Sujii, E.R., and Morais, H.C. (2008) Chemically based interactions and nutritional ecology of *Labidus praedator* (Formicidae: Ecitoninae) in an agroecosystem adjacent to a gallery forest. *Revista Brasileira de Zoologia 25*, 674–81.

Moog, J., Feldhaar, H., and Maschwitz, U. (2002) On the caulinary domatia of the SE-Asian ant-plant *Zanthoxylum myriacanthum* Wall. ex Hook. f. (Rutaceae) their influence on branch statics, and the protection against herbivory. *Sociobiology 40*, 547–74.

Mooney, K.A. (2007) Tritrophic effects of birds and ants on a canopy food web, tree growth and phytochemistry *Ecology 88*, 2005–14.

——and Agrawal, A.A. (2008) Plant genotype shapes ant-aphid interactions: implications for community structure and indirect plant defense. *American Naturalist 168*, E195-E205.

——and Tillberg, C.V. (2005) Temporal and spatial variation to ant omnivory in pine forests. *Ecology 86*, 1225–35.

——Jones, P., and Agrawal, A.A. (2008) Coexisting congeners: traits of two milkweed feeding aphids and their competitive interactions. *Oikos 117*, 450–8.

Moore, J. (2002) *Parasites and the Behavior of Animals*. Oxford University Press, Oxford.

Morales, M.A., and Beal, A.L.H. (2006) Effects of host plant quality and ant tending for treehopper *Publilia concava*. *Annals of the Entomological Society of America 99*, 545–52.

——and Heithaus, E.R. (1998) Food from seed-dispersal mutualism shifts sex ratios in colonies of the ant *Aphaenogaster rudis*. *Ecology 79*, 734–9.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

——Barone, J.L., and Henry, C.S. (2008a) Acoustic alarm signaling facilitates predator protection of treehoppers by mutualist ant bodyguards. *Proceedings of the Royal Society of London B 275*, 1935–41.

——Dodge, G.J., and Inouye, D.W. (2005) A phenological mid-domain effect in flowering diversity. *Oecologia 142*, 83–9.

——Leduc, E.N., and Ness, J.H. (2008b) Complex interactions between populations of native ants, non-native ants, and Japanese knotweed. Ecological Society of America, 93rd Annual Meeting, Milwaukee, WI USA, 3–8 August 2008.

Moreau, C.S., Bell, C.D., Vila, R., Archibald, S.B., and Pierce, N.E. (2006) Phylogeny of the ants: diversification in the age of angiosperms. *Science 312*, 101–4.

Moritz, R.F.A., Lattorff, H.M.G., Neumann, P., Kraus, F.B., Radloff, S.E., and Hepburn, H.R. (2005) Rare royal families in honeybees, *Apis mellifera*. *Naturwissenschaften 92*, 488–91.

Moron, D., Witek, M., and Woyciechowski, M. (2008) Division of labour among workers with different life expectancy in the ant *Myrmica scabrinodis*. *Animal Behaviour 75*, 345–50.

Morris, J.R., and Steigman, K.L. (1993) Effects of polygyne fire ant invasion on native ants of a blackland prairie in Texas. *Southwest Naturalist 38*, 136–40.

Morrison, J.E., Williams, D.F., Oi, D.H., and Potter, K.N. (1997a) Damage to dry crop seed by red imported fire ant (Hymenoptera: Formicidae). *Journal of Economic Entomology 90*, 218–22.

Morrison, L.W. (1996) Community organization in a recently assembled fauna: the case of Polynesian ants. *Oecologia 107*, 243–56.

——(1999) Indirect effects of phorid fly parasitoids on the mechanisms of interspecific competition among ants. *Oecologia 121*, 113–22.

——(2000) Mechanisms of interspecific competition among an invasive and two native fire ants. *Oikos 90*, 238–52.

——(2002a) Island biogeography and metapopulation dynamics of Bahamian ants. *Journal of Biogeography 29*, 387–94.

——(2002b) Long-term impacts of an arthropod community invasion by the imported fire ant, *Solenopsis invicta*. *Ecology 83*, 2337–45.

——and Porter, S.D. (2003) Positive association between densities of the red imported fire ant, *Solenopsis invicta* (Hymenoptera: Formicidae), and generalized ant and arthropod diversity. *Environmental Entomology 32*, 548–54.

————(2005) Testing for population-level impacts of introduced *Pseudacteon tricuspis* flies, phorid parasitoids of *Solenopsis invicta* fire ants. *Biological Control 33*, 9–19.

——Dall'Aglio-Holvorcem, C.G., and Gilbert, L.E. (1997b) Oviposition behaviour and development of Pseudacteon flies (Diptera: Phoridae), parasitoids of *Solenopsis* fire ants (Hymenoptera: Formicidae). *Environmental Entomology 26*, 716–24.

——Korzukhin, M.D., and Porter, S.D. (2005) Predicted range expansion of the invasive fire ant, *Solenopsis invicta*, in the eastern United States based on the VEMAP global warming scenario. *Diversity and Distributions 11*, 199–204.

——Porter, S.D., Daniels, E., and Korzukhin, M.D. (2004) Potential global range expansion of the invasive fire ant, *Solenopsis invicta*. *Biological Invasions 6*, 183–91.

Morrone, J.J. (2002) Biogeographical regions under track and cladistic scrutiny. *Journal of Biogeography 29*, 149–52.

Moutinho, P., Nepstad, D.C., and Davidson, E.A. (2003) Influence of leaf-cutting ant nests on secondary forest growth and soil properties in Amazonia. *Ecology 84*, 1265–76.

Mueller, U.G., Rehner, S.A., and Schultz, T.R. (1998) The evolution of agriculture in ants. *Science 281*, 2034–8.

Müller, M., and Wehner, R. (2007) Wind and sky as compass cues in desert ant navigation. *Naturwissenschaften 94*, 589–94.

Murray, B.D., and Lepschi, B.J. (2004) Are locally rare species abundant elsewhere in their geographic range? *Austral Ecology 29*, 287–93.

Myers, J.H., Simberloff, D., Kuris, A.M., and Carey, J.R. (2000a) Eradication revisited: dealing with exotic species. *Trends in Ecology and Evolution 15*, 316–20.

Myers, N., Mittermeier, R.A., Mittermeier, C.G., da Fonseca, G.A.B., and Kent, J. (2000b) Biodiversity hotspots for conservation priorities. *Nature 403*, 853–8.

Nakamura, A., Catterall, C.P., House, A.P.N., Kitching, R. L., and Burwell, C.J. (2007) The use of ants and other soil and litter arthropods as bio-indicators of the impacts of rainforest clearing and subsequent land use. *Journal of Insect Conservation 11*, 177–86.

Nation, J.L. (2002) *Insect Physiology and Biochemistry*. CRC Press, Boca Raton.

Ndoutoume-Ndong, A., and Mikissa, B. (2007) Influence de la presence de la fourmi *Wasmannia auropunctata* (Roger 1863) (Hymenoptera: Formicidae) sur les autres especes de fourmis dans la reserve de la Lope (centre du Gabon). *Annales de la Societe Entomologique de France 43*, 155–8.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Neece, K.C., and Bartell, D.P. (1981) Insects associated with *Solenopsis* spp. in southeastern Texas, USA. *Southwestern Entomologist 6*, 307–11.

Nel, A., Perrault, G., Perrichot, V., and Néraudeau, D. (2004) The oldest ant in the Lower Cretaceous amber of Charente-Maritime (SW France) (Insecta: Hymenoptera: Formicidae). *Geologica Acta 2*, 23–9.

Nelder, M.P., Paysen, E.S., Zungoli, P.A., and Benson, E.P. (2006) Emergence of the introduced ant *Pachycondyla chinensis* (Formicidae: Ponerinae) as a public health threat in the southeastern United States. *Journal of Medical Entomology 43*, 1094–8.

Nendick, D. (2008) Win-win from offshore container management programme. *Biosecurity 84*, 12.

Ness, J.H. (2003a) *Catalpa bignonioides* alters extrafloral nectar production after herbivory and attracts ant bodyguards. *Oecologia 134*, 210–8.

——(2003b) Contrasting exotic *Solenopsis invicta* and native *Forelius pruinosus* ants as mutualists with *Catalpa bignonioides*, a native plant. *Ecological Entomology 28*, 247–51.

——(2004) Forest edges and fire ants alter the seed shadow of an ant-dispersed plant. *Oecologia 138*, 448–54.

——(2006) A mutualism's indirect costs: the most aggressive plant bodyguards also deter pollinators. *Oikos 113*, 506–14.

——and Bronstein, J.L. (2004) The effects of invasive ants on prospective ant mutualists. *Biological Invasions 6*, 445–61.

——and Morin, D. (2008) Forest edges and landscape history shape interactions between plants, seed-dispersing ants and seed predators. *Biological Conservation 141*, 838–47.

——Morris, W.F., and Bronstein, J.L. (2006) Variation in mutualistic potential among ant species tending extrafloral nectaries of *Ferocactus wislizeni*. *Ecology 87*, 912–21.

————————(in press) For ant-protected plants, the best defense is a hungry offense. *Ecology*.

——Bronstein, J.L., Andersen, A.N., and Holland, J.N. (2004) Ant body size predicts dispersal distance of ant-adapted seeds: implications of small-ant invasions. *Ecology 85*, 1244–50.

Nestel, D., and Dickschen, F. (1990) Foraging kinetics of ground ant communities in different Mexican coffee agroecosystems. *Oecologia 84*, 58–63.

Newell, W., and Barber, T.C. (1913) The Argentine ant. *USDA Bureau of Entomology Bulletin 122*.

Newey, P.S., Robson, S.K., and Crozier, R.H. (2008) Near-infrared spectroscopy identifies the colony and nest of origin of weaver ants, *Oecophylla smaragdina*. *Insectes Sociaux 55*, 171–5.

Nichols, B. J., and Sites, R.W. (1991) Ant predators of founder queens of *Solenopsis invicta* (Hymenoptera, Formicidae) in central Texas. *Environmental Entomology 20*, 1024–9.

Nielsen, M.G. (1997) Nesting biology of the mangrove mud-nesting ant *Polyrhachis sokolova* Forel (Hymenoptera, Formicidae) in northern Australia. *Insectes Sociaux 44*, 15–21.

——Christian, K., Henriksen, P.G., and Birkmore, D. (2006) Respiration by mangrove ants *Camponotus anderseni* during nest submersion associated with tidal inundation in Northern Australia. *Physiological Entomology 31*, 120–6.

—— ——and Birkmose, D. (2003) Carbon dioxide concentrations in the nests of the mud-dwelling mangrove ant *Polyrhachis sokolova* Forel (Hymenoptera: Formicidae). *Australian Journal of Entomology 42*, 357–62.

Nonacs, P. (1991) Less growth with more food: how insect-prey availability changes colony demographics in the ant, *Camponotus floridanus*. *Journal of Insect Physiology 37*, 891–8.

——and Dill, L.M. (1990) Mortality risk vs. food quality trade-offs in a common currency – ant patch preferences. *Ecology 71*, 1886–92.

North, R.D., Jackson, C.W., and Howse, P.E. (1997) Evolutionary aspects of ant-fungus interactions in leaf-cutting ants. *Trends in Ecology & Evolution 12*, 386–9.

Norton, G.A., and Mumford, J.D., eds. (1993) *Decision Tools for Pest Management*. CAB International, Wallingford, Oxon, UK.

Nougier, J., Cantagrel, J.M., and Karche, J.P. (1986) The Comores archipelago in the western Indian Ocean: volcanology, geochronology, and geodynamic setting. *Journal of African Earth Science 5*, 135–45.

Novotny, V., Drozd, P., Miller, S.E., Kulfan, M., Janda, M., Basset, Y., and Weiblen, G. D. (2006) Why are there so many species of herbivorous insects in tropical rainforests? *Science 313*, 1115–18.

Nowbahari, E. (2007) Learning of colonial odor in the ant *Cataglyphis niger* (Hymenoptera; Formicidae). *Learning and Behavior 35*, 87–94.

O'Donnell, S., Lattke, J., Powell, S., and Kaspari, M. (2007) Army ants in four forests: geographic variation in raid rates and species composition. *Journal of Animal Ecology 76*, 580–9.

O'Dowd, D.J. (1979) Foliar nectar production and ant activity on a neotropical tree, *Ochroma pyramidale*. *Oecologia 43*, 233–48.

——(1980) Pearl bodies of a neotropical tree, *Ochroma pyramidale*: ecological implications. *American Journal of Botany 67*, 543–9.

——(1982) Pearl bodies as ant food: an ecological role for some leaf emergences of tropical plants. *Biotropica 14*, 40–9.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

——Green, P.T., and Lake, P.S. (2003) Invasional 'melt-down' on an oceanic island. *Ecology Letters 6*, 812–7.

Oberrath, R., and Bohning-Gaese, K. (2002) Phenological adaptation of ant-dispersed plants to seasonal variation in ant activity. *Ecology 83*, 1412–20.

Offenberg, J. (2000) Correlated evolution of the association between aphids and ants and the association between aphids and plants with extrafloral nectaries. *Oikos 91*, 146–52.

——(2007) The distribution of weaver ant pheromones on host trees. *Insectes Sociaux 54*, 248–50.

——Nielsen, M.G., MacIntosh, D.J., Havanon, S., and Aksornkoae, S. (2004) Evidence that insect herbivores are deterred by ant pheromones. *Proceedings of the Royal Society of London B (Suppl) 271*, S433-5.

Ogata, K., and Okido, H. (2007) Revision of the ant genus *Perissomyrmex* with notes on the phylogeny of the tribe Myrmecinini. *Memoirs of the American Entomological Institute 80*, 352–69.

Ohashi, M., Finer, L., Domisch, T., Risch, A.C., Jurgensen, M.F., and Niemela, P. (2007) Seasonal and diurnal CO_2 efflux from red wood ant (*Formica aquilonia*) mounds in boreal coniferous forests. *Soil Biology and Biochemistry 39*, 1504–11.

Ohgushi, T. (2008) Herbivore-induced indirect interaction webs on terrestrial plants: the importance of non-trophic, indirect, and facilitative interactions. *Entomologia Experimentalis et Applicata 128*, 217–29.

Ohnishi, H., Imai, H.T., and Yamamoto, M.T. (2004) Molecular phylogenetic analysis of ant subfamily relationship inferred from rDNA sequences. *Genes and Genetic Systems 78*, 419–25.

Oi, D.H., and Drees, B.M. (2009) Fire ant IPM. In E.B. Radcliffe, W.D. Hutchison, and R.E. Cancelado, eds. *Integrated Pest Management: concepts, tactics, strategies, and case studies*, 390–401. Cambridge University Press, Cambridge.

——and Williams, D.F. (2002) Impact of *Thelohania solenopsae* (Microsporidia: Thelohaniidae) on polygyne colonies of red imported fire ants (Hymenoptera: Formicidae). *Journal of Economic Entomology 95*, 558–62.

Oldham, N.J., Morgan, E.D., Agosti, D., and Wehner, R. (1999) Species recognition from postpharyngeal gland contents of ants of the *Cataglyphis bicolor* group. *Journal of Chemical Ecology 25*, 1383–94.

Oldroyd, B.P., and Fewell, J.H. (2007) Genetic diversity promotes homeostasis in insect colonies. *Trends in Ecology and Evolution 22*, 408–13.

Oliveira, P.S., Freitas, A.V.L. (2004) Ant—plant—herbivore interactions in the Neotropical cerrado savanna. *Naturwissenschaften 91*, 557–70.

——Rico-Gray, V., Diaz-Castelazo, C., and Castillo-Guevara, C. (1999) Interaction between ants, extrafloral nectaries and insect herbivores in Neotropical coastal sand dunes: herbivore deterrence by visiting ants increases fruit set in *Opuntia stricta* (Cactaceae). *Functional Ecology 13*, 623–31.

Oliver, T.H., Leather, S.R., and Cook, J.M. (2008) Macroevolutionary patterns in the origin of mutualisms involving ants. *Journal of Evolutionary Biology 21*, 1597–608.

Oliveras, J., Bas, J.M., and Gómez, C. (2005b) Reduction of the ant mandible gap range after biotic homogenization caused by an ant invasion (Hymenoptera: Formicidae). *Sociobiology 45*, 1–10.

————————(2007) A shift in seed harvesting by ants following Argentine ant invasion. *Vie et Milieu 57*, 75–81.

————————Casellas, D., and Gómez, C. (2005a) Numerical dominance of the Argentine ant vs native ants and consequences on soil resource searching in Mediterranean cork-oak forests (Hymenoptera: Formicidae). *Sociobiology 45*, 643–58.

Olmstead, K.L., and Wood, T.K. (1990) Altitudinal patterns in species richness of neotropical treehopper (Homoptera: Membracidae); the role of ants. *Proceedings of the Entomological Society of Washington 92*, 552–60.

Olson, D.M. (1994) The distribution of leaf litter invertebrates along a Neotropical altitudinal gradient. *Journal of Tropical Ecology 10*, 129–50.

——Dinerstein, E., and Wikramanayake, E.D. (2001) Terrestrial ecoregions of the world: a new map of life on Earth. *BioScience 51*, 933–8.

Olsson, K., and Agren, J. (2002) Latitudinal population differentiation in phenology, life history and flower morphology in the perennial herb *Lythrum salicaria*. *Journal of Evolutionary Biology 15*, 983–96.

Onoyama, K. (1982) Immature stages of the harvester ant *Messor aciculatus* (Hymenoptera, Formicidae). *Kontyu 50*, 324–9.

Oppelt, A., Spitzenpfeil, N., Kroiss, J., and Heinze, J. (2008) The significance of intercolonial variation of cuticular hydrocarbons for inbreeding avoidance in ant sexuals. *Animal Behaviour 76*, 1029–34.

Orians, G.H., and Milewski, A.V. (2007) Ecology of Australia: the effects of nutrient-poor soils and intense fires. *Biological Reviews 82*, 393–423.

——and Pearson, N.E. (1979) On the theory of central place foraging. In D.J. Horn, R.D. Mitchell, and G.R. Stairs, eds. *Analyses of Ecological Systems*, pp. 154–77. Ohio State University Press, Columbus, OH.

Orivel, J., Errard, C., and Dejean, A. (1997) Ant gardens: interspecific recognition in parabiotic ant species. *Behavioral Ecology and Sociobiology 40*, 87–93.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Orr, M.R., De Camargo, R.X., and Benson, W.W. (2003) Interactions between ant species increase arrival rates of an ant parasitoid. *Animal Behaviour 65*, 1187–93.

——Seike, S.H., Benson, W.W., and Gilbert, L.E. (1995) Flies suppress fire ants. *Nature 373*, 292–3.

Orrock, J., and Danielson, B. (2004) Rodents balancing a variety of risks: invasive fire ants and indirect and direct indicators of predation risk. *Oecologia 140*, 662–7.

Oster, G.F., and Wilson, E.O. (1978) *Caste and Ecology in the Social Insects*. Princeton University Press, Princeton, NJ.

Ottonetti, L., Tucci, L., and Santini, G. (2006) Recolonisation patterns of ants in a rehabilitated lignite mine in Central Italy: potential for the use of Mediterranean ants as indicators of restoration processes. *Restoration Ecology 14*, 60–6.

Ouellette, G.D., Fisher, B.L., and Girman, D.J. (2006) Molecular systematics of basal subfamilies of ants using 28S rRNA (Hymenoptera: Formicidae). *Molecular Phylogenetics and Evolution 40*, 359–69.

Ozaki, K., Takashima, S., and Suo, O. (2000) Ant predation suppresses populations of the scale insect *Aulacaspis marina* in natural mangrove forests. *Biotropica 32*, 764–8.

Ozaki, M., Wada-Katsumata, A., Fujikawa, K., Iwasaki, M., Yokohari, F., Satoji, Y., Nisimura, T., and Yamaoka, R. (2005) Ant nestmate and non-nestmate discrimination by a chemosensory sensillum. *Science 309*, 311–314.

Pacheco, J., Herrera, H.W., and Mackay, W. (2007) A new species of thief ant of the genus *Solenopsis* from the Galapagos Islands (Hymenoptera: Formicidae). *Sociobiology 50*, 1075–86.

Pacheco, R., and Vasconcelos, H.L. (2007) Invertebrate conservation in urban areas: ants in the Brazilian Cerrado. *Landscape and Urban Planning 81*, 193–9.

Pacific Invasive Ant Group (2004) *Pacific ant prevention plan*. IUCN/SSC Invasive Species Specialist Group, Auckland, NZ. http://www.issg.org/database/species/reference_files/PAPP.pdf

Page, R.E., and Mitchell, S.D. (1991) Self organization and adaptation in insect societies. *Proceedings of the Biennial Meeting of the Philosophy of Science Association 1990*, University of Chicago Press, 289–98.

Paine, R.T. (1995) A conversation on refining the concept of keystone species. *Conservation Biology 9*, 962–4.

——(1996) Food web complexity and species diversity. *American Naturalist 100*, 65–75.

Palacio, E.E., and Fernández, F. (2003) Claves para las subfamilias y géneros. In F. Fernández, ed. *Introducción a las Hormigas de la Región Neotropical*, pp. 233–60. Instituto de Investigación de Recursos Biológicos Alexander von Humboldt, Bogotá.

Palladini, J.D., Jones, M.G., Sanders, N.J., and Jules, E.S. (2007) The recovery of ant communities in regenerating temperate conifer forests. *Forest Ecology and Management 242*, 619–24.

Palmer, T.M. (2003) Spatial habitat heterogeneity influences competition and coexistence in an African acacia ant guild. *Ecology 84*, 2843–55.

——Stanton, M.L., Young, T.P., Goheen, J.R., Pringle, R. M., and Karban, R. (2008) Breakdown of an ant-plant mutualism follows the loss of large herbivores from an African savanna. *Science 391*, 192–5.

Pamilo, P. (1991) Evolution of colony characteristics in social insects. I. Sex allocation. *American Naturalist 137*, 83–107.

——Crozier, R.H., and Fraser, J. (1985) Internest interactions, nest autonomy, and reproductive specialization in an Australian arid-zone ant, *Rhytidoponera* sp. 12. *Psyche (Cambridge) 92*, 217–36.

——Viljakainen, L., and Vihavainen, A. (2007) Exceptionally high density of NUMTs in the honeybee genome. *Molecular Biology and Evolution 24*, 1340–6.

——Zhu, D.Q., Fortelius, W., Rosengren, R., Seppä, P., and Sundström, L. (2005) Genetic patchwork of network-building wood ant populations. *Annales Zoologici Fennici 42*, 179–87.

Paris, C., Jouquet, P., Lata, J.C., Ranjard, L., and Dauber, J. (2004) Ant-tree aphid mutualism: effects on community structure of soil microorganisms. *XIVth International Colloquium on Soil Zoology and Ecology*, 136.

Parmesan, C., and Yohe, G. (2003) A globally coherent fingerprint of climate change impacts across natural systems. *Nature 421*, 37–42.

Parr, C.L. (2008) Dominant ants can control species richness in a South African savanna. *Journal of Animal Ecology 77*, 1191–8.

——and Andersen, A.N. (2008) Fire resilience of ant assemblages in long-unburnt savanna of northern Australia. *Austral Ecology 33*, 830–838.

————Chastagnol, C., and Duffaud, C. (2007) Savanna fires increase rates and distances of seed dispersal by ants. *Oecologia 151*, 33–41.

——Robertson, H.G., Biggs, H.C., and Chown, S.L. (2004) Response of African savanna ants to long-term fire regimes. *Journal of Applied Ecology 41*, 630–42.

——Sinclair, B.J., Andersen, A.N., Gaston, K.J., and Chown, S.L. (2005) Constraint and competition in assemblages: a cross-continental and modeling approach for ants. *American Naturalist 165*, 481–94.

Parris, L.B., Lamont, M.M., and Carthy, R.R. (2002) Increased incidence of red imported fire ant (Hymenoptera: Formicidae) presence in loggerhead sea turtle (Testudines: Cheloniidae) nests and observations of hatchling mortality. *Florida Entomologist 85*, 514–7.

Pascoe, A. (2003) Red imported fire ant response stood down. *Biosecurity Magazine 45*, 7.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Passera, L. (1994) Characteristics of tramp species. In D.F. Williams, ed. *Exotic Ants: biology, impact, and control of introduced species*, pp. 23–43. Westview Press, Boulder, CO.

——and Aron, S. (2005) *Les fourmis. Comportement, organisation sociale et évolution*. Presses scientifiques du CNRC, Ottawa, Canada.

——and Keller, L. (1990) Loss of mating flight and shift in the pattern of carbohydrate storage in sexuals of ants (Hymenoptera; Formicidae). *Journal of Comparative Physioliolgy B 160*, 207–11.

——Roncin, E., Kaufmann, B., and Keller, L. (1996) Increased soldier production in ant colonies exposed to intraspecific competition. *Nature 379*, 630–1.

Patek, S.N., Baio, J.E., Fisher, B.L., and Suarez, A.V. (2006) Multifunctionality and mechanical origins: ballistic jaw propulsion in trap-jaw ants. *Proceedings of the National Academy of Sciences USA 103*, 12787–92.

Paton, T.R., Humphrey, G.S. and Mitchell, P.B. (1995). *Soils: a new global view*. Yale University Press, New Haven.

Paul, J., and Roces, F. (2003) Fluid intake rates in ants correlate with their feeding habits. *Journal of Insect Physiology 49*, 347–57.

Peakall, R. (1989) The unique pollination of *Leporella fimbriata* (Orchidaceae): pollination by pseudocopulating male ants (*Myrmecia urens*, Formicidae). *Plant Systematics and Evolution 167*, 137–48.

Pearcy, M., Aron, S., Doums, C., and Keller, L. (2004) Conditional use of sex and parthenogenesis for worker and queen production in ants. *Science 306*, 1780–3.

Pearson, R.G., and Dawson, T.P. (2003) Predicting the impacts of climate change on the distribution of species: are bioclimate envelope models useful? *Global Ecology and Biogeography 12*, 361–71.

Peck, S.L., McQuaid, B., and Campbell, C.L. (1998) Using ant species (Hymenoptera: Formicidae) as a biological indicator of agroecosystem condition. *Environmental Entomology 27*, 1102–10.

Pedersen, E.K., Bedford, T.L., Grant, W.E., Vinson, S.B., Martin, J.B., Longnecker, M.T., Barr, C.L., and Drees, B. M. (2003) Effect of red imported fire ants on habitat use by hispid cotton rats (*Sigmodon hispidus*) and northern pygmy mice (*Baiomys taylori*). *Southwestern Naturalist 48*, 419–426.

Pedersen, J.S., and Boomsma, J.J. (1999) Genetic analysis of colony structure in polydomous and polygynous ant populations. *Biological Journal of the Linnean Society 66*, 115–44.

——Krieger, M.J.B., Vogel, V., Giraud, T., and Keller, L. (2006) Native supercolonies of unrelated individuals in the invasive Argentine ant. *Evolution 60*, 782–91.

Peeters, C. (1988) Nestmate discrimination in a ponerine ant (*Rhytidoponera* sp. 12) without a queen caste and with a low intra-nest relatedness. *Insectes Sociaux 35*, 34–46.

——(1991) Ergatoid queens and intercastes in ants: two distinct adult forms which look morphologically intermediate between workers and winged queens. *Insectes Sociaux 38*, 1–15.

——(1997) Morphologically 'primitive' ants: comparative review of social characters, and the importance of queen-worker dimorphism. In J.C. Choe, and B.J. Crespi, eds. *The Evolution of Social Behavior in Insects and Arachnids*, pp. 372–91. Cambridge University Press, Cambridge.

——and Ito, F. (2001) Colony dispersal and the evolution of queen morphology in social Hymenoptera. *Annual Review of Entomology 46*, 601–30.

——and Liebig, J. (2009) Fertility signaling as a general mechanism of regulating reproductive division of labor in ants. In J. Gadau, and J. Fewell, eds. *Organization of Insect Societies: from genome to socio-complexity*, pp. 220–42. Harvard University Press, Cambridge, MA.

——Liebig, J., and Hölldobler, B. (2000) Sexual reproduction by both queens and workers in the ponerine ant *Harpegnathos saltator*. *Insectes Sociaux 47*, 325–32.

Pemberton, R.W. (1988) The abundance of plants bearing extrafloral nectaries in Colorado and Mojave desert communities of southern California. *Madrono 35*, 283–246.

Peñaloza, C., and Farji-Brener, A.G. (2003) The importance of treefall gaps as foraging sites for leaf-cutting ants depends on forest age. *Journal of Tropical Ecology 19*, 603–5.

Peng, R.K., and Christian, K. (2005) Integrated pest management in mango orchards in the Northern Territory of Australia, using the weaver ant, *Oecophylla smaragdina*, (Hymenoptera: Formicidae) as a key element. *International Journal of Pest Management 51*, 149–55.

————and Gibb, K. (1999) The effect of colony isolation of the predacious ant, *Oecophylla smaragdina* (F.) (Hymenoptera: Formicidae), on protection of cashew plantations from insect pests. *International Journal of Pest Management 45*, 189–94.

————————(2004) Implementing ant technology in commercial cashew plantations. *Rural Industries Research and Development Corporation Publication No. W04/088, ISSN 1440–6845*, p. 72.

Penick, C.A., and Tschinkel, W.R. (2008) Thermoregulatory brood transport in the fire ant, *Solenopsis invicta*. *Insectes Sociaux 55*, 176–82.

Pennisi, E. (2009) Evolutionary biology: agreeing to disagree. *Science 323*, 706–8.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Perfecto, I. (1991) Ants (Hymenoptera: Formicidae) as natural control agents of pests in irrigated maize in Nicaragua. *Journal of Economic Entomology 84*, 65–70.

——(1994) Foraging behavior as a determinant of asymmetric competitive interaction between two ant species in a tropical agroecosystem. *Oecologia 98*, 184–92.

——and Castiñeiras, A. (1998) Deployment of the predaceous ants and their conservation in agroecosystems. In P. Barbosa, ed. *Perspectives on the Conservation of Natural Enemies of Pest Species*, pp. 269–89. Academic Press, San Diego.

——and Vandermeer, J. (1993) Distribution and turnover rate of a population of *Atta cephalotes* in a tropical rainforest in Costa Rica. *Biotropica 25*, 316–21.

————(1996) Microclimatic changes and the indirect loss of ant diversity in a tropical agroecosystem. *Oecologia 108*, 577–82.

————(2002) Quality of agroecological matrix in a tropical montane landscape: ants in coffee plantations in southern Mexico. *Conservation Biology 16*, 174–82.

————(2006) The effect of an ant-hemipteran mutualism on the coffee berry borer (*Hypothenemus hampei*) in southern Mexico. *Agriculture Ecosystems & Environment 117*, 218–21.

————(2008) Spatial pattern and ecological process in the coffee agroecosystem. *Ecology 89*, 915–20.

——Armbrecht, I., Philpott, S.M., Soto-Pinto, L., and Dietsch, T.V. (2007) Shaded coffee and the stability of rainforest margins in Latin America. In T. Tscharntke, C. Leuschner, M. Zelle, E. Guhadja, and A. Bidin, eds. *The Stability of Tropical Rainforest Margins: linking ecological, economic and social constraints of land use and conservation*, pp. 227–63. Springer Verlag, Berlin.

Perrichot, V., Lacau, S., Néraudeau, D., and Nel, A. (2008a) Fossil evidence for the early ant evolution. *Naturwissenschaften 95*, 85–90.

——Nel, A., Néraudeau, D., Lacau, S., and Guyot, T. (2008b) New fossil ants in French Cretaceous amber (Hymenoptera: Formicidae). *Naturwissenschaften 95*, 91–7.

Perrings, C. (2005) How to manage biological invasions under globalization. *Trends in Ecology and Evolution 20*, 212–5.

Persad, A.B., and Hoy, M.A. (2004) Predation by *Solenopsis invicta* and *Blatella asahinai* on *Toxoptera citricida* parasitized by *Lysiphlebus testaceipes* and *Lipolexis oregmae* on citrus in Florida. *Biological Control 30*, 531–7.

Peterson, B., and Fry, B. (1987) Stable isotopes in ecosystem studies. *Annual Review of Ecology and Systematics 18*, 293–320.

Petralia, R.S., Sorensen, A.A., and Vinson, S.B. (1980) The labial gland system of larvae of the imported fire ant, *Solenopsis invicta* Buren: ultrastructure and enzyme analysis. *Cell and Tissue Research 206*, 145–56.

Petren, K., and Case, T.J. (1996) An experimental demonstration of exploitation competition in an ongoing invasion. *Ecology 77*, 118–32.

Petrov, I. (2006) The ants of Serbia and Montenegro. *Posebna Izdanja. Srpska Akademija Nauka i Umetnosti 656*, 1–136.

Pfeiffer, M., and Linsenmair, K.E. (2001) Territoriality in the Malaysian giant ant *Camponotus gigas* (Hymenoptera/Formicidae) *Journal of Ethology 19*, 75–85.

Philpott, S.M. (2005a) Changes in arboreal ant populations following pruning of coffee shade-trees in Chiapas, Mexico. *Agroforestry Systems 64*, 219–24.

——(2005b) Trait-mediated effects of parasitic phorid flies (Diptera: Phoridae) on ant (Hymenoptera: Formicidae) competition and resource access in coffee agro-ecosystems. *Environmental Entomology 34*, 1089–94.

——and Armbrecht, I. (2006) Biodiversity in tropical agroforests and the ecological role of ants and ant diversity in predatory function. *Ecological Entomology 31*, 369–77.

——and Foster, P.F. (2005) Nest-site limitation in coffee agroecosystems: artificial nests maintain diversity of arboreal ants. *Ecological Applications 15*, 1478–85.

——Perfecto, I., and Vandermeer, J. (2006) Effects of management intensity and season on arboreal ant diversity and abundance in coffee agroecosystems. *Biodiversity and Conservation 15*, 139–55.

————————(2008a). Effects of predatory ants on lower trophic levels across a gradient of coffee management complexity. *Journal of Animal Ecology 77*, 505–11.

————————(2008b) Behavioral diversity of predatory ants in coffee agroecosystems. *Environmental Entomology 37*, 181–91.

Pianka, E.R. (1966) Latitudinal gradients in species diversity: a review of concepts. *American Naturalist 100*, 33–46.

Pickett, S.T.A., and White, P.S. (1985) *The Ecology of Natural Disturbance as Patch Dynamics*. Academic Press, New York.

Pielou, E.C. (1979) *Biogeography*. John Wiley and Sons, New York.

Pierce, N.E. (1986) Lycaenid butterflies and ants: selection for nitrogen fixing and other protein-rich foods. *American Naturalist 125*, 888–95.

——and Mead, P.S. (1981) Parasitoids as selective agents in the symbiosis between lycaenid butterfly caterpillars and ants. *Science 211*, 1185–7.

——Brady, M.F., Heath, A., Lohman, D.J., Mathew, J., Rand, D.B., and Travassos, M.A. (2002) The ecology and evolution of ant association in the Lycaenidae (Lepidoptera). *Annual Review of Entomology 47*, 733–71.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Pirk, C.W.W., Neumann, P., Moritz, R.F.A., and Pamilo, P. (2001) Intranest relatedness and nestmate recognition in the meadow ant *Formica pratensis* (R). *Behavioral Ecology and Sociobiology 49*, 366–74.

Plentovich, S., Hebshi, A., and Conant, S. (2009) Detrimental effects of two widespread invasive ant species on weight and survival of colonial nesting seabirds in the Hawaiian Islands. *Biological Invasions 11*, 289–98.

Plowes, N.J., and Adams, E.S. (2005) An empirical test of Lanchester's square law: mortality during battles of the fire ant *Solenopsis invicta*. *Proceedings of the Royal Society of London B 272*, 1809–14.

Plowes, R.M., Dunn, J.G., and Gilbert, L.E. (2007) The urban fire ant paradox: native fire ants persist in an urban refuge while invasive fire ants dominate natural habitats. *Biological Invasions 9*, 825–36.

Poinar Jr., G., Lachaud, J.P., Castillo, A., and Infante, F. (2006) Recent and fossil nematode parasites (Nematoda: Mermithidae) of Neotropical ants. *Journal of Invertebrate Pathology 91*, 19–26.

——and Yanoviak, S.P. (2008) *Myrmeconema neotropicum* n. g., n. sp., a new tetradonematid nematode parasitising South American populations of *Cephalotes atratus* (Hymenoptera: Formicidae), with the discovery of an apparent parasite-induced host morph. *Systematic Parasitology 69*, 145–53.

Pontin, A.J. (1960) Field experiments on colony foundation by *Lasius niger* and *L. flavus* (Hym., Formicidae). *Insectes Sociaux 7*, 227–30.

——(1961) Population stabilization and competition between the ants *Lasius flavus* (F.) and *L. niger* (L.). *Journal of Animal Ecology 30*, 47–54.

——(1969) Experimental transplantation of nest-mounds of the ant *Lasius flavus* (F.) in a habitat containing also *L. niger* (L.) and *Myrmica scabrinodis* Nyl. *Journal of Animal Ecology 38*, 747–54.

Porter, S.D. (1988) Impact of temperature on colony growth and developmental rates of the ant *Solenopsis invicta*. *Journal of Insect Physiology 34*, 1127–33.

——and Savignano, D.A. (1990) Invasion of polygyne fire ants decimates native ants and disrupts arthropod community. *Ecology 71*, 2095–106.

——and Tschinkel, W.R. (1986) Adaptive value of nanitic workers in newly founded red imported fire ant colonies (Hymenoptera: Formicidae). *Annals of the Entomological Society of America 79*, 723–6.

——Nogueira de Sá, L.A., and Morrison, L.W. (2004) Establishment and dispersal of the fire ant decapitating fly *Pseudaction tricuspis* in north Florida. *Biological Control 29*, 179–88.

——Williams, D.F., Patterson, R.F., and Fowler, H.G. (1997) Intercontinental differences in the abundance of *Solenopsis* fire ants (Hymenoptera: Formicidae): an escape from natural enemies? *Environmental Entomology 26*, 373–84.

——Vander Meer, R.K., Pesquero, M.A., Campiolo, S., and Fowler, H.G. (1995) *Solenopsis* (Hymenoptera: Formicidae) fire ant reactions to attacks of *Pseudacteon* flies (Diptera: Phoridae) in southeastern Brazil. *Annals of the Entomological Society of America 88*, 570–5.

Poulsen, M., and Boomsma, J. (2005) Mutualistic fungi control crop-diversity in fungus-growing ants. *Science 307*, 741–4.

——and Currie, C.R. (2006) Complexity of insect-fungal associations: exploring the influence of microorganisms on the attine ant-fungus symbiosis. In B. Kostas, ed. *Insect Symbiosis*, pp. 57–77. CRC Press, Hoboken.

——Bot, A.N.M., Currie, C.R., and Boomsma, J.J. (2002) Mutualistic bacteria and a possible trade-off between alternative defence mechanisms in *Acromyrmex* leaf-cutting ants. *Insectes Sociaux 49*, 15–9.

Powell, S. (2008) Ecological specialization and the evolution of a specialized caste in *Cephalotes* ants. *Functional Ecology 22*, 902–911.

——and Clark, E. (2004) Combat between large derived societies: a subterranean army ant established as a predator of mature leaf-cutting ant colonies. *Insectes Sociaux 51*, 342–51.

——and Franks, N.R. (2005) Caste evolution and ecology: a special worker for novel prey. *Proceedings of the Royal Society of London B 272*, 2173–80.

————(2006) Ecology and the evolution of worker morphological diversity: a comparative analysis with *Eciton* army ants. *Functional Ecology 20*, 1105–14.

————(2007) How a few help all: living pothole plugs speed prey delivery in the army ant *Eciton burchelli*. *Animal Behaviour 73*, 1067–76.

——and Tschinkel, W.R. (1999) Ritualized conflict in *Odontomachus brunneus* and the generation of interaction-based task allocation: a new organizational mechanism in ants. *Animal Behaviour 58*, 965–72.

Power, M.E. (1992) Top-down and bottom-up forces in food webs – do plants have primacy? *Ecology 73*, 733–46.

Pusch, K., Seifert, B., Foitzik, S., and Heinze, J. (2006) Distribution and genetic divergence of two parapatric sibling ant species in Central Europe. *Biological Journal of the Linnean Society 88*, 223–34.

Pyne, S.J. (1997) *World fire: the culture of fire on earth*. University of Washington Press, Seattle.

Qian, H. (1998) Large-scale biogeographic patterns of vascular plant richness in North America: an analysis at the generic level. *Journal of Biogeography 25*, 829–36.

——(2008) A latitudinal gradient of beta diversity for exotic vascular plant species in North America. *Diversity and Distributions 14*, 556–60.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Qian, H. and Ricklefs, R.E. (2008) Global concordance in diversity patterns of vascular plants and terrestrial vertebrates. *Ecology Letters 11*, 547–53.

——Badgley, C., and Fox, D.L. (2009) The latitudinal gradient of beta diversity in relation to climate and topography for mammals in North America. *Global Ecology and Biogeography 18*, 111–22.

Quek, S.-P., Davies, S.J., Ashton, P.S., Itino, T., and Pierce, N.E. (2007) The geography of diversification in mutualistic ants: a gene's-eye view into the Neogene history of Sundaland rain forests. *Molecular Ecology 16*, 2045–62.

Queller, D.C. (2000) Relatedness and the fraternal major transitions. *Philosophical Transactions of the Royal Society B 355*, 1647–55.

——and Strassmann, J.E. (2002) The many selves of social insects. *Science 296*, 311–3.

Quinlan, R.J., and Cherrett, J.M. (1979) The role of fungus in the diet of the leaf-cutting ant *Atta cephalotes* (L.). *Ecological Entomology 4*, 151–60.

Quiroz-Robledo, L., and Valenzuela-Gonzalez, J. (1995) A comparison of ground ant communities in a tropical rainforest and adjacent grassland in Los Tuxtlas, Veracruz, Mexico. *Southwestern Entomologist 20*, 203–13.

Rabeling, C., Brown, J.M., and Verhaagh, M. (2008) Newly discovered sister lineage sheds light on early ant evolution. *Proceedings of the National Academy of Sciences USA 105*, 14913–7.

——Cover, S.P., Johnson, R.A., and Mueller, U.G. (2007) A review of the North American species of the fungus-gardening ant genus *Trachymyrmex* (Hymenoptera: Formicidae). *Zootaxa 1664*, 1–53.

Rabinowitz, D. (1981) Seven forms of rarity. In H. Synge, ed. *The Biological Aspects of Rare Plant Conservation*, pp. 205–17. Wiley, New York.

Raczkowski, J.M., and Wenzel, J.W. (2008) Biodiversity studies and their foundation in taxonomic scholarship. *BioScience 57*, 974–9.

Radchenko, A. (2004) A review of the ant genera *Leptothorax* Mayr and *Temnothorax* Mayr (Hymenoptera, Formicidae) of the eastern Palaearctic. *Acta Zoologica Academiae Scientiarum Hungaricae 50*, 109–37.

——(2005a) Monographic revision of the ants (Hymenoptera: Formicidae) of North Korea. *Annales Zoologici (Warsaw) 55*, 127–221.

——(2005b) A review of the ants of the genus *Lasius* Fabricius, 1804, subgenus *Dendrolasius* Ruzsky, 1912 (Hymenoptera: Formicidae) from east Palaearctic. *Annales Zoologici (Warsaw) 55*, 83–94.

Radchenko, A.G., and Elmes, G.W. (2003) A taxonomic revision of the socially parasitic *Myrmica* ants (Hymenoptera: Formicidae) of the Palaearctic region. *Annales Zoologici (Warsaw) 53*, 217–43.

Radnikova, Zh.I. (2003) Distribution patterns of ants in different natural zones and landscapes Kazakhstan and West Siberia along a meridian trend. *EuroAsian Entomological Journal 2*, 235–42.

Rahbek, C. (2005) The role of spatial scale and the perception of large-scale species-richness patterns. *Ecology Letters 8*, 224–39.

——Gotelli, N.J., Colwell, R.K., Entsminger, G.L., Rangel, T., and Graves, G.R. (2007) Predicting continental-scale patterns of bird species richness with spatially explicit models. *Proceedings of the Royal Society of London B 274*, 165–74.

Raine, N.E., Ings, T.C., Dornhaus, A., Saleh, N., and Chittka, L. (2006) Adaptation, genetic drift, pleiotropy, and history in the evolution of bee foraging behavior. *Advances in the Study of Behavior 36*, 305–54.

Raj, M. (2007) *Navigation in the intertidal ant* Polyrhachis sokolova: *the role of path integration and vision*. Honours thesis, School of Marine & Tropical Biology, James Cook University, Townville.

Ramírez, M., Armbrecht, I., and Montoya, J. (2007) Fodder banks as modifiers of arthropod diversity in agricultural landscapes. In P. Leterme, E. Mugueitio, and A. Buldgeen, eds. *Sustainable Pig Production Systems in the Tropics, Based on Tree Foliage*, pp. 139–63, CIPAV: Centre for Research on Sustainable Agricultural Production Systems, Faculte de Sciences Agronomiques de Gembloux, Belgium.

Ramirez, R.A., Thompson, D.C., and Remmenga, M.D. (2006) Influence of low humidity, *Pseudacteon* flies (Diptera: Phoridae), and competition by *Solenopsis xyloni* on *Solenopsis invicta* (Hymenoptera: Formicidae). *Environmental Entomology 35*, 1037–48.

Rangel, T., Diniz-Filho, J.A.F., and Colwell, R.K. (2007) Species richness and evolutionary niche dynamics: a spatial pattern-oriented simulation experiment. *American Naturalist 170*, 602–16.

Rao, A., and Vinson, S.B. (2004) Ability of resident ants to destruct small colonies of *Solenopsis invicta* (Hymenoptera: Formicidae). *Environmental Entomology 33*, 587–98.

Ratchford, J.S., Wittman, S.E., Jules, E.S., Ellison, A.M., Gotelli, N.J., and Sanders, N.J. (2005) The effects of fire, local environment and time on ant assemblages in fens and forests. *Diversity and Distributions 11*, 487–97.

Ratnieks, F.L.W., Foster, K.R., and Wenseleers, T. (2006) Conflict resolution in insect societies. *Annual Review of Entomology 51*, 581–608.

Read, J.L., and Andersen, A.N. (2000) The value of ants as early warning bioindicators: responses to pulsed cattle grazing at an Australian arid zone locality. *Journal of Arid Environments 45*, 231–51.

Redding, D.W., Hartmann, K., Mimotob, A., Bokalb, D., DeVosb, M., and Mooersa, A. (2007) Evolutionarily

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

distinctive species often capture more phylogenetic diversity than expected. *Journal of Theoretical Biology 251*, 606–15.

Reed, J.M. (1996) Using statistical probability to increase confidence of inferring species extinction. *Conservation Biology 10*, 1283–5.

Reeve, H.K. (1989) The evolution of conspecific acceptance thresholds. *American Naturalist 133*, 407–35.

Regan, T.J., McCarthy, M.A., Baxter, P.W.J., F.D. Panetta, F.D., and Possingham, H.P. (2006) Optimal eradication: when to stop looking for an invasive plant. *Ecology Letters 9*, 759–66.

Rejmánek, M., and Richardson, D.M. (1996) What attributes make some plant species more invasive? *Ecology 77*, 1655–61.

Retana, J., and Cerdá, X. (2000) Patterns of diversity and composition of Mediterranean ground ant communities tracking spatial and temporal variability in the thermal environment. *Oecologia 123*, 436–44.

Rettenmeyer, C.W. (1963) Behavioral studies of army ants. *University of Kansas Scientific Bulletin 44*, 281–465.

Rey, S., and Espadaler, X. (2004) Area-wide management of the invasive garden ant *Lasius neglectus* (Hymenoptera: Formicidae) in northeast Spain. *Journal of Agricultural and Urban Entomology 21*, 99–112.

Rheindt, F.E., Gadau, J., Strehl, C.-P., and Hölldobler, B. (2004) Extremely high mating frequency in the Florida harvester ant (*Pogonomyrmex badius*). *Behavioral Ecology and Sociobiology 56*, 472–81.

Ribas, C.R., and Schoereder, J.H. (2002) Are all ant mosaics caused by competition? *Oecologia 131*, 606–11.

Rice, B., and Westoby, M. (1986) Evidence against the hypothesis that ant-dispersed seeds reach nutrient-enriched microsites. *Ecology 67*, 1270–4.

Richard, F.J., Hefetz, A., Christides, J.-P., and Errard, C. (2004) Food influence on colonial recognition and chemical signature between nestmates in the fungus-growing ant *Acromyrmex subterraneus subterraneus*. *Chemoecology 14*, 9–16.

——Poulsen, M., Drijfhout, F.P., Jones, G., and Boomsma, J.J. (2007) Specificity in chemical profiles of workers, brood and mutualistic fungi in *Atta, Acromyrmex*, and *Sericomyrmex* fungus-growing ants. *Journal of Chemical Ecology 33*, 2281–92.

Richards, O.W. (1977) Hymenoptera. Introduction and key to families (2nd edition). *Handbook for the Identification of British Insects*, vol. *6*, Royal Entomological Society, London.

Richardson, T.O., Sleeman, P.A., McNamara, J.M., Houston, A.I., and Franks, N.R. (2007) Teaching with evaluation in ants. *Current Biology 17*, 1520–6.

Ricklefs, R.E. (2006) Global variation in the diversification rate of passerine birds. *Ecology 87*, 2468–78.

——and Bermingham, E. (2002) The concept of the taxon cycle in biogeography. *Global Ecology and Biogeography 11*, 353–61.

Ricks, B.L., and Vinson, S.B. (1970) Feeding acceptability of certain insects and various water-soluble compounds to two varieties of the imported fire ant. *Journal of Economic Entomology 63*, 145–8.

————(1972) Digestive enzymes of the imported fire ant, *Solenopsis richteri* (Hymenoptera: Formicidae). *Entomologia Experimentalis et Applicata 15*, 329–34.

Rico-Gray, V. (1993) Use of plant-derived food resources by ants in the dry tropical lowlands of coastal Veracruz, Mexico. *Biotropica 25*, 301–15.

——and Oliveira, P.S. (2007) *The Ecology and Evolution of Ant-Plant Interactions*. University of Chicago Press, Chicago.

Rissing, S.W. (1984) Replete caste production and allometry of workers in the honey ant, *Myrmecocystus mexicanus* Wesmael (Hymenoptera, Formicidae). *Journal of the Kansas Entomological Society 57*, 347–50.

Robertson, H.G. (2000) Formicidae (Hymenoptera: Vespoidea). In A.H. Kirk-Spriggs, and E. Marais, eds. *Dâures – biodiversity of the Brandberg Massif, Namibia. Cimbebasia Memoir 9*, pp. 371–82. National Museum of Namibia, Windhoek.

——(2002) Comparison of leaf litter ant communities in woodlands, lowland forests and montane forests of north-eastern Tanzania. *Biodiversity and Conservation 11*, 1637–52.

——and Villet, M.H. (1989) Mating behavior in three species of myrmicine ants (Hymenoptera: Formicidae). *Journal of Natural History 23*, 767–73.

Robinson, E.J.H. (1985) Effects of a juvenile-hormone analog on honey bee foraging behaviour and alarm pheromone production. *Journal of Insect Physiology 31*, 277–82.

——Jackson, D.E., Holcombe, M., Ratnieks, F.L.W. (2005a) 'No entry' signal in ant foraging. *Nature 438*, 442.

Robinson, W., Nicholls, Z., and Collier, P. (2005b) The attractiveness of several commercial ant baits and food attractants to black crazy ants, *Paratrechina longicornis*. University of the Sunshine Coast, Queensland, Technical Report 4088.

Robson, S.K., and Traniello, J.F.A. (2002) Transient division of labor and behavioral specialization in the ant *Formica schaufussi*. *Naturwissenschaften 89*, 128–31.

Roces, F. (2002) Individual complexity and self-organization in foraging by leaf-cutting ants. *Biological Bulletin 202*, 306–13.

Rockwood, L.L., and Hubbell, S.P. (1987) Host-plant selection, diet diversity, and optimal foraging in a tropical leafcutting ant. *Oecologia 74*, 55–61.

Rodrigo, A., and Retana, J. (2006) Post-fire recovery of ant communities in submediterranean *Pinus nigrus* forests. *Ecography 29*, 231–9.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Rodrigues, A.S.L., and Brooks, T.M. (2007) Shortcuts for biodiversity conservation planning: the effectiveness of surrogates. *Annual Review of Ecology, Evolution and Systematics 38*, 713–37.

——and Gaston, K.J. (2002) Maximising phylogenetic diversity in the selection of networks of conservation areas. *Biological Conservation 105*, 103–11.

——Pilgrim, J.D., Lamoreux, J.F., Hoffmann, M., and Brooks, T.M. (2006) The value of the IUCN Red List for conservation. *Trends in Ecology and Evolution 21*, 71–6.

Roff, D.A. (1990) The evolution of flightlessness in insects. *Ecoogical Monographs 60*, 389–421.

——(1992) *The Evolution of Life Histories: theory and analysis*. Chapman & Hall, New York.

Rohde, K. (1996) Rapoport's rule is a local phenomenon and cannot explain latitudinal gradients in species diversity. *Biodiversity Letters 3*, 10–3.

——(1999) Latitudinal gradients in species diversity and Rapoport's rule revisited: a review of recent work and what can parasites teach us about the causes of gradients? *Ecography 22*, 593–613.

Romdal, T.S., and Grytnes, J.A. (2007) An indirect area effect on elevational species richness patterns. *Ecography 30*, 440–8.

Room, P.M. (1971) The relative distributions of ant species in Ghana's cocoa farms. *Journal of Animal Ecology 40*, 735–51.

Roque-Albelo, L., Causton, C.E., and Mieles, A. (2000) The ants of Marchena Island, twelve years after the introduction of the little fire ant *Wasmannia auropunctata*. *Noticias de Galapápagos 61*, 17–20.

Röschard, J., and Roces, F. (2003) Cutters, carriers and transport chains: distance-dependent foraging strategies in the grass-cutting ant *Atta vollenweideri*. *Insectes Sociaux 50*, 237–44.

Rosene, W.J. (1958) Whistling cock counts of bobwhite quail on areas treated with insecticide and untreated areas, Decatur Country, Georgia. 12th Annual Conference of the Association of Game and Fish Commissioners, Louisville, KY pp. 14–8.

Rosengaus, R.B., Moustakas, J.E., Calleri, D.V., and Traniello, J.F.A. (2003) Nesting ecology and cuticular microbial loads in dampwood (*Zootermopsis angusticollis*) and drywood termites (*Incisitermes minor, I. schwarzi, Cryptotermes cavifrons*). *Journal of Insect Science 3*, 31, available online: insectscience.org/3.31. 31.

Rosengren, R. (1986) Competition and coexistence in an insular ant community – a manipulation experiment (Hymenoptera: Formicidae). *Annales Zoologici Fennici 23*, 297–302.

——and Pamilo, P. (1983) The evolution of polygyny and polydomy in mound-building *Formica* ants. *Acta Entomologica Fennica 42*, 65–77.

——Sundström, L., and Fortelius, W. (1993) Monogyny and polygyny in *Formica* ants: the results of alternative dispersal tactics. In L. Keller, ed. *Queen Number and Sociality in Insects*, pp. 308–33. Oxford University Press, Oxford.

Rosenzweig, M.L. (1995) *Species Diversity in Space and Time*. Cambridge University Press, Cambridge.

——and Sandlin, E.A. (1997) Species diversity and latitudes: listening to area's signal. *Oikos 80*, 172–6.

Ross, K.G. (1993) The breeding system of the fire ant *Solenopsis invicta*, and its effects on colony genetic structure. *American Naturalist 141*, 554–76.

——(2001) Molecular ecology of social behaviour: analyses of breeding systems and genetic structure. *Molecular Ecology 10*, 265–84.

——and Carpenter, J.M. (1991) Phylogenetic analysis and the evolution of queen number in eusocial Hymenoptera. *Journal of Evolutionary Biology 4*, 117–30.

——and Keller, L. (1998) Genetic control of social organization in an ant. *Proceedings of the National Academy of Sciences USA 95*, 14232–7.

——and Shoemaker, D.D. (2005) Species delimitation in native South American fire ants. *Molecular Ecology 14*, 3419–38.

——Vargo, E.L., and Keller, L. (1996) Social evolution in a new environment: the case of introduced fire ants. *Proceedings of the National Academy of Sciences USA 93*, 3021–5.

——Krieger, M.J.B., Shoemaker, D.D., Vargo, E.L., and Keller, L. (1997) Hierarchical analysis of genetic structure in native fire ant populations: results from three classes of molecular markers. *Genetics 147*, 643–55.

Rosset, H., Schwander, T., and Chapuisat, M. (2007) Nestmate recognition and levels of aggression are not altered by changes in genetic diversity in a socially polymorphic ant. *Animal Behaviour 74*, 951–6.

Roughgarden, J. (1983) Competition and theory in community ecology. *American Naturalist 122*, 583–601.

Roulston, T.H., Buczkowski, G., and Silverman, J. (2003) Nestmate discrimination in ants: effect of bioassay on aggressive behavior. *Insectes Sociaux 50*, 151–9.

Roura-Pascual, N. (2004) Geographic potential of Argentine ants (Mayr) in the face of global climate change. *Proceedings of the Royal Society of London B 571*, 2527–34.

——(2006) Niche differentiation and fine scale projections for Argentine ants based on remotely sensed data. *Ecological Applications 16*, 1832–41.

——and Suarez, A.V. (2008) The utility of species distribution models to predict the spread of invasive ants (Hymenoptera: Formicidae) and to anticipate changes

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

in their ranges in the face of global climate change. *Myrmecological News 11*, 67–77.

Rousset, F., and Roze, D. (2007) Constraints on the origin and maintenance of genetic kin recognition. *Evolution 61*, 2320–30.

Rowles, A.D., and O'Dowd, D.J. (2009) New mutualism for old: indirect disruption and direct facilitation of seed dispersal following Argentine ant invasion. *Oecologia 158*, 709–16.

——(2007) Interference competition by Argentine ants displaces native ants: implications for biotic resistance to invasion. *Biological Invasions 9*, 73–85.

Roy, H.E., Steinkraus, D.C., Eilenberg, J., Hajek, A.E., and Pell, J.K. (2006) Bizarre interactions and endgames: entomopathogenic fungi and their arthropod hosts. *Annual Review of Entomology 51*, 331–57.

Rudgers, J.A., and Strauss, S.Y. (2004) A selection mosaic in the facultative mutualism between ants and wild cotton. *Proceedings of the Royal Society of London B 271*, 2481–8.

Rueppell, O., and Kirkman, R.W. (2005) Extraordinary starvation resistance in *Temnothorax rugatulus* (Hymenoptera, Formicidae) colonies: demography and adaptive behavior. *Insectes Sociaux 52*, 282–90.

Ryder Wilkie, K.T., Mertl, A.L., Traniello, J.F.A. (2007) Biodiversity below ground: probing the subterranean ant fauna of Amazonia. *Naturwissenschaften 94*, 725–31.

Ryti, R.T., and Case, T.J. (1986) Overdispersion of ant colonies – a test of hypotheses. *Oecologia 69*, 446–53.

——(1988) Field experiments on desert ants – testing for competition between colonies. *Ecology 69*, 1993–2003.

——(1992) The role of neighborhood competition in the spacing and diversity of ant communities. *American Naturalist 139*, 355–74.

Saarinen, E.V., and Daniels, J.C. (2006) Miami blue butterfly larvae (Lepidoptera: Lycaenidae) and ants (Hymenoptera: Formicidae): new information on the symbionts of an endangered taxon. *Florida Entomologist 89*, 69–74.

Sagers, C.L., Ginger, S.M., and Evans, R.D. (2000) Carbon and nitrogen isotopes trace nutrient exchange in an ant-plant mutualism. *Oecologia 123*, 582–6.

Sameshima, S., Hasegawa, E., Kitade, O., Minaka, N., and Matsumoto, T. (1999) Phylogenetic comparison of endosymbionts with their host ants based on molecular evidence. *Zoological Science 16*, 993–1000.

Samson, D.A., Rickart, E.A., and Gonzales, P.C. (1997) Ant diversity and abundance along an elevational gradient in the Philippines. *Biotropica 29*, 349–63.

Samways, M.J. (1983) Community structure of ants (Hymenoptera: Formicidae) in a series of habitats associated with citrus. *Journal of Appied Ecology 20*, 833–47.

Sanders, N.J. (2002) Elevational gradients in ant species richness: area, geometry, and Rapoport's rule. *Ecography 25*, 25–32.

——and Gordon, D.M. (2002) Resources and the flexible allocation of work in the desert ant, *Aphaenogaster cockerelli*. *Insectes Sociaux 49*, 371–9.

————(2003) Resource-dependent interactions and the organization of desert ant communities. *Ecology 84*, 1024–31.

——Barton, K.E., and Gordon, D.M. (2001) Long-term dynamics of the distribution of the invasive Argentine ant, *Linepithema humile*, and native ant taxa in northern California. *Oecologia 127*, 123–30.

——Moss, J., and Wagner, D. (2003b) Patterns of ant species richness along elevational gradients in an arid ecosystem. *Global Ecology and Biogeography 12*, 93–102.

——Gotelli, N.J., Heller, N.E., and Gordon, D.M. (2003a) Community disassembly by an invasive species. *Proceedings of the National Academy of Sciences USA 100*, 2474–7.

——Lessard, J.P., Fitzpatrick, M.C., and Dunn, R.R. (2007b) Temperature, but not productivity or geometry, predicts elevational diversity gradients in ants across spatial grains. *Global Ecology and Biogeography 16*, 640–9.

——Crutsinger, G.M., Dunn, R.R., Majer, J.D., Delabie, J. H.C. (2007a) An ant mosaic revisited: dominant ant species disassemble arboreal ant communities but co-occur randomly. *Biotropica 39*, 422–7.

Sanetra, M., and Crozier, R.H. (2001) Polyandry and colony genetic structure in the primitive ant *Nothomyrmecia macrops*. *Journal of Evolutionary Biology 14*, 368–78.

————(2002) Daughters inherit colonies from mothers in the "living-fossil" ant *Nothomyrmecia macrops*. *Naturwissenschaften 89*, 71–4.

————(2003) Patterns of population subdivision and gene flow in the ant *Nothomyrmecia macrops* reflected in microsatellite and mitochondrial DNA markers. *Molecular Ecology 12*, 2281–95.

Santini, G., Tucci, L., Ottonetti, L., and Frizzi, F. (2007) Competition trade-offs in the organisation of a Mediterranean ant assemblage. *Ecological Entomology 32*, 319–26.

Sarnat, E.M. (2006) *Lordomyrma* (Hymenoptera: Formicidae) of the Fiji Islands. *Bishop Museum Occasional Papers 90*, 9–42.

——(2008) A taxonomic revision of the *Pheidole rooseveltii*-group (Hymenoptera: Formicidae) in Fiji. *Zootaxa 1767*, 1–36.

Sarty, M., Abbott, K.L., and Lester, P.J. (2006) Habitat complexity facilitates coexistence in a tropical ant community. *Oecologia 149*, 465–73.

————————(2007) Community level impacts of an ant invader and food mediated coexistence. *Insectes Sociaux 54*, 166–73.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Sauer, C., Stackebrandt, E., Gadau, J., Hölldobler, B., and Gross, R. (2000) Systematic relationships and cospeciation of bacterial endosymbionts and their carpenter ant host species: proposal of the new taxon Candidatus *Blochmannia* gen. nov. *International Journal of Systematic and Evolutionary Microbiology 50*, 1877–86.

Saux, C., Fisher, B.L., and Spicer, G.S. (2004) Dracula ant phylogeny as inferred by nuclear 28S rDNA sequences and implications for ant systematics (Hymenoptera: Formicidae: Amblyoponinae). *Molecular Phylogenetics and Evolution 33*, 457–68.

Savolainen, R., and Vepsäläinen, K. (1988) A competition hierarchy among boreal ants: impact on resource partitioning and community structure. *Oikos 51*, 135–55.

————and Wuorenrinne, H. (1989) Ant assemblages in the taiga biome – testing the role of territorial wood ants. *Oecologia 81*, 481–6.

Say-Piau, L., and Chow-Yang, L. (2003) Nestmate recognition and intercolonial aggression in the crazy ant, *Paratrechina longicornis* (Latreille) (Hymenoptera: Formicidae). *Sociobiology 41*, 295–305.

Schaffer, W.M., Jensen, D.B., Hobbs, D.E., Gurevitch, J., Todd, J.R., and Schaffer, M.V. (1979) Competition, foraging energetics, and the cost of sociality in three species of bees. *Ecology 60*, 976–87.

Schatz, B., Lachaud, J., and Beugnon, G. (1999) Spatiotemporal learning by the ant *Ectatomma ruidum*. *Journal of Animal Ecology 202*, 1897–907.

Schemske, D.W. (1980) The evolutionary significance of extrafloral nectar production by *Costus woodsonii* (Zingiberaceae): an experimental analysis of ant protection. *Journal of Ecology 68*, 959–67.

Schilman, P.E., Lighton, J.R.B., and Holway, D.A. (2005) Respiratory and cuticular water loss in insects with continuous gas exchange: comparison across five ant species. *Journal of Insect Physiology 51*, 1295–305.

Schlick-Steiner, B.C., Steiner, F.M., and Steiner, H.M. (2005) Effect of extensification of coppice management on central European ant assemblages (Hymenoptera: Formicidae). *Entomologia Generalis 28*, 23–37.

————Moder, K., Bruckner, A., Fiedler, K., and Christian, E. (2006a) Assessing ant assemblages: pitfall trapping versus nest counting (Hymenoptera, Formicidae). *Insectes Sociaux 53*, 274–81.

————Konrad, H., Seifert, B., Christian, E., Moder, K., Stauffer, C., and Crozier, R. H. (2008) Specificity and transmission mosaic of ant nest-wall fungi. *Proceedings of the National Academy of Sciences USA 105*, 940–943.

————Moder, K., Bruckner, A., Fiedler, K., and Christian, E. (2006b) A multidisciplinary approach reveals cryptic diversity in western Palearctic *Tetramorium* ants (Hymenoptera: Formicidae). *Molecular Phylogenetics and Evolution 40*, 259–73.

Schluter, D. (1984) A variance test for detecting species associations, with some example applications. *Ecology 65*, 998–1005.

Schmid-Hempel, P. (1998) *Parasites in Social Insects*. Princeton University Press, Princeton, NJ.

——Schmid-Hempel, R. (1984) Life duration and turnover of foragers in the ant *Cataglyphis bicolor* (Hymenoptera, Formicidae). *Insectes Sociaux 31*, 345–60.

Schmidt, G.H. (1974) Steuerung der Kastenbildung und Geschlechtsregulation im Waldameisenstaat. In G.H. Schmidt, ed. *Sozialpolymorphismus bei Insekten*, pp. 404–512. Wissenschaftliche Verlagsgesellschaft, Stuttgart.

Schneirla, T.C. (1971) *Army Ants: a study in social organization*. W. H. Freeman & Co., San Francisco.

Schödl, S. (2007) Revision of Australian *Meranoplus*: the *Meranoplus diversus* group. *Memoirs of the American Entomological Institute 80*, 370–424.

Schoener, T.W. (1977) Competition and the niche. In C. Gans, and D.W. Tinkle, eds. *Biology of the Reptilian*, pp. 36–136. Academic Press, New York.

——(1982) The controversy over interspecific competition. *American Scientist 70*, 586–95.

——(1983) Field experiments on interspecific competition. *American Naturalist 122*, 240–85.

——and Adler, G.H. (1991) Greater resolution of distributional complementarities by controlling for habitat affinities – a study with Bahamian lizards and birds. *American Naturalist 137*, 669–92.

Schöning, C., Kinuthia, W., and Franks, N.R. (2005) Evolution of allometries in the worker caste of *Dorylus* army ants. *Oikos 110*, 231–40.

Schooley, R.L., and Wiens, J.A. (2003) Spatial patterns, density dependence, and demography in the harvester ant, *Pogonomyrmex rugosus* in semi-arid grasslands. *Journal of Arid Environments 53*, 183–96.

Schrempf, A., and Heinze, J. (2006) Back to one: consequences of derived monogyny in an ant with polygynous ancestors. *Journal of Evolutionary Biology 20*, 792–9.

Schultz, T., and Brady, S.G. (2008) Major evolutionary transitions in ant agriculture. *Proceedings of the National Academy of Sciences USA 105*, 5435–40.

Schulz, A., and Wagner, T. (2002) Influence of forest type and tree species on canopy ants (Hymenoptera: Formicidae) in Budongo Forest, Uganda. *Oecologia 133*, 224–32.

Schwander, T., Helms Cahan, S., and Keller, L. (2007) Characterization and distribution of *Pogonomyrmex* harvester ant lineages with genetic caste determination. *Molecular Ecology 16*, 367–87.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Seagraves, M.P., and McPherson, R.M. (2006) Monitoring red imported fire ant (Hymenoptera: Formicidae) foraging behavior and impact on foliage-dwelling arthropods on soybean produced under three ant suppression regimes. *Journal of Entomological Science 41*, 374–84.

————and Ruberson, J.R. (2004) Impact of *Solenopsis invicta* Buren suppression on arthropod ground predators and pest species in soybean. *Journal of Entomological Science 39*, 433–43.

Seal, J.N., and Tschinkel, W.R. (2007a) Co-evolution and the superorganism: switching cultivars does not alter the performance of fungus-gardening ant colonies. *Functional Ecology 21*, 988–97.

————(2007b) Complexity in an obligate mutualism: do fungus-gardening ants know what makes their garden grow? *Behavioral Ecology and Sociobiology 61*, 1151–60.

Seaman, R.E., and Marino, P.C. (2003) Influence of mound building and selective seed predation by the red imported fire ant (*Solenopsis invicta*) on an old-field plant assemblage. *Journal of the Torrey Botanical Society 130*, 193–201.

Seifert, B. (2000) Rapid range expansion in *Lasius neglectus* (Hymenoptera: Formicidae) – an Asian invader swamps Europe. *Deutsche Entomologische Zeitschrift 47*, 173–9.

——(2007) *Die Ameisen Mittel- und Nordeuropas*. lutra Verlags- und Vertriebsgesellschaft, Tauer.

Sempo, G., Depickère, S., and Detrain, C. (2006) Spatial organization in a dimorphic ant: caste specificity of clustering patterns and area marking. *Behavioral Ecology 17*, 642–50.

Sendova-Franks, A.B., and Franks, N.R. (1995) Spatial relationships within nests of the ant *Leptothorax unifasciatus* (Latr.) and their implications for the division of labour. *Animal Behaviour 50*, 121–36.

Seppä, P. (2008) Do ants (Hymenoptera: Formicidae) need conservation and does ant conservation need genetics? *Myrmecological News 11*, 161–72.

——Fernández-Escudero, I., Gyllenstrand, N., and Pamilo, P. (2008) Colony fission affects kinship in a social insect. *Behavioral Ecology and Sociobiology 62*, 589–97.

Serfling, R.E. (1952) Historical review of epidemic theory. *Human Biology 24*, 145–66.

Seymour, M. (2007) *Effect of red imported fire ant* (Solenopsis invicta *Buren*) *on the nesting success of Northern bobwhite* (Colinus virginianus). Masters thesis, Louisiana State University, Baton Rouge.

Sfenthourakis, S., Tzanatos, E., and Giokas, S. (2005) Species co-occurrence: the case of congeneric species and a causal approach to patterns of species association. *Global Ecology and Biogeography 15*, 39–49.

Shaffer, H.B., and Thomson, R.C. (2007) Delimiting species in recent radiations. *Systematic Biology 56*, 896–906.

Shattuck, S.O. (1999) *Australian ants: their biology and identification*. CSIRO Publishing, Collingwood, Victoria.

——(2006) A third species in the rare Australian ant genus *Peronomyrmex* Viehmeyer (Hymenoptera: Formicidae). *Zootaxa 1194*, 49–55.

——(2007) New species of myrmicine ants from Western Australia (Hymenoptera: Formicidae). *Zootaxa 1661*, 47–53.

Shattuck, S.O. (2008a) Australian ants of the genus *Aphaenogaster* (Hymenoptera: Formicidae). *Zootaxa* 1677, 25–45.

——(2008b) Review of the ant genus *Aenictus* (Hymenoptera: Formicidae) in Australia with notes on *A. ceylonicus* (Mayr). *Zootaxa 1926*, 1–19.

——(2008c) Revision of the ant genus *Prionopelta* (Hymenoptera: Formicidae) in the Indo-Pacific region. *Zootaxa 1846*, 21–34.

——and Barnett, N.J. (2006) Australian species of the ant genus *Diacamma* (Hymenoptera: Formicidae). *Myrmecologische Nachrichten 8*, 13–9.

——and Barnett, N.J. (2007) Revision of the ant genus *Mayriella*. *Memoirs of the American Entomological Institute 80*, 437–58.

Sherman, P.W., Reeve, H.K., and Pfenning, D.W. (1997) Recognition systems. In R. Krebs, and N.B. Davies, eds. *Behaviuoral Ecology: an evolutionary approach*, pp. 69–96. Blackwell Scientific, Oxford.

Shigesada, N., and Kawasaki, K. (1997) *Biological Invasions: theory and practice*. Oxford University Press, Oxford.

Shingleton, A.W., Stern, D.L., and Foster, W.A. (2005) The origin of a mutualism: a morphological trait promoting the evolution of ant-aphid mutualisms. *Evolution 59*, 921–6.

Shoemaker, D.D., DeHeer, C.J., Krieger, M.J.B., and Ross, K.G. (2006) Population genetics of the invasive fire ant *Solenopsis invicta* (Hymenoptera: Formicidae) in the United States. *Annals of the Entomological Society of America 99*, 1213–33.

Shrestha, R.K., Stein, T.V., and Clark, J. (2007) Valuing nature-based recreation in public natural areas of the Apalachicola River region, Florida. *Journal of Environmental Management 85*, 977–85.

Shuetrim, A. (2001) *Territoriality, colony structure and spatial dispersion in the intertidal ant* Polyrhachis sokolova *(Formicidae: Formicinae)*. Honours thesis, James Cook University, Cairns.

Shure, D.J., and Phillips, D.L. (1991) Patch size of forest openings and arthropod populations. *Oecologia 86*, 325–34.

Sih, A., Englund, G., and Wooster, D. (1998) Emergent impacts of multiple predators on prey. *Trends in Ecology and Evolution 13*, 350–5.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Silverman, J., and Brightwell, R.J. (2008) The Argentine ant: challenges in managing a unicolonial invasive ant. *Annual Review of Entomology 53*, 231–52.

——and Nsimba, B. (2000) Soil-free collection of Argentine ants (Hymenoptera: Formicidae) based on food-directed brood and queen movement. *Florida Entomologist 83*, 10–6.

Simberloff, D. (2002) Today Tiritiri Matangi, tomorrow the world! Are we aiming too low in invasives control? In C. R. Veitch, and M.N. Clout, eds. *Turning the tide: the eradication of invasive species. Proceedings of the International Conference on Eradication of Island Invasives*. Occasional Paper of the IUCN Species Survival Commission Gland, Switzerland.

——(2003) How much information on population biology is needed to manage introduced species? *Conservation Biology 17*, 83–92.

——(2006) Invasional meltdown 6 years later: important phenomenon, unfortunate metaphor, or both? *Ecology Letters 9*, 912–9.

——(2009) We can eliminate invasions or live with them. Successful management projects. *Biological Invasions 11*, 149–57.

——and Gibbons, L. (2004) Now you see them, now you don't – population crashes of established introduced species. *Biological Invasions 6*, 161–72.

——and von Holle, B. (1999) Positive interactions of nonindigenous species: invasional meltdown? *Biological Invasions 1*, 21–32.

——and Wilson, E.O. (1969) Experimental zoogeography of islands – Colonization of empty islands. *Ecology 50*, 278–96.

Singer, T.L. (1998) Role of hydrocarbons in the recognition systems of insects. *American Zoologist 38*, 394–405.

Smallwood, J. (1982) Nest relocations in ants. *Insectes Sociaux 29*, 138–47.

Smith, A.A., and Haight, K.L. (2008) Army ants as research and collection tools. *Journal of Insect Science 8*, 71, available online: insectscience.org/8.71.

Smith, C.R. (2007) Energy use and allocation in the Florida harvester ant, *Pogonomyrmex badius*: are stored seeds a buffer? *Behavioral Ecology and Sociobiology 61*, 1479–87.

Smith, J.E., Taylor, S.J., Whelan, C.J., Denight, M.L., and Stake, M.M. (2004) Behavioral interactions between fire ants and vertebrate nest predators at two black-capped vireo nests. *Wilson Bulletin 116*, 163–7.

Smith, M.A., Fisher, B.L., and Hebert, P.D.N. (2005) DNA barcoding for effective biodiversity assessment of a hyperdiverse arthropod group: the ants of Madagascar. *Philosophical Transactions of the Royal Society B 360*, 1825–34.

——Woodley, N., Hallwachs, W., Janzen, D.H., and Hebert, P.D.N. (2006) DNA barcodes reveal cryptic host-specificity within the presumed polyphagous members of a genus of parasitoid flies (Diptera: Tachinidae). *Proceedings of the National Academy of Sciences USA 103*, 3657–62.

Smith, M.R. (1934) Ponerine ants of the genus *Euponera* in the United States. *Annals of the Entomological Society of America 27*, 558–64.

Smith, R.A., Mooney, K.A., and Agrawal, A.A. (2008) Coexistence of three specialist aphids on common milkweed, *Asclepias syriaca*. *Ecology 89*, 2187–96.

Smythe, K.D., Bernabo, J.C., Carter, T.B., and Jutro, P.R. (1996) Focusing biodiversity research on the needs of decision makers. *Environmental Management 20*, 865–72.

Snelling, G.C., and Snelling, R.R. (2007) New synonymy, new species, new keys to *Neivamyrmex* army ants of the United States. *Memoirs of the American Entomological Institute 80*, 459–550.

Snelling, R.R. (2006) Taxonomy of the *Camponotus festinatus* complex in the United States of America (Hymenoptera: Formicidae). *Myrmecologische Nachrichten 8*, 83–97.

——(2007) A review of the arboreal Afrotropical ant genus *Axinidris*. *Memoirs of the American Entomological Institute 80*, 551–79.

Soininen, J., Lennon, J.J., and Hillebrand, H. (2007) A multivariate analysis of beta diversity across organisms and environments. *Ecology 88*, 2830–8.

Solow, A.S. (1993) Inferring extinction from sighting data. *Ecology 74*, 962–4.

Srinivasan, M.V., Zhang, S., Altwein, M., and Tautz, J. (2000) Honeybee navigation: nature and calibration of the "Odometer". *Science 287*, 851–3.

Srivastava, D.S., and Lawton, J.H. (1998) Why more productive sites have more species: experimental test of theory using tree-hole communities. *American Naturalist 152*, 510–29.

Stachowicz, J.J. (2001) Mutualism, facilitation, and the structure of ecological communities. *BioScience 51*, 235–46.

Stadler, B., and Dixon, A.F.G. (1998) Costs of ant attendance for aphids. *Journal of Animal Ecology*, 67, 454–9.

————(2005) Ecology and evolution of aphid-ant interactions. *Annual Review of Ecology, Evolution and Systematics 36*, 345–72.

——and Dixon, T. (2008) *Mutualism: ants and their insect partners*. Cambridge University Press, Cambridge.

——Michalzik, B., and Müller, T. (1998) Linking aphid ecology with nutrient fluxes in a coniferous forest. *Ecology 79*, 1514–25.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Stake, M.M., and Cimprich, D.A. (2003) Using video to monitor predation at black-capped vireo nests. *Condor 105*, 348–57.

Staller, E.L., Palmer, W.E., Carroll, J.P., Thornton, R.P., and Sisson, D.C. (2005) Identifying predators at northern bobwhite nests. *Journal of Wildlife Management 69*, 124–32.

Stanaway, M.A., Zalucki, M.P., Gillespie, P.S., and Rodriquez, C.M. (2001) Pest risk assessment of insects in sea cargo containers. *Australian Journal of Entomology 40*, 180–92.

Stanton, M.L., Palmer, T.M., Young, T.P., Evans, A., and Turner, M.L. (1999) Sterilization and canopy modification of a swollen thorn acacia tree by a plant ant. *Nature 401*, 578–81.

Stapley, J.H. (1980) Using the predatory ants, *Oecophylla smaragdina*, to control insect pests of coconuts and cocoa. *Information Circular, South Pacific Commission 85*, 5.

Starks, P.T. (2004) Recognition systems: from components to conservation. *Annales Zoologici Fennici 41*, 689–90.

Steghaus-Kovac, S., Maschwitz., U. (1993) Predation on earwigs – a novel diet specialization within the genus *Leptogenys* (Formicidae, Ponerinae). *Insectes Sociaux 40*, 337–40.

Stein, M., Thorvilson, H.G., and Johnson, J. (1990) Seasonal changes in bait preference of the red imported fire ant, *Solenopsis invicta* Buren (Hymenoptera: Formicidae). *Florida Entomologist 73*, 118–23.

Steiner, F.M., Schlick-Steiner, B.C., Trager, J., Moder, K., Sanetra, M., Christian, E., and Stauffer, C., (2006a) *Tetramorium tsushimae*, a new invasive ant in North America. *Biological Invasions 8*, 117–23.

————Konrad, H. Moder, K., Christian, E., Seifert, B., Crozier, R.H., Stauffer, C., and Buschinger, A. (2006b) No sympatric speciation here: multiple data sources show that the ant *Myrmica microrubra* is not a separate species but an alternate reproductive morph of *Myrmica rubra*. *Journal of Evolutionary Biology 19*, 777–87.

————Moder, K., Stauffer, C., Arthofer, W., Buschinger, A., Espadaler, X., Christian, E., Einfinger, K., Lorbeer, E., Schafellner, C., Ayasse, M., and Crozier, R. H. (2007) Abandoning aggression but maintaining self-nonself discrimination as a first stage in ant supercolony formation. *Current Biology 17*, 1903–7.

————Nikiforov, A., Kalb, R., and Mistrik, R. (2002) Cuticular hydrocarbons of *Tetramorium* ants from Central Europe: analysis of GC-MS data with self-organizing maps (SOM) and implications for systematics. *Journal of Chemical Ecology 28*, 2569–84.

Stevens, G.C. (1989) The latitudinal gradient in geographical range: how so many species coexist in the tropics. *American Naturalist 133*, 240–56.

——(1992) The elevational gradient in altitudinal range: an extension of Rapoport's latitudinal rule to altitude. *American Naturalist 140*, 893–911.

Stevens, R.D., and Willig, M.R. (2002) Geographical ecology at the community level: perspectives on the diversity of new world bats. *Ecology 83*, 545–60.

Stiles, J.H., and Jones, R.H. (2001) Top-down control by the red imported fire ant (*Solenopsis invicta*). *American Midland Naturalist 146*, 171–85.

Stille, M. (1996) Queen/worker thorax volume ratios and nest-founding strategies in ants. *Oecologia 105*, 87–93.

Stoll, S., Gadau, J., Gross, R., and Feldhaar, H. (2007) Bacterial microbiota associated with ants of the genus *Tetraponera*. *Biological Journal of the Linnean Society 90*, 399–412.

Stone, L., and Roberts, A. (1990) The checkerboard score and species distributions. *Oecologia 85*, 74–9.

——(1992) Competitive-exclusion, or species aggregation – an aid in deciding. *Oecologia 91*, 419–24.

Stow, A., Briscoe, D., Gillings, M., Holley, M., Smith, S., Leys, R., Silberbauer, L., Turnbull, C., and Beattie, A. (2007) Antimicrobial defences increase with sociality in bees. *Biology Letters 3*, 422–424.

Stradling, D.J. (1978) Food and feeding habits of ants. In M.V. Brian, ed. *Production Ecology of Ants and Termites*, pp. 81–106. Cambridge University Press, Cambridge.

Straka, J., and Feldhaar, H. (2007) Development of a chemically defined diet for ants. *Insectes Sociaux 54*, 100–4.

Stuart, R.J., Greshambissett, L., and Alloway, T.M. (1993) Queen adoption in the polygynous and polydomous ant, *Leptothorax curvispinosus*. *Behavioral Ecoogy 4*, 276–81.

——Jackson, I.W., and McCoy, C.W. (2003) Predation on neonate larvae of *Diaprepes abbreviatus* (Coleoptera: Curculionidae) in Florida citrus: testing for daily patterns of neonate drop, ant predators and chemical repellency. *Florida Entomologist 86*, 61–72.

Styrsky, J.D., and Eubanks, M.D. (2007) Ecological consequences of interactions between ants and honeydew-producing insects. *Proceedings of the Royal Society of London B 274*, 151–64.

——Kaplan, I., and Eubanks, M.D. (2006) Plant trichomes indirectly enhance tritrophic interactions involving a generalist predator, the red imported fire ant. *Biological Control 36*, 375–284.

Suarez, A.V., and Case, T.J. (2002) Bottom-up effects on persistence of a specialist predator: ant invasions and horned lizards. *Ecological Applications 12*, 291–8.

——and Tsutsui, N.D. (2004) The value of museum collections for research and society. *BioScience 54*, 66–74.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Suarez, A.V., and Case, T.J. (2008) The evolutionary consequences of biological invasions. *Molecular Ecology 17*, 351–60.
——Bolger, D.T., and Case, T.J. (1998) Effect of fragmentation and invasion on native ant communities in coastal Southern California. *Ecology 79*, 2041–56.
——Holway, D.A., and Case, T.J. (2001) Patterns of spread in biological invasions dominated by long-distance jump dispersal: insights from Argentine ants. *Proceedings of the National Academy of Sciences USA 98*, 1095–100.
————and Tsutsui, N.D. (2008) Genetics and behavior of a colonizing species: the invasive Argentine ant. *American Naturalist 172*, S72–84.
————and Ward, P.S. (2005a) The role of opportunity in the unintentional introduction of invasive ants. *Proceedings of the National Academy of Sciences USA 102*, 17032–5.
——Richmond, J.Q., and Case, T.J. (2000) Prey selection in horned lizards following the invasion of Argentine ants in southern California. *Ecological Applications 10*, 711–25.
——Yeh, P., and Case, T.J. (2005b) Impacts of Argentine ants on avian nesting success. *Insectes Sociaux 52*, 378–82.
——Tsutsui, N.D., Holway, D.A., and Case, T.J. (1999) Behavioral and genetic differentiation between native and introduced populations of the Argentine ant. *Biological Invasions 1*, 43–53.
Suchocka, H., Czechowski, W., and Radchenko, A. (2008) Second report on the occurrence of *Camponotus truncatus* (Spinola) (Hymenoptera: Formicidae) in Poland, with a key to the Polish species of the genus *Camponotus* Mayr. *Fragmenta Faunistica (Warsaw) 51*, 9–13.
Sunamura, E., Nishisue, K., Terayama, M., and Tatsuki, S. (2007) Invasion of four Argentine ant supercolonies into Kobe Port, Japan: their distributions and effects on indigenous ants (Hymenoptera: Formicidae). *Sociobiology 50*, 659–74.
Sundström, L. (1993) Foraging responses of *Formica truncorum* (Hymenoptera, Formicidae) – exploiting stable vs spatially and temporally variable resources. *Insectes Sociaux 40*, 147–61.
——(1995) Dispersal polymorphism and physiological condition of males and females in the ant, *Formica truncorum*. *Behavioral Ecology 6*, 132–9.
——(1997) Queen acceptance and nestmate recognition in monogyne and polygyne colonies of the ant *Formica truncorum*. *Animal Behaviour 53*, 499–510.
——Seppä, P., and Pamilo, P. (2005) Genetic population structure and dispersal patterns in *Formica* ants – a review. *Annales Zoologici Fennici 42*, 163–77.
Sutherst, R.W., and Maywald, G. (2005) A climate model for the red imported fire ant, *Solenopsis invicta* Buren (Hymenoptera: Formicidae): implications for invasion of new regions, particularly Oceania. *Environmental Entomology 34*, 317–35.
Tarpy, D.R., Nielsen, R., and Nielsen, D.I. (2004) A scientific note on the revised estimates of effective paternity in *Apis*. *Insectes Sociaux 51*, 203–4.
Tay, W.T., Cook, J.M., Rowe, D.J., and Crozier, R.H. (1997) Migration between nests in the Australian arid-zone ant *Rhytidoponera* sp. 12 revealed by DGGE analyses of mitochondrial DNA. *Molecular Ecology 6*, 403–11.
Taylor, P.H., and Gaines, S.D. (1999) Can Rapoport's rule be rescued? Modeling causes of the latitudinal gradient in species richness. *Ecology* 80, 2474–82.
Taylor, R.W. (1978) *Nothomyrmecia macrops*: a living-fossil ant rediscovered. *Science 201*, 979–85.
Tennant, L.E. (1994) The ecology of *Wasmannia auropunctata* in primary tropical rainforest in Costa Rica and Panama. In D.F. Williams, ed. *Exotic Ants: biology, impact, and control of introduced species*, pp. 80–90. Westview Press, Boulder, CO.
——and Porter, S.D. (1991) Comparison of diets of two fire ant species (Hymenoptera: Formicidae): solid and liquid components. *Journal of Entomological Science 26*, 450–65.
Texas A&M University (2008) *Rasberry crazy ant*. http://urbanentomology.tamu.edu/ants/exotic_tx.cfm.
Thead, L.G., Vogt, J.T., and Streett, D.A. (2005) Dispersal of the fire ant decapitating fly, *Pseudacteon curvatus* (Diptera: Phoridae) in northeast Mississippi. *Florida Entomologist 88*, 214–16.
Thomas, M.L. (2002) Nest site selection and longevity in the ponerine ant *Rhytidoponera metallica* (Hymenoptera, Formicidae). *Insectes Sociaux 49*, 147–52.
——and Holway, D.A. (2005) Condition-specific competition between invasive Argentine ants and Australian *Iridomyrmex*. *Journal of Animal Ecology 74*, 532–42.
——Payne-Makrisa, C.M., Suarez, A.V., Tsutsui, N.D., and Holway, D.A. (2006) When supercolonies collide: territorial aggression in an invasive and unicolonial social insect. *Molecular Ecology 15*, 4303–15.
Thompson, J.N. (1981) Elaiosomes and fleshy fruits: phenology and selection pressures for ant-dispersed seeds. *American Naturalist 117*, 104–8.
Thorne, B.L., and Traniello, J.F.A. (2003) Comparative social biology of basal taxa of ants and termites. *Annual Review of Entomology 48*, 283–306.
Thorvilson, H.G., Cokendolpher, J.C., and Phillips, S.A. (1992) Survival of the red imported fire ant (Hymenoptera: Formicidae) on the Texas high plains. *Environmental Entomology 21*, 964–8.
Thurin, N., and Aron, S. (2008) Seasonal nestmate recognition in the polydomous ant *Plagiolepis pygmaea*. *Animal Behaviour 75*, 1023–30.
Tillberg, C.V., Holway, D.A., LeBrun, E.G., and Suarez, A. V. (2007) Trophic ecology of invasive Argentine ants in their native and introduced ranges. *Proceedings of the National Academy of Sciences USA 104*, 20856–61.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

——McCarthy, D.P., Dolezal, A.G., and Suarez, A.V. (2006) Measuring the trophic ecology of ants using stable isotopes. *Insectes Sociaux 53*, 65–9.

Tilley, C.A., and Oldroyd, B.P. (1997) Unequal subfamily proportions among honey bee queen and worker brood. *Animal Behaviour 54*, 1483–90.

Tillman, G., Schomberg, H., Phatak, S., Mullinix, B., Lachnicht, S., Timper, P., and Olson, D. (2004) Influence of cover crops on insect pests and predators in conservation tillage cotton. *Journal of Economic Entomology 97*, 1217–32.

Tilman, D. (1982) *Resource Competition and Community Structure*. Princeton University Press, Princeton, NJ.

Tobin, J.E. (1994) Ants as primary consumers: diet and abundance in the Formicidae. In J.H. Hunt, and C.A. Nalepa, eds. *Nourishment and Evolution in Insect Societies*, pp. 279–308. Westview Press, Boulder, CO.

Todd, B.D., Rothermel, B.B., Reed, R.N., Luhring, T. M., Schlatter, K., Trenkamp, L., and Gibbons, J. W. (2008) Habitat alteration increases invasive fire ant abundance to the detriment of amphibians and reptiles. *Biological Invasions 10*, 539–46.

Torossian, C. (1967) Recherches sur la biologie et l'ethologie de *Dolichoderus quadripunctatus* (L.) (Hym. Form. Dolichoderidae). IV. Étude des possibilités évolutives des colonies avec reine, et des femelles isolées désailées. *Insectes Sociaux 14*, 259–80.

Torres, J.A. (1984) Diversity and distribution of ant communities in Puerto Rico. *Biotropica 16*, 296–303.

Touyama, Y., Ihara, Y., and Ito, F. (2008) Argentine ant infestation affects the abundance of the native myrmecophagic jumping spider *Siler cupreus* Simon in Japan. *Insectes Sociaux 55*, 144–6.

Townsend, C.R., and Hildrew, A.G. (1994) Species traits in relation to a habitat templet for river systems. *Freshwater Biology 31*, 265–75.

Trager, J.C., MacGown, J.A., Trager, M.D. (2007) Revision of the Nearctic endemic *Formica pallidefulva* group. *Memoirs of the American Entomological Institute 80*, 610–36.

Traniello, J.F.A. (1987) Comparative foraging ecology of north temperate ants: the role of worker size and cooperative foraging in prey selection. *Insectes Sociaux 34*, 118–30.

——(1989) Foraging strategies of ants. *Annual Review of Entomology 34*, 191–210.

——and Beshers, S.N. (1991) Maximization of foraging efficiency and resource defense by group retrieval in the ant *Formica schaufussi*. *Behavioral Ecology and Sociobiology 29*, 283–9.

——and Levings, S.C. (1986) Intra- and intercolony patterns of nest dispersion in the ant *Lasius neoniger*: correlations with territoriality and foraging ecology. *Oecologia 69*, 413–9.

Travassos, M.A., and Pierce, N.E. (2000) Acoustics, context and function of vibrational signalling in a lycaenid butterfly—ant mutualism. *Animal Behaviour 60*, 13–26.

Travis, B.V. (1941) Notes on the biology of the fire ant *Solenopsis geminata* (F.) in Florida and Georgia. *Florida Entomologist* 24, 15–22.

Tremper, B.S. (1976) *Distribution of the Argentine ant*, Iridomyrmex humilis *Mayr, in relation to certain native ants of California: ecological, physiological, and behavioral aspects*. Doctoral dissertation, University of California, Berkeley.

Treseder, K.K., Davidson, D.W., and Ehleringer, J.R. (1995) Absorption of ant-provided carbon dioxide and nitrogen by a tropical epiphyte. *Nature 375*, 137–9.

Tripet, F., and Nonacs, P. (2004) Foraging for work and age-based polyethism: the roles of age and previous experience on task choice in ants. *Ethology 110*, 863–77.

Trunzer, B., Heinze, J., and Hölldobler, B. (1998) Cooperative colony founding and experimental primary polygyny in the ponerine ant *Pachycondyla villosa*. *Insectes Sociaux 45*, 267–76.

Tschinkel, W.R. (1988a) Colony growth and the ontogeny of worker polymorphism in the fire ant *S. invicta*. *Behavioral Ecology and Sociobiology 22*, 103–15.

——(1988b) Distribution of the fire ants *Solenopsis invicta* and *S. geminata* (Hymenoptera: Formicidae) in northern Florida in relation to habitat and disturbance. *Annals of the Entomological Society of America 81*, 76–81.

——(1991) Insect sociometry, a field in search of data. *Insectes Sociaux 38*, 77–82.

——(1993) Sociometry and sociogenesis of colonies of the fire ant *Solenopsis invicta* during one annual cycle. *Ecological Monographs 64*, 425–57.

——(1998) Sociometry and sociogenesis of colonies of the harvester ant, *Pogonomyrmex badius*: worker characteristics in relation to colony size and season. *Insectes Sociaux 45*, 385–410.

——(2002) The natural history of the arboreal ant, *Crematogaster ashmaedi*. *Journal of Insect Science 2*, 12, available online: insectscience.org/2.12.

——(2003) Subterranean ant nests: trace fossils past and future? *Palaeogeography, Palaeoclimatology, Palaeoecology 192*, 321–33.

——(2004) The nest architecture of the Florida harvester ant, *Pogonomyrmex badius*. *Journal of Insect Science 4*, 21, available online: insectscience.org/4.21.

——(2006) *The Fire Ants*. The Belknap Press of Harvard University Press, Cambridge, MA.

——and Howard, D.F. (1983) Colony founding by pleometrosis in the fire ant, *Solenopsis invicta*. *Behavioral Ecology and Sociobiology 12*, 103–13.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Tsuji, K. (1996) Queen-male conflict over sperm use in social insects. *Trends in Ecology and Evolution 11*, 490–1.

Tsutsui, N.D. (2004) Scents of self: the expression component of self/non-self recognition systems. *Annales Zoologici Fennici 41*, 713–27.

——Suarez, A.V., and Grosberg, R.K. (2003) Genetic diversity, asymmetrical aggression, and recognition in a widespread invasive species. *Proceedings of the National Academy of Sciences USA 100*, 1078–83.

————————Holway, D.A., and Case, T.J. (2000) Reduced genetic variation and the success of an invasive species. *Proceedings of the National Academy of Sciences USA 97*, 5948–53.

————————(2001) Relationships among native and introduced populations of the Argentine ant (*Linepithema humile*) and the source of introduced populations. *Molecular Ecology 10*, 2151–61.

Turillazzi, S., Dapporto, L., Pansolli, C., Boulay, R., Dani, F.R., Moneti, G., and Pieraccini, G. (2006) Habitually used hibernation sites of paper wasps are marked with venom and cuticular peptides. *Current Biology 16*, R530–R531.

Turnbull, C.L., and Culver, D.C. (1983) The timing of seed dispersal in *Viola nuttallii*: attraction of dispersers and avoidance of predators. *Oecologia 59*, 360–5.

Ugelvig, L.V., Drijfhout, F.P., Kronauer, D.J.C., Boomsma, J.J., Pedersen, J.S., and Cremer, S. (2008) The introduction history of invasive garden ants in Europe: integrating genetic, chemical and behavioral approaches. *BMC Biology 6*, 11, doi:10.1186/1741-7007-6-11.

UK Biodiversity Action Plan (2007) *Species Action Plan. Red barbed ant, Formica rufibarbis*. http://www.ukbap.org.uk/UKPlans.aspx?ID = 312.

Umphrey, G.J. (2006) Sperm parasitism in ants: selection for interspecific mating and hybridization. *Evolution 87*, 2148–59.

Underwood, A.J. (1986) The analysis of competition by field experiments. In J. Kikkawa, and D.J. Anderson, eds. *Community Ecology: pattern and process*, pp. 240–68. Blackwell Publishing, Melbourne.

Underwood, E.C., and Fisher, B.L. (2006) The role of ants in conservation monitoring: if, when, and how. *Biological Conservation 132*, 166–82.

U.S. Census Bureau, Population Division (2008) World population 1950–2050. http://www.census.gov/ipc/www/idb/worldpopgraph.html.

U.S. Environmental Protection Agency (2000). Pesticide fact sheet: indoxacarb. Office of Prevention, Pesticides, and Toxic Substances. http://www.epa.gov/opprd001/factsheets/indoxacarb.pdf

Valone, T.J., and Kaspari, M. (2005) Interactions between granivorous and omnivorous ants in a desert grassland: results from a long-term experiment. *Ecological Entomology 30*, 116–21.

Van Bael, S.A., Philpott, S.M., Greenberg, R., Bichier, P., Barber, N.A., Mooney, K.A., and Gruner, D.S (2008) Birds as predators in tropical agroforestry systems. *Ecology 89*, 928–934.

van Borm, S., Billen, J., and Boomsma, J.J. (2002) The diversity of microorganisms associated with *Acromyrmex* leafcutter ants. *BMC Evolutionary Biology 2*, 9, doi:10.1186/1471-2148-2-9.

Van Mele, P., and Cuc, N.T.T. (2003) *Ants as Friends: improving your tree crops with weaver ant*. CABI Bioscience, UK.

Van Schagen, J.J., Davis, P.R., and Widmer, M.A. (1994) Ant pests of Western Australia, with particular reference to the Argentine Ant (*Linepithema humile*). In D.F. Williams, ed. *Exotic Ants: biology, impact, and control of introduced species*, pp. 174–80. Westview Press, Boulder, CO.

van Wilgenburg, E., and Elgar, M.A. (2007) Colony structure and spatial distribution of food resources in the polydomous meat ant *Iridomyrmex purpureus*. *Insectes Sociaux 54*, 5–10.

——van Lieshout, E., and Elgar, M.A. (2005) Conflict resolution strategies in meat ants (*Iridomyrmex purpureus*): ritualised displays versus lethal fighting. *Behaviour 142*, 701–16.

——Dang, S., Forti, A.-L., Koumoundouros, T., Ly, A., and Elgar, M. (2007) An absence of aggression between nonnestmates in the bull ant *Myrmecia nigriceps*. *Naturwissenschaften 94*, 787–90.

van Zweden, J.S., Carew, M.E., Henshaw, M.T., Robson, S. K.A., and Crozier, R.H. (2007) Social and genetic structure of a supercolonial weaver ant, *Polyrhachis robsoni*, with dimorphic queens. *Insectes Sociaux 54*, 34–41.

Vander Meer, R.K., and Morel, L. (1998) Nestmate recognition in ants. In R.K. Vander Meer, M.D. Breed, K. Espelie, and M.L. Winston, eds. *Pheromone Communication in Social Insects. Ants, wasps, bees and termites*, pp. 79–103. Westview Press, Boulder, CO.

——Jaffe, K., and Cedeno, A. (1990) *Applied Myrmecology: a world perspective*. Westview Press, Boulder, CO.

Vandermeer, J., and Perfecto, I. (2007) The diverse faces of ecosystem engineers in agroecosystems. In K.M.D. Cuddington, J.E. Byers, A. Hastings, and W.G. Wilson, eds. *Ecosystem Engineers: plants to protists*, pp. 367–86. Elsevier, New York.

——Granzow de la Cerda, I., Boucher, D., Perfecto, I., and Ruiz, J. (2000) Hurricane disturbance and tropical tree species diversity. *Science 290*, 788–91.

Vanderwoude, C., Lobry de Bruyn, L.A., and House, A.P. N. (2000) Response of an open-forest ant community to invasion by the introduced ant, *Pheidole megacephala*. *Austral Ecology 25*, 253–9.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

——Elson Harris, M., Hargreaves, J.R., Harris, E.J., and Plowman, K.P. (2003) An overview of the red imported fire ant (*Solenopsis invicta* Buren) eradication plan for Australia. *Records of the South Australian Museum Monograph Series 7*, 11–6.

Vantaux, A., Dejean, A., Dor, A., and Orivel, J. (2007) Parasitism versus mutualism in the ant-garden parabiosis between *Camponotus femoratus* and *Crematogaster levior*. *Insectes Sociaux 54*, 95–9.

Vasconcelos, H.L. (1999a) Effects of forest disturbance on the structure of ground-foraging ant communities in central Amazonia. *Biodiversity and Conservation 8*, 409–20.

——(1999b) Forest fragmentation in central Amazonia and its effects on litter-dwelling ants. *Biological Conservation 91*, 51–7.

——and Cherrett, J.M. (1997) Leaf-cutting ants and early forest succession in central Amazonia: effects of herbivory on tree seedling establishment. *Journal of Tropical Ecology 13*, 357–70.

——and Fowler, H.G. (1990) Foraging and fungal substrate selection by leaf-cutting ants. In R.K. Vander Meer, K. Jaffé, and A. Cedeño, eds. *Applied Myrmecology: a world perspective*, pp. 410–9. Westview Press, Boulder, CO.

——Carvalho, K.S., and Delabie, J.C. (2001) Landscape modifications and ant communities. In R.O. Bierregaard Jr., C. Gascon, T.E. Lovejoy, and R. Mesquita, eds. *Lessons from Amazonia: the ecology and conservation of a fragmented forest*, pp. 199–207. Yale University Press, New Haven.

——Vilhena, J.M.S., and Caliri, G.J.A. (2000) Responses of ants to selective logging of a central Amazonian forest. *Journal of Applied Ecology 37*, 508–14.

——Vieira-Neto, E.H.M., Mundim, F.M., and Bruna, E.M. (2006) Roads alter the colonization dynamics of a keystone herbivore in neotropical savannas. *Biotropica 38*, 661–5.

Vásquez-Bolaños, M. (2007) Una especie nueva del género *Tetramorium* Mayr (Hymenoptera: Formicidae) de Mascota, Jalisco, México. *Dugesiana 14*(2), 93–7.

Vasquez, G.M., and Silverman, J. (2008) Intraspecific aggression and colony fusion in the Argentine ant. *Animal Behaviour 75*, 583–93.

Veeresh, G.K. (1990) Pest ants of India. In R.K. Vander Meer, K. Jaffe, and A. Cedeno, eds. *Applied Myrmecology: a world perspective*, pp. 15–23. Westview Press, Boulder, CO.

Vega, F.E., and Blackwell, M. (2005) Conclusion: symbioses, biocomplexity, and metagenomes. In F. Vega, and M. Blackwell, eds. *Insect-Fungal Association: ecology and evolution*, pp. 293–5. Oxford University Press, New York.

Vepsäläinen, K., and Pisarski, B. (1982) Assembly of island ant communities. *Annales Zoologici Fennici 19*, 327–35.

——Ikonen, H., and Koivula, M.J. (2008) The structure of ant assemblages in an urban area of Helsinki, southern Finland. *Annales Zoologici Fennici 45*, 109–27.

——Savolainen, R., Tiainen, J., and Vilén, J. (2000) Successional changes of ant assemblages: from virgin and ditched bogs to forests. *Annales Zoologici Fennici 37*, 135–49.

Viana, A.M.M., Frézard, A., Malosse, C., Della Lucia, T.M.C., Errard, C., and Lenoir, A. (2001) Colonial recognition of fungus in the fungus-growing ant *Acromyrmex subterraneus subterraneus* (Hymenoptera: Formicidae). *Chemoecology 11*, 29–36.

Vieira-Neto, E.H.M., Mundim, F.M., and Vasconcelos, H.L. (2006) Hitchhiking behaviour in leaf-cutter ants: an experimental evaluation of three hypotheses. *Insectes Sociaux 53*, 326–32.

Villesen, P., Murakami, T., Schultz, T.R., and Boomsma, J.J. (2002) Identifying the transition between single and multiple mating of queens in fungus-growing ants. *Proceedings of the Royal Society of London B 269*, 1541–8.

Villet, M.H. (1991) Colony foundation in *Plectroctena mandibularis* F. Smith, and the evolution of ergatoid queens in *Plectroctena* (Hymenoptera: Formicidae). *Journal of Natural History 25*, 979–83.

Visscher, P.K. (2007) Group decision-making in nest-site selection among social insects. *Annual Review of Entomology 52*, 255–75.

Visser, D., Wright, M.G., and Giliomee, J.H. (1996) The effect of the Argentine ant, *Linepithema humile* (Mayr) (Hymenoptera: Formicidae), on flower-visiting insects of *Protea nitida* Mill. (Proteaceae). *African Entomology 4*, 285–7.

Vogt, J.T., Rice, S.A., and Armstrong, S.A. (2003) Seed preferences of the red imported fire ant (Hymenoptera: Formicidae) in Oklahoma. *Journal of Entomological Science 38*, 696–698.

——Grantham, R.A., Corbett, E., Rice, S.A., and Wright, R.E. (2002) Dietary habits of *Solenopsis invicta* (Hymenoptera: Formicidae) in four Oklahoma habitats. *Environmental Entomology 31*, 47–53.

Völkl, W., Woodring, J., Fisher, M., Lorenz, M.W., and Hoffmann, K.H. (1999) Ant-aphid mutualisms: the impact of honeydew production and honeydew sugar composition on ant-preferences. *Oecologia 118*, 483–91.

von Humboldt, A. (1808) *Ansichten der natur mit wissenschaftlichen Erlauterungen*. J.G. Cotta, Tubingen, Germany.

Vos, P., Hogers, R., and Bleeker, M., Reijans, M., Van de Lee, T., Hornes, M., Frijters, A., Pot, J., Peleman, J., Kuiper, M., and Zabeau, M. (1995) AFLP: a new

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

technique for DNA fingerprinting. *Nucleic Acids Research 23*, 4407–14.

Wäckers, F.L. (2001) A comparison of nectar- and honeydew sugars with respect to their utilization by the hymenopteran parasitoid *Cotesia glomerata*. *Journal of Insect Physiology 47*, 1077–84.

Wagner, D. (1997) The influence of ant nests on *Acacia* seed production, herbivory and soil nutrients. *Journal of Ecology 85*, 83–93.

——and Gordon, D.M. (1999) Colony age, neighborhood density and reproductive potential in harvester ants. *Oecologia 119*, 175–82.

——and Kay, A. (2002) Do extrafloral nectaries distract ants from visiting flowers? An experimental test of an overlooked hypothesis. *Evolutionary Ecology Research 4*, 293–305.

——and Kurina, L. (2003) The influence of ants and water availability on oviposition behaviour and survivorship of a facultatively ant-tended herbivore. *Ecological Entomology 22*, 352–60.

——Jones, J.B., and Gordon, D.M. (2004) Development of harvester ant colonies alters soil chemistry. *Soil Biology & Biochemistry 36*, 794–804.

——Brown, M.J.F., Broun, P., Cuevas, W., Moses, L.E., Chao, D.L., and Gordon, D.M. (1998) Task-related differences in the cuticular hydrocarbon composition of harvester ants, *Pogonomyrmex barbatus*. *Journal of Chemical Ecology 24*, 2021–2037.

——Tissot, M., Cuevas, W., and Gordon, D.M. (2000) Harvester ants utilize cuticular hydrocarbons in nestmate recognition. *Journal of Chemical Ecology 26*, 2245–57.

Waldman, B. (1987) Mechanisms of kin recognition. *Journal of Theoretical Biology 128*, 159–85.

Walin, L., Seppä, P., and Sundström, L. (2001) Reproductive allocation within a polygyne, polydomous colony of the ant *Myrmica rubra*. *Ecological Entomology 26*, 537–46.

Walker, K.L. (2006) Impact of the little fire ant, *Wasmannia auropunctata*, on native forest ants in Gabon. *Biotropica 38*, 666–73.

Wallace, R. (1855) On the law which has regulated the introduction of new species. *Annals and Magazine of Natural History 16*, 184–96.

Waloff, N., and Blackith, R.E. (1962) The growth and distribution of the mounds of *Lasius-flavus* (Fabricius) (Hym, Formiciade) in Silwood Park, Berkshire. *Journal of Animal Ecology 31*, 421–37.

Walsh, P.D., Henschel, P., Abernethy, K.A., Tutin, C.E.G., Telfer, P., and Lahm, S.A. (2004) Logging speeds little red fire ant invasion of Africa. *Biotropica 36*, 637–41.

Walters, A.C. (2006) Invasion of Argentine ants (Hymenoptera: Formicidae) in South Australia: impacts on community composition and abundance of invertebrates in urban parklands. *Austral Ecology 31*, 567–76.

——and Mackay, D.A. (2003a) An experimental study of the relative humidity preference and survival of the Argentine ant, *Linepithema humile* (Hymenoptera, Formicidae): comparisons with a native *Iridomyrmex* species in South Australia. *Insectes Sociaux 50*, 355–60.

————(2003b) The impact of the Argentine ant, *Linepithema humile* (Mayr) on native ants and other invertebrates in South Australia. *Records of the South Australian Museum Monograph Series 7*, 17–24.

————(2004) Comparisons of upper thermal tolerances between the invasive Argentine ant (Hymenoptera: Formicidae) and two native Australian ant species. *Annals of the Entomological Society of America 97*, 971–5.

————(2005) Importance of large colony size for successful invasion by Argentine ants (Hymenoptera: Formicidae): evidence for biotic resistance by native ants. *Austral Ecology 30*, 395–406.

Walters, C.J., and Holling, C.S. (1990) Large-scale management experiments and learning by doing. *Ecology 71*, 2060–8.

Walther, G.R., Post, E., Convey, P., Menzel, A., Parmesan, C., Beebee, T.J.C., Fromentin, J.M., Hoegh-Guldberg, O., and Bairlein, F. (2002) Ecological responses to recent climate change. *Nature 416*, 389–95.

Wandeler, P., Hoeck, P.E.A., and Keller, L.F. (2007) Back to the future: museum specimens in population genetics. *Trends in Ecology and Evolution 22*, 634–42.

Ward, D.F. (2007a) Modelling the potential geographic distribution of invasive ant species in New Zealand. *Biological Invasions 9*, 723–35.

——and Beggs, J. (2007) Coexistence, habitat patterns and the assembly of ant communities in the Yasawa islands, Fiji. *Acta Oecologica 32*, 215–23.

——and Harris, R.J. (2005) Invasibility of native habitats by Argentine ants, *Linepithema humile*, in New Zealand. *New Zealand Journal of Ecology 29*, 215–9.

——and Wetterer, J.K. (2006) Checklist of the ants of Fiji (Hymenoptera: Formicidae). *British Museum Occasional Papers, Fiji Arthropods III 85*, 23–47.

——Beggs, J.R., Clout, M.N., Harris, R.J., and O'Connor, S. (2006) The diversity and origin of exotic ants arriving in New Zealand via human-mediated dispersal. *Diversity and Distributions 12*, 601–9.

Ward, P.S. (1987) Distribution of the introduced Argentine ant (*Iridomyrmex humilis*) in natural habitats of the lower Sacramento Valley and its effects on the indigenous ant fauna. *Hilgardia 55*(2), 1–16.

——(1990) The endangered ants of Mauritius: doomed like the Dodo? *Notes from the Underground 4*, 3–5.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

——(1991) Phylogenetic analysis of pseudomyrmecine ants associated with domatia-bearing plants. In C.R. Huxley and D.F. Cutler, eds. *Ant-Plant Interactions*, pp. 335–52. Oxford University Press, Oxford.

——(2000) Broad-scale patterns of diversity in leaf litter ant communities. In D. Agosti, J.D. Majer, L.E. Alonso, and T.R. Schultz, eds. *Ants: standard methods for measuring and monitoring biodiversity*, pp. 99–121. Smithsonian Institution Press, Washington, DC.

——(2001) Taxonomy, phylogeny and biogeography of the ant genus *Tetraponera* (Hymenoptera: Formicidae) in the Oriental and Australian regions. *Invertebrate Taxonomy 15*, 589–665.

——(2006) The ant genus *Tetraponera* in the Afrotropical region: synopsis of species groups and revision of the *T. ambigua*-group (Hymenoptera: Formicidae). *Myrmecologische Nachrichten 8*, 119–30.

——(2007b) The ant genus *Leptanilloides*: discovery of the male and evaluation of phylogenetic relationships based on DNA sequence data. *Memoirs of the American Entomological Institute 80*, 637–49.

——(2007c) Phylogeny, classification, and species-level taxonomy of ants (Hymenoptera: Formicidae). *Zootaxa 1668*, 549–63.

——and Brady, S.G. (2003) Phylogeny and biogeography of the ant subfamily Myrmeciinae (Hymenoptera: Formicidae). *Invertebrate Systematics 17*, 361–86.

——and Downie, D.A. (2005) The ant subfamily Pseudomyrmecinae (Hymenoptera: Formicidae): phylogeny and evolution of big-eyed arboreal ants. *Systematic Entomology 30*, 310–35.

——Brady, S.G., Fisher, B.L., and Schultz, T.R. (2009) Phylogeny and biogeography of dolichoderine ants: effects of data partitioning and relict taxa on historical inference. *Systematic Biology*, in press.

Way, M.J. (1963) Mutualism between ants and honeydew-producing Homoptera. *Annual Review of Entomology 8*, 307–44.

——and Khoo, K.C. (1992) Role of ants in pest management. *Annual Review of Entomology 37*, 479–503.

——Javier, G., and Heong, K.L. (2002) The role of ants, especially the fire ant, *Solenopsis geminata* (Hymenoptera: Formicidae), in the biological control of tropical upland rice pests. *Bulletin of Entomological Research 92*, 431–437.

——Cammell, M.E., Paiva, M.R., and Collingwood, C.A. (1997) Distribution and dynamics of the Argentine ant *Linepithema* (*Iridomyrmex*) *humile* (Mayr) in relation to vegetation, soil conditions, topography and native competitor ants in Portugal. *Insectes Sociaux 44*, 415–33.

Webber, B.L., Moog, J., Curtis, A.S.O., and Woodrow, I.E. (2007) The diversity of ant-plant interactions in the rainforest understorey tree, *Ryparosa* (Achariaceae): food bodies, domatia, prostomata, and hemipteran trophobionts. *Botanical Journal of the Linnean Society 154*, 353–71.

Weber, N.A. (1943) The ants of the Imatong Mountains, Anglo-Egyptian Sudan. *Bulletin of the Museum of Comparative Zoology 93*, 263–389.

Weeks, R.D., Wilson, L.T., Vinson, S.B., and James, W.D. (2004) Flow of carbohydrates, lipids, and protein among colonies of polygyne red imported fire ants, *Solenopsis invicta* (Hymenoptera: Formicidae). *Annals of the Entomological Society of America 97*, 105–10.

Wehner, R. (1987) Spatial organization of foraging behavior in individually searching desert ants, *Cataglyphis* (Sahara desert) and *Ocymyrmex* (Namib desert). *Experientia Supplementum 54*, 15–42.

——and Menzel, R. (1969) Homing in the ant *Cataglyphis bicolor*. *Science 164*, 192–4.

Weir, J.T., and Schluter, D. (2007) The latitudinal gradient in recent speciation and extinction rates of birds and mammals. *Science 315*, 1574–6.

Weiser, M., and Kaspari, M. (2006) Ecological morphospace of new world ants. *Ecological Entomology 31*, 131–42.

Weissflog, A. (2001) *Freinestbau von Ameisen (Hymenoptera: Formicidae) in der Kronenregion feuchttropischer Wälder Südostasiens*. Doctoral thesis, J.W. Goethe Universität, Frankfurt.

Wells, S., Pyle, R.M., Collins, N.M, and IUCN (compilers). 1983. *The IUCN Invertebrate Red Data Book*. International Union for Conservation of Nature, Gland, Switzerland.

Wenseleers, T. (2007) Nepotism absent in insect societies – or is it? *Molecular Ecology 16*, 3063–5.

——and Ratnieks, F.L.W. (2006) Comparative analysis of worker reproduction and policing in eusocial Hymenoptera supports relatedness theory. *American Naturalist 168*, E163–79.

——Billen, J., and Hefetz, A. (2002) Territorial marking in the desert ant *Cataglyphis niger*: does it pay to play bourgeois? *Journal of Insect Behavior 15*, 85–93.

Werner, E.E. (1976) Species interactions in freshwater fish communities. In J. Diamond, and T.J. Case, eds. *Community ecology*, pp. 344–57. Harper and Row, New York.

West, G.B., Brown, J.H., and Enquist, B.J. (1999) The fourth dimension of life: fractal geometry and allometric scaling of organisms. *Science 284*, 167–9.

Western Australian Department of Agriculture. (1988) Argentine ant control annual report for the year ending 30 June 1988.

Westoby, M., Hughes, L., and Rice, B.L. (1991b) Seed dispersal by ants; comparing infertile soils with fertile soils. In C.R. Huxley, and D.F. Cutler, eds. *Ant-Plant Interactions*, pp. 434–47 Oxford University Press, Oxford.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Westoby, M., French, K., Hughes, L., Rice, B., and Rodgerson, L. (1991a) Why do more plant species use ants for dispersal on infertile compared with fertile soils? *Australian Journal of Ecology 16*, 445–55.

Wetterer, J.K. (1995) Forager size and ecology of *Acromyrmex coronatus* and other leaf-cutting ants in Costa Rica. *Oecologia 104*, 409–15.

——(2002) Ants of Tonga. *Pacific Science 56*, 125–35.

——(2006) The vanished plague ants (Hymenoptera: Formicidae) of 19th century Bermuda. *Myrmecologische Nachrichten 8*, 219–24.

——(2007) Biology and impacts of Pacific Island invasive species. 3. The African big-headed ant, *Pheidole megacephala* (Hymenoptera: Formicidae). *Pacific Science 61*, 437–56.

——and Porter, S.D. (2003) The little fire ant, *Wasmannia auropunctata*: distribution, impact, and control. *Sociobiology 42*, 1–41.

——and Wetterer, A.L. (2003) Ants (Hymenoptera: Formicidae) on non-native neotropical ant-acacias (Fabales: Fabaceae) in Florida. *Florida Entomologist 86*, 460–3.

————(2006) A disjunct Argentine ant metacolony in Macaronesia and southwestern Europe. *Biological Invasions 8*, 1123–9.

——Miller, S.E., and Wheeler, D.E. (1999) Ecological dominance by *Paratrechina longicornis* (Hymenoptera: Formicidae), an invasive tramp ant, in Biosphere 2. *Florida Entomologist 82*, 381–8.

——Wood, L.D., Johnson, C., Krahe, H., and Fitchett, S. (2007) predacious ants, beach replenishment, and nest placement by sea turtles. *Environmental Entomology 36*, 1084–91.

——Espadaler, X., Wetterer, A.L., Aguin-Pombo, D., and Franquinho-Aguiar, A.M. (2006) Long-term impact of exotic ants on the native ants of Madeira. *Ecological Entomology 31*, 358–68.

Wheeler, D.E (1996) The role of nourishment in oogenesis. *Annual Review of Entomology 41*, 407–31.

——(1994) Nourishment in ants: patterns in individuals and societies. In J.H. Hunt, and C.A. Nalepa, eds. *Nourishment and Evolution in Insect Societies*, pp. 245–78. Westview Press, Boulder, CO.

——and Martínez, T. (1995) Storage proteins in ants (Hymenoptera: Formicidae). *Journal of Comparative Biochemistry and Physiology B 112*, 15–9.

Wheeler, W.M. (1908) A European ant (*Myrmica levinodis*) introduced into Massachusetts. *Journal of Economic Entomology 1*, 337–9.

——(1910) *Ants*. Columbia University Press, New York.

White, T.C.R. (1993) *The Inadequate Environment: nitrogen and the abundance of animals*. Springer, New York.

White, W.H., Reagan, T.E., Smith Jr., J.W., and Salazar, J.A. (2004) Refuge releases of *Cotesia flavipes* (Hymenoptera: Braconidae) into the Louisiana sugarcane ecosystem. *Environmental Entomology 33*, 627–32.

Whitehouse, M.E.A., and Jaffe, K. (1996) Ant wars: combat strategies, territory and nest defence in the leaf-cutting ant *Atta laevigata*. *Animal Behaviour 51*, 1207–17.

Wiens, J.A. (1989) Spatial scaling in ecology. *Functional Ecology 3*, 385–97.

Wiens, J.J., and Graham, C.H. (2005) Niche conservatism: integrating evolution, ecology, and conservation biology. *Annual Review of Ecology Evolution and Systematics 36*, 519–39.

Wiernasz, D.C., and Cole, B.J. (1995) Spatial-distribution of *Pogonomyrmex occidentalis* recruitment, mortality and overdispersion. *Journal of Animal Ecology 64*, *36*, 519–27.

————(2003) Queen size mediates queen survival and colony fitness in harvester ants. *Evolution 57*, 2179–83.

——Perroni, C.L., and Cole, B.J. (2004) Polyandry and fitness in the western harvester ant, *Pogonomyrmex occidentalis*. *Molecular Ecology 13*, 1601–6.

Wild, A.L. (2005) Observations on larval cannibalism and other behaviors in a captive colony of *Amblyopone oregonensis*. *Notes from the Underground 11(1)*, 9.

Wild, A.L. (2007a). A catalogue of the ants of Paraguay. *Zootaxa 1622*, 1–55.

——(2007b) Taxonomic revision of the ant genus *Linepithema* (Hymenoptera: Formicidae). *University of California Publications in Entomology 126*, 1–151 http://repositories.cdlib.org/ucpress/ucpe/vol_126.

——(2009) Evolution of the Neotropical ant genus *Linepithema*. *Systematic Entomology 34*, 49–62.

Wilkinson, E.B., and Feener, D.H. (2007) Habitat complexity modifies ant-parasitoid interactions: implications for community dynamics and the role of disturbance. *Oecologia 152*, 151–61.

Williams, D.F. (1983) The development of toxic baits for the control of the imported fire ant. *Florida Entomologist 66*, 162–72.

——(1994) *Exotic Ants: biology, impact, and control of introduced species*. Westview Press, Boulder, CO.

——and Vail, K.M. (1994) Control of a natural infestation of the pharaoh ant (Hymenoptera: Formicidae) with a corn grit bait of fenoxycarb. *Journal of Economic Entomology 87*, 108–15.

——Collins, H.L., and Oi, D.H. (2001) The red imported fire ant (Hymenoptera: Formicidae): an historical perspective of treatment programs and the development of chemical baits for control. *American Entomologist 47*, 146–59.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

——Knue, G.J., Becnel, J.J. (1998) Discovery of *Thelohania solenopsae* from the red imported fire ant, *Solenopsis invicta*, in the United States. *Journal of Invertebrate Pathology 71*, 175–6.

——Oi, D.H., and Knue, G.J. (1999) Infection of red imported fire ant (Hymenoptera: Formicidae) colonies with the entomopathogen *Thelohania solenopsae* (Microsporidia: Thelohaniidae). *Journal of Economic Entomology 92*, 830–6.

——Lofgren, C.S., Banks, W.A., Stringer, W.A., and Plumley, J.K. (1980) Laboratory studies with 9 amidinohydrazones, a promising new class of bait toxicants for control of the red imported fire ants (Hymenopera: Formicidae). *Journal of Economic Entomology 73*, 798–802.

Williamson, M. (1996) *Biological Invasions*. Chapman & Hall, London.

Willig, M.R., and Lyons, S.K. (1998) An analytical model of latitudinal gradients of species richness with an empirical test for marsupials and bats in the New World. *Oikos 81*, 93–8.

——Kaufman, D.M., and Stevens, R.D. (2003) Latitudinal gradients of biodiversity: pattern, process, scale, and synthesis. *Annual Review of Ecology Evolution and Systematics 34*, 273–309.

Willmer, P.G., and Stone, G.N. (1997) How aggressive ant-guards assist seed-set in *Acacia* flowers. *Nature 388*, 165–7.

Wilson, D.S., and Wilson, E.O. (2007) Rethinking the theoretical foundation of sociobiology. *Quarterly Review of Biology 82*, 327–48.

Wilson, E.O. (1951) Variation and adaptation in the imported fire ant. *Evolution 5*, 68–79.

——(1959) Adaptive shift and dispersal in a tropical ant fauna. *Evolution 13*, 122–44.

——(1961) The nature of the taxon cycle in the Melanesian ant fauna. *American Naturalist 95*, 169–93.

——(1971) *The Insect Societies*. The Belknap Press of Harvard University Press, Cambridge, MA.

——(1976) The organization of colony defense in the ant *Pheidole dentata* Mayr (Hymenoptera: Formicidae). *Behavioral Ecology and Sociobiology 1*, 63–81.

——(1980) Caste and division of labor in leaf-cutter ants: I. The overall pattern in *Atta sexdens*. *Behavioral Ecology and Sociobiology 7*, 143–56.

——(1983) Caste and division of labor in leaf-cutter ants (Hymenoptera: Formicidae: *Atta*) IV. Colony ontogeny of *A. cephalotes*. *Behavioral Ecology and Sociobiology 14*, 55–60.

——(1984) Tropical social parasites in the ant genus *Pheidole*, with an analysis of the anatomical parasitic syndrome (Hymenoptera: Formicidae). *Insectes Sociaux 31*, 316–34.

——(1987a) Causes of ecological success: the case of ants. *Journal of Animal Ecology 56*, 1–9.

——(1987b) The little things that run the world (The importance and conservation of invertebrates). *Conservation Biology 1*, 344–6.

——(1988) The biogeography of the West Indian Ants (Hymenoptera: Formicidae). In J.K. Liebherr, ed. *Zoogeography of Caribbean Insects*, pp. 214–30. Cornell University Press, Ithaca.

——(2003) Pheidole *in the New World. A dominant, hyperdiverse ant genus*. Harvard University Press, Cambridge, MA.

——(2005) Early ant plagues in the New World. *Nature 433*, 32.

——(2006) *The Creation*. W.W. Norton and Company, New York.

——and Hölldobler, B. (2005) The rise of the ants: a phylogenetic and ecological explanation. *Proceedings of the National Academy of Sciences USA 102*, 7411–4.

Wilson, E.O., Carpenter, F.M., and Brown Jr., W.L., (1967) The first Mesozoic ants, with the description of a new subfamily. *Psyche (Cambridge) 74*, 1–19.

Wilson, E.O., Eisner, T., Wheeler, G.C., and Wheeler, J. (1956) *Aneuretus simoni* Emery, a major link in ant evolution. *Bulletin of the Museum of Comparative Zoology 115*, 81–99.

Wimp, G.M., and Whitham, T.G. (2001) Biodiversity consequences of predation and host plant hybridization on an aphid-ant mutualism. *Ecology 82*, 440–52.

Winter, U., and Buschinger, A. (1986) Genetically mediated queen polymorphism and caste determination in the slave-making ant, *Harpagoxenus sublaevis* (Hymenoptera: Formicidae). *Entomologia Generalis 11*, 125–37.

Wirth, R., Herz, H., Ryel, R.J., Beyschlag, W., and Hölldobler, B. (2003) *Herbivory of Leaf-Cutting Ants: a case study on* Atta colombica *in the tropical rainforest*. Springer-Verlag, Heidelberg.

Witt, A.B.R., and Giliomee, J.H. (1999) Soil-surface temperatures at which six species of ants (Hymenoptera: Formicidae) are active. *African Entomology 7*, 161–4.

——(2005) Dispersal of elaiosome-bearing seeds of six plant species by native species of ants and the introduced invasive ant, *Linepithema humile* (Mayr) (Hymenoptera: Formicidae) in the Western Cape Province, South Africa. *African Plant Protection 11*, 1–7.

Witte, V., and Maschwitz, U. (2008) Mushroom harvesting ants in the tropical rain forest. *Naturwissenschaften 95*, 1049–54.

Wittlinger, M., Wehner, R., and Wolf, H. (2006) The ant odometer: stepping on stilts and stumps. *Science 312*, 1965–7.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Wittlinger, M., Wehner, R., and Wolf, H. Wehner, R., and Wolf, H. (2007) The desert ant odometer: a stride integrator that accounts for stride length and walking speed. *Journal of Experimental Biology 210*, 198–207.

Wojcik, D.P., and Porter, S.D. (2008) FORMIS: a master bibliography of ant literature. USDA-ARS, CMAVE, Gainesville, FL (http://fm.cits.fcla.edu/cgi-bin/wlv4/DBFM)

——Smittle, B.J., and Cromroy, H.L. (1991) Fire ant myrmecophiles: feeding relationships of *Martinezia dutertrei* and *Euparia castanea* (Coleoptera: Scarabaeidae) with their host ants, *Solenopsis* spp. (Hymenoptera: Formicidae). *Insectes Sociaux 38*, 273–81.

Woodd-Walker, R.S., Ward, P., and Clarke, A. (2002) Large-scale patterns in diversity and community structure of surface water copepods from the Atlantic Ocean. *Marine Ecology Progress Series 236*, 189–203.

Worm, B., Lotze, H.K., Hillebrand, H., Sommer, U. (2002) Consumer versus resource control of species diversity and ecosystem functioning. *Nature 417*, 848–51.

Woyciechowski, M., and Kozlowski, J. (1998) Division of labor by division of risk according to worker life expectancy in the honey bee (*Apis mellifera* L.). *Apidologie 29*, 191–205.

Wright, D.H. (1983) Species-energy theory: an extension of species-area theory. *Oikos 41*, 496.

Wuellner, C.T., and Saunders, J.B. (2003) Circadian and circannual patterns of activity and territory shifts: comparing a native ant (*Solenopsis geminata*, Hymenoptera: Formicidae) with its exotic, invasive congener (*S. invicta*) and its parasitoids (*Pseudacteon* spp., Diptera: Phoridae) at a central Texas site. *Annals of the Entomological Society of America 96*, 54–60.

Wyatt, T.D. (2003) *Pheromones and Animal Behaviour*. Cambridge University Press, Cambridge.

Wyckhuys, K.A.G., and O'Neil, R.J. (2007) Influence of extra-field characteristics to abundance of key natural enemies of *Spodoptera frugiperda* Smith (Lepidoptera: Noctuidae) in subsistence maize production. *International Journal of Pest Management 53*, 89–99.

Wynalda, R.A. (2008) *Nutrient regulation of an exotic, unidentified* Paratrechina *sp. (Hymenoptera: Formicidae) found in Texas*. Master of Science thesis, Texas A&M University, College Station.

Xiong, Y., Chen, J-D., Gu, X-Y., Wu, X-H., Wan, F-H., and Hong, X-Y. (2008) The potential suitability of Jiangsu Province, east China for the invasive red imported fire ant. *Solenopsis invicta. Biological Invasions 10*, 475–81.

Xu, Z.H. (2003) A systematic study on Chinese species of the ant genus *Oligomyrmex* Mayr (Hymenoptera: Formicidae). *Acta Zootaxonomica Sinica 28*, 310–22.

——and Chai, Z.Q. (2004) Systematic study on the ant genus *Tetraponera* F. Smith (Hymenoptera: Formicidae) of China. *Acta Zootaxonomica Sinica 29*, 63–76.

——and Zhou, X.G. (2004) Systematic study on the ant genus *Pyramica* Roger (Hymenoptera, Formicidae) of China. *Acta Zootaxonomica Sinica 29*, 440–50.

Yamaguchi, T. (1995) Intraspecific competition through food robbing in the harvester ant, *Messor aciculatus* (Fr Smith), and its consequences on colony survival. *Insectes Sociaux 42*, 89–101.

——(2004) Influence of urbanization on ant distribution in parks of Tokyo and Chiba City, Japan I. Analysis of ant species richness. *Ecological Research 19*, 209–16.

Yamauchi, K., Furukawa, T., Kinomura, K., Takamine, H., and Tsuji, K. (1991) Secondary polygyny by inbred wingless sexuals in the dolichoderine ant *Technomyrmex albipes*. *Behavioral Ecology and Sociobiology 29*, 313–319.

Yang, A.S. (2006) Seasonality, division of labor, and dynamics of colony-level nutrient storage in the ant *Pheidole morrisi*. *Insectes Sociaux 53*, 456–62.

Yanoviak, S.P., and Dudley, R. (2006) The role of visual cues in directed aerial descent of *Cephalotes atratus* workers (Hymenoptera: Formicidae). *Journal of Experimental Biology 209*, 1777–83.

————and Kaspari, M. (2005) Directed aerial descent in canopy ants. *Nature 433*, 624–6.

——Fisher, B.A., and Alonso, A. (2008a) Directed aerial descent behaviour in African canopy ants (Hymenoptera: Formicidae). *Journal of Insect Behaviour 21*, 164–71.

——Kaspari, M., Dudley, R., and Poinar Jr., G. (2008b) Parasite-induced fruit mimicry in a tropical canopy ant. *American Naturalist 171*, 536–44.

Yao, I., Shibao, H., and Akimato, S. (2000) Costs and benefits of ant attendance to the drepanosiphid aphid *Tuberculatus quercicola*. *Oikos 89*, 3–10.

Ydenberg, R., and Schmid-Hempel, P. (1994) Modelling social insect foraging. *Trends in Ecology and Evolution 9*, 491–3.

Yéo, K., Molet, M., and Peeters, C. (2006) When David and Goliath share a home: compound nesting of *Pyramica* and *Platythyrea* ants. *Insectes Sociaux 53*, 435–8.

Yoshimura, M., and Fisher, B.L. (2007) A revision of male ants of Madagascar (Hymenoptera: Formicidae): key to subfamilies and treatment of the genera of Ponerinae. *Zootaxa 1654*, 21–40.

Young, A.M., and Hermann, H.R. (1980) Notes on foraging of the giant tropical ant *Paraponera clavata* (Hymenoptera: Formicidae: Ponerinae). *Journal of the Kansas Entomological Society 53*, 35–55.

Youngsteadt, E., Nojima, S., Häberlein, C., Schulz, S., and Schal, C. (2008) Seed odor mediates an obligate ant—plant mutualism in Amazonian rainforests. *Proceedings of the National Academy of Sciences USA 105*, 4571–5.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

Yu, D.W., and Pierce, N.E. (1998) A castration parasite of an ant-plant mutualism. *Proceedings of the Royal Society of London B 265*, 375–81.

Zapata, F.A., Gaston, K.J., and Chown, S.L. (2003) Mid-domain models of species richness gradients: assumptions, methods and evidence. *Journal of Animal Ecology 72*, 677–90.

————————(2005) The mid-domain effect revisited. *American Naturalist 166*, E144–8.

Zappalà, L., Hoy, M.A., and Cave, R.D. (2007) Interactions between the red imported fire ant, the citrus leafminer, and its parasitoid *Ageniaspis citricola* (Hymenoptera: Encyrtidae): laboratory and field evaluations. *Biocontrol Science and Technology 17*, 353–63.

Zavaleta, E.S., and Royval, J.L. (2002) Climate change and the susceptibility of U.S. ecosystems to biological invasions: two cases of expected range expansion. In S.H. Schneider, and T.L. Root, eds. *Wildlife Responses to Climate Change: North American case studies*, pp. 277–341. Island Press, Washington, DC.

Zayed, A., and Packer, L. (2005) Complementary sex determination substantially increases extinction proneness of haplodiploid populations. *Proceedings of the National Academy of Sciences USA 102*, 10742–6.

Zee, J., and Holway, D. (2006) Nest raiding by the invasive Argentine ant on colonies of the harvester ant, *Pogonomyrmex subnitidus*. *Insectes Sociaux 53*, 161–7.

Zelikova, T.J., Dunn, R.R., and Sanders, N.J. (2008) Variation in seed dispersal along an elevational gradient in Great Smoky Mountains National Park. *Acta Oecologica 34*, 155–62.

Zenner-Polania, I. (1994) Impact of *Paratrechina fulva* on other ant species. In D.F. Williams, ed. *Exotic Ants: biology, impact, and control of introduced species*, pp. 121–32. Westview Press, Boulder, CO.

Zera, A.J., and Denno, R.F. (1997) Physiology and ecology of dispersal polymorphism in insects. *Annual Review of Entomology 42*, 207–30.

Zettel, H. (2006) On the ants (Hymenoptera: Formicidae) of the Philippine Islands: I. The genus *Pristomyrmex* Mayr, 1866. *Myrmecologische Nachrichten 8*, 59–68.

Zettler, J.A., Spira, T.P., and Allen, C.R. (2001) Ant-seed mutualisms: can red imported fire ants sour the relationship? *Biological Conservation 101*, 249–53.

——Taylor, M.D., Allen, C.R., and Spira, T.P. (2004) Consequences of forest clear-cuts for native and nonindigenous ants (Hymenoptera: Formicidae). *Annals of the Entomological Society of America 97*, 513–8.

Zhou, H., Chen, J., and Chen, F. (2007) Ant-mediated seed dispersal contributes to the local spatial pattern and genetic structure of *Globba lancangensis* (Zingiberaceae). *Journal of Heredity 98*, 317–24.

Zhou, S.Y., and Xu, Z.H. (2003) Taxonomic study on Chinese members of the ant genus *Strumigenys* F. Smith (Hymenoptera: Formicidae) from the mainland of China. *Acta Zootaxonomica Sinica 28*, 737–40.

——Zhao, S., and Jia, F. (2006) A taxonomic study on the ant genus *Pheidologeton* Mayr (Hymenoptera, Formicidae, Myrmicinae) from China. *Acta Zootaxonomica Sinica 31*, 870–3.

——and Huang, J. (2006) Two new species of the ant genus *Perissomyrmex* Smith (Hymenoptera: Formicidae) from China. *Entomological News 117*, 189–96.

Zimmerman, E.C. (1970) Adaptive radiation in Hawaii with special reference to insects. *Biotropica 2*, 32–8.

Zinck, L., Hora, R.R., Châline, N., and Jaisson, P. (2008) Nestmate recognition in the polydomous and facultative polygynous ant *Ectatomma tuberculatum*. *Entomologia Experimentalis et Applicata 126*, 211–6.

Zoebelein, G. (1956) Der Honigtau als Nahrung der Insekten, Teil I. *Zeitschrift für Angewandte Entomologie 38*, 369–416.

Zoological Society of London. (2007) *ZSL to mount 'operation red ant'*. http://www.zsl.org/zsl-london-zoo/news/zsl-to-mount-operation-red-ant,338,NS.html.

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207

This page intentionally left blank

© Lach, Lori; Parr, Catherine; Abbott, Kirsti, Dec 03, 2009, Ant Ecology
OUP Oxford, Oxford, ISBN: 9780191574207