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Vol. 11 / 2013 / Issue #2

The Conservation Behaviorist

Social Behavior and Conservation

What social spiders can tell us about extinction

p2

Investing in the Future

An interview with the 2013 E.O. Wilson award winner Dara Williams

p3

Conservation Behavior Workshop

Summary and Update

p5

Grazing and Land Management

An interview with conservation biologists on Grazing to manage invasives

p5

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Created in 1997, the Conservation Committee aims to encourage ABS members to participate in research programs addressing the interface between animal behavior and conservation science. By identifying and evaluating the areas in which behavioral research has contributed to conservation, as well as the fields that need development, the Committee seeks to generate discussion and promote studies in behavior and conservation.

Upcoming events and programs

Do you have some research on Behavior Conservation that you want to present? Here is a list of meetings you might consider:

51st Annual Meeting of the Animal Behavior Society at Princeton University 9-14 August 2014. Check the ABS website www.animalbehaviorsociety.org for details

Ecology and Behavior 10th annual meeting in Montpellier (France) 12-16 May 2014. Abstract Submission Deadline January 15, 2014, see eb2014.sciencesconf.org for details

The XV Congress of the International Society for Behavioral Ecology at New York University July 31 to August 5, 2014. Abstract Submission Deadline February 28, 2014, see www.isbe2014.com for details

International Marine Conservation Congress in Glasgow, Scotland August 14-19, 2014. Call for abstracts will open 25 January 2014, see www.conbio.org/minisites/imcc-2014 for details

Joint meeting July 8-12 at the University of Illinois Urbana-Champaign
International Society of Chemical Ecology:
<http://www.chemecol.org/annualmeeting.shtml>
Chemical Signals in Vertebrates 13: <http://www.wku.edu/csiv/>

What Social Spiders Can Tell Us About Extinction

By: Jonathan Pruitt, Assistant Professor of Biological Sciences at the University of Pittsburgh

When one considers the topic of extinction, one typically thinks of massive biodiversity loss as a result of humans or catastrophic geological events, like the demise of the dinosaurs. Yet, in truth, extinction is just one of the inevitable elements of life. It's generic. And, it is a process that we know comparatively little about. Take to Google scholar for a moment. A mere 38 scholars have listed *extinction* among their research interests. Yet, it's opposing sister process, speciation, has a more respectable 214 scholars. The disparity might make sense for any number of reasons but, in my view, it has two drivers: (i) extinction depresses people; and (ii) it's difficult to study because it's hard to study something that has already gone, or will soon go, extinct. As a result, our understanding of the ecology behind extinction or how key functional traits (like behavior) shape lineages' susceptibility is very shallow.

Social spiders are, by most metrics, evolutionary losers. Unlike social insects, social spiders have not taken over the globe. No, instead, social spiders boast a mere 25 species of the 42,000 known species of spider. Social spiders occupy a relatively narrow range of delicate habitats concentrated around the equator and, for various unknown reasons, their individual colonies and entire subpopulations are extraordinarily susceptible to extinction. From the spiders' perspective, this can't be good. But, if one were interested in exploring the drivers of extinction, there might be no more ideal system to study.



Fig. 1. A group of freshly marked social species in the process of making a new experimental colony (Photo J. Pruitt)



Fig. 2. Jonathan N. Pruitt at one of his riparian study sites at Ranamafana Madagascar. (Photo N. Keiser)

I study animal personality and how the mixture of trait variants within social groups influences their performance. In particular, I use a combination of long-term field experiments and individual-level behavioral assays to explore how colonies and entire lineages of colonies go extinct. Social spiders in genus *Anelosimus* exhibit a remarkable, discrete behavioral polymorphism where colony members can be categorized into a discrete “docile” or “aggressive” behavioral type, and the mixture of these trait types within groups shapes their growth rate, proliferation rate, and extinction risk. In particular, lineages dominated by docile individuals grow at a rate 4x faster than that of rival lineages, but they also do not engage in defensive behavior. Thus, docile lineages are also more susceptible to infiltration by social parasites. More than 50 other species of spider make their homes in social spider colonies, and docile lineages sequester these parasites at rate 5x that of aggressive lineages. In fact, if docile lineages are left undisturbed without aggressive immigrants, they experience a 95% extinction rate within a three generation period. This is a powerful result for three reasons: (i) it demonstrates how subtle variation in behavior can shape the rise and fall of entire social lineages; (ii) it implicates a specific ecological driver of lineage demise (social parasites) and this driver can be manipulated; and (iii) entire lineages experience a familiar growth/survivorship trade-offs that is commonly experienced by individual organisms: some lineages grow quickly but are more susceptible to demise (docile lineages), while others grow slowly but enjoy higher survivorship (aggressive lineages).

Where next? Population ecology provides us with tons of cool hypotheses. In particular, I'm interested in how gene flow from aggressive to docile lineages (and vice versa) influences susceptibility to extinction. Can docile lineages be saved by aggressive immigrants? How many will it take? How late in the extinction process can they arrive? I'm also interested in how lineages' dispersion across a landscape influences waves of extinction. Can a break in a lineage's distribution slow or halt a wave of colony die offs? Hard to say. What I find most exciting about this sort of research is that I never thought I would be asking these sorts of questions. When I set up my initial experiments I was interested in a completely different series of questions. Now, only after being blindsided by cool results, have I come to think of my work in a conservation-relevant framework. But, I suppose that's the coolest thing about science-- the natural world isn't merely limited by what we can imagine a priori. Thank goodness.

To read more about Jonathan Pruitt's research see the following recent references:

References

1. McDermott D*, Chips M*, McGuirk M*, Armagost F*, DiRienzo N, **Pruitt JN** (*in press*) Boldness is Influenced by sub-lethal interactions with predators and is associated with successful harem infiltration. *Behavioral Ecology and Sociobiology*.
2. Keiser CN, **Pruitt JN** (2013) The aggressiveness of host spiders and their inquilines jointly determine the bidirectional fitness consequences of their interactions. *Behavioral Ecology*.
3. **Pruitt JN**, Keiser CN (2013) The aggressive spillover hypothesis: existing ailments and potential remedies. *Ethology*.
4. Grinsted L, **Pruitt JN**, Settepani V, Bilde T (2013) Individual personalities drive task differentiation in a social spider. *Proceedings of the Royal Society of London Series B*.
5. **Pruitt JN**, Grinsted L, Settepani V (2013) Linking levels of personality: personalities of average and extreme group members shape colony-level personality. *Animal Behaviour*.
6. Sweeney K*, Cusack B, Armagost F*, O'Brian T*, Kesier CN, **Pruitt JN** (2013) Predator and prey activity levels jointly influence the outcome of long-term foraging bouts. *Behavioral Ecology* 24:1205-1210.
7. DiRienzo N, **Pruitt JN**, Hedrick AV (2013) Combined behavioral tendencies of predator and prey mediate the outcome of their interaction. *Animal Behaviour* 86:317-322.
8. **Pruitt JN** (2013) A real-time eco-evolutionary dead-end strategy is mediated by the traits of lineage progenitors and interactions with colony invaders. *Ecology Letters* 16:879-886.
9. Jandt JM, Bengston S, Pinter-Wollman N, **Pruitt JN**, Raine NE, Dornhaus A, Sih A (2013) Behavioral syndromes and social insects: personality at multiple levels. *Biological Reviews*.

DARA ADAMS, OHIO STATE UNIVERSITY RECEIVES 2013 E.O. WILSON CONSERVATION AWARD

"I was overjoyed when I checked my email and discovered I had received funding from Animal Behavior Society and I was even more excited to discover I received the E.O. Wilson award—what an honor to receive an award named after one of the most prominent pioneers of biodiversity conservation!," said Adams on learning that the ABS grant committee chose to fund her proposal "Predation risk and alarm calling behavior in Peruvian bald-faced Saki monkeys (*Pithecia irrorata*): An experimental approach". She received the 2013 E.O. Wilson Student Research Grant for Conservation.

Adam's study will examine predator prey dynamics between Saki monkeys and their feline and hawk predators in the neotropics.

"Dara is working in one of few habitats that still have functioning populations of big cats and hawk predators as well as large prey species, says advisor Dawn Kitchen, Associate Professor of Anthropology at Ohio State. "Often the movement patterns and

ability to utilize cover by both these groups of animals is limited due to the encroachment of humans and their settlements. Dara's work will help determine how much this kind of limitation actually affects the movement and daily time budgets of these two groups of animals".

"I am so thrilled that Dara is working with me, together we are constantly getting excited about scientific questions and possibilities and I learn as much from her as I teach. I have known Dara and her work before she even became my student. Our first meeting was at a National meeting (American Association of Physical Anthropologists) where as a graduate student just earning her Master's degree, Dara was presenting her work on alarm calls in Saki monkeys. I was very impressed not just with her project but also with her ability to convey the information and her plans for the future. I then took her on as a PhD student. Dara led a team of researchers for two quarters in Mexico without me and the data she collected was impeccable. She is a bright and engaging academic and an impressive teacher, who has a true concern not only for the animals and habitats that she works in, but also the people that live near or with these animals. I believe she will make a huge impact not only through her scholarship, but also at a local level, teaching people about conservation and sustainability."



Adult bald-faced Saki monkey
(Photo D. Adams)



Dara Adams observing Saki monkeys during a focal follow
(Photo G. Ulmer)

Camera trap image of a jaguar
(Photo D. Adams)

The Conservation Behaviorist talked with Dara Adams about the E.O. Wilson Conservation Award:

CB: What was your immediate reaction to receiving the E.O. Wilson award?

DA: I was overjoyed when I checked my email and discovered I had received funding from Animal Behavior Society and I was even more excited to discover I received the E.O. Wilson award—what an honor to receive an award named after one of the most prominent pioneers of biodiversity conservation! The E.O. Wilson award was also the first funding I received for my dissertation project, which gave me renewed motivation and recognition to secure additional funding.

CB: What do you think about the award? Will it encourage students to present more proposals with conservation content?

DA: It is challenging to obtain funding for behavioral research that contains a conservation element. The few conservation-earmarked funds available seem to preference purely applied projects while the behavioral funds often exclude conservation-oriented projects for being too applied. The E.O. Wilson award provides a unique opportunity to graduate students pursuing research that intersects conservation and behavior. I unequivocally think this award will encourage graduate students in animal behavior to think more critically about how their research can address specific conservation issues.

CB: How do you see your research contributing to the conservation of neotropical primates?

DA: Most predation research on primates has been confined to Old World species and particularly terrestrial primates. Among neotropical primates, much of what we know about predation stems comes from anecdotal reports and inferred predation rates. There is also a particular focus on raptor species because evidence of predation by felids is severely lacking. This absence of evidence may be in part due to challenges of studying highly elusive ambush predators such as felids. Nevertheless, many researchers have pointed out that the perceived threat of predation may be as important—if not more—than actual predation events. Much of the focus on conservation of neotropical primates concentrates on habitat variables such as food availability, food quality, etc. and less recognition has been given to the role predation plays in constituting a healthy ecosystem for primates. Thus I see my research contributing to the conservation of neotropical primates by elucidating the intricacies of this primate predator-prey system and the variation in behavioral responses to predation risk that occurs across primate species.

CB: Do you view your research on predator-prey dynamics as having a conservation application in other systems?

DA: Indeed, I do. An understanding of how both predators and prey influence each other and are regulated in ecosystems is essential to wildlife management and species conservation. Research on predator-prey systems tends to primarily focus on prey, which limits our understanding of the role predators play in ecosystems. Conducting field research in a natural system where both predators and primates occur at high densities affords me the opportunity to study complex dynamics between both predators and prey. My

research examines how felid predators use resources over space and time, which sheds light on primate behavioral variation. These temporal and spatial variables play a role in other prey-predator systems across the trophic levels. It is my hope to contribute hypotheses that are not limited only to primate-felid dynamics, but can also address other systems, and in doing so, deepen our understanding of these dynamics more broadly across taxa. In addition to examining prey response to predator behavior, I also utilize playback experiments to better understand how primate anti-predator responses (namely alarm calling and mobbing behaviors) influence predator behavior. Predator-prey dynamics are complex and we need to have a better understanding of them to make appropriate conservation management decisions.

CB: How did you become interested in risk perception and anti-predator strategies?

DA: I first became interested in risk perception and anti-predator strategies while I was in the field conducting my master's research on bald-faced Saki monkey vocal communication. One day in the field, I witnessed a jaguarundi walking across a fallen tree near the group of Sakis I had been following all morning. Just as I noticed the cat, the Sakis started alarm calling and the entire group began to approach the jaguarundi, which quickly fled the vicinity. The Sakis followed the jaguarundi for several minutes and emitted alarm calls throughout the entire pursuit. This experience spurred a flurry of questions about the behavior of both the Sakis and the jaguarundi. Why did the Sakis pursue the cat rather than flee? Why did they continue to alarm call well after the jaguarundi was gone? And how did these behaviors affect the jaguarundi's response?

After returning from the field, I began perusing the literature on risk perception and anti-predator behaviors. I discovered that while behavioral decisions made under the risk of predation have been a major area of interest in behavioral ecology, this area of research has only recently been explored in the field of primatology. I also discovered that data on predator-prey interactions are biased toward prey and little is known about predator behavior. It was at this point that I began working closely with my advisor to develop research questions that promote a more holistic view of predator-prey dynamics by incorporating the perspective of both primates and their predators.

CB: How do you see yourself in the future? Academic work? Conservation-oriented work?

DA: I am passionate about both research and teaching. I see myself remaining in academia while continuing to pursue behavioral research questions with conservation relevance. I plan to use my research on primate predator-prey dynamics as a classroom tool to show future students the value of integrating conservation and behavior. It is also my hope that through this type of research, I will become actively involved with management planning initiatives at the local level in the Amazonian region where I conduct research.

The E.O. Wilson Award

The ABS student research grant program has changed in 2013. The grant site now opens in September with the next deadline in November of 2014.

The Edward O. Wilson Conservation Award seeks to encourage graduate students of animal behavior to participate in meaningful conservation-related research. This single award of up to US \$2000 is given in recognition of a research proposal considered meritorious for its integration of behavior and conservation. E. O. Wilson, professor at Harvard University, who in 2002 received the ABS Distinguished Animal Behaviorist Award, is one of the world's most eminent scientists and pioneers in biodiversity conservation.

Only students who have paid their society dues will be eligible to submit a grant application. Applications can be submitted by logging in through the ABS website after they have contacted the ABS Central Office to verify their status. If you have any questions about your membership or the submission process, contact the ABS Central Office (aboffice@indiana.edu). Example applications are available on the [grant application website](#).

By: Misty McPhee

There is often a lack of communication between the fields of conservation and animal behavior. To bridge this gap, the Animal Behavior Society's Conservation Committee conducted a one-day workshop that applied behavioral theory and research to real-world conservation problems. The day was built around four issues that conservation practitioners are currently facing with either wildlife management or conservation. Heather Johnson from Colorado Parks & Wildlife presented extensive data on conflicts between humans and black bears as a result of inadvertent urban food provisioning. According to Johnson, "For state wildlife agencies to design effective strategies to decrease bear-human conflicts, we need to understand the behavioral and demographic mechanisms driving [the patterns of bear habitat use]." Moving from bears to birds, David Bradbeer talked about managing protected bird species at the airport in Vancouver, British Columbia. Great blue herons hunt Townsend's voles on the airfield of the Vancouver International Airport, creating a significant risk to aircraft and bird, especially if ingested into the engine of a large passenger jet on takeoff. Dr. Bradbeer is exploring ways to manage this bird and reduce its presence in the Airfield. The third presenter was Verena Gill of the US Fish & Wildlife Service seeking advice on conflicts between sea otter management and commercial fisheries regulation in Alaska. In the 1800s, sea otters were extirpated from Southeast Alaska by the fur trade. In the absence of this keystone predator, macroinvertebrate populations increased, and lucrative fisheries developed. In the 1960s, the State of Alaska successfully translocated 412 animals to Southeast Alaska in the 1960s. The now-thriving sea otter population is, however, in direct

competition with commercial and subsistence fisheries. The final presenter of the day was Valerie Matheson, the Urban Wildlife Conservation Coordinator for the City of Boulder. For the past couple of years, recreational trail users within the city of Boulder have experienced conflict with coyotes ranging from cyclists being chased along the trail to joggers being bitten. According to Matheson, "The conflict area includes high quality coyote habitat (a mature cottonwood grove; Boulder Creek; a pond and prairie dog colony) and a commuter bike path that is used by approximately 800-1,000 pedestrians per day." The theme with all of these problems was, how can wildlife and humans co-exist?

After the practitioners presented their issues, approximately 60 behavioral ecologists broke into working groups to brainstorm possible solutions. The working groups met for two hours after which the groups reconvened to share their ideas. Since the workshop, the working groups have established committees to follow the progress of the issues and an update report will be disseminated in January 2014. In addition, a more formal progress report will be presented at the 2014 ABS meeting in Princeton, New Jersey.

Overall, the workshop provided a unique and valuable opportunity for the practitioners to learn about the challenges and rewards of applying behavioral biology in the field. Ideally this two-way interaction will inspire future research and networking to aid in solving the increasingly complex problems of real-world conservation.

USING GRAZING FOR MANAGEMENT OF INVASIVE PLANTS:

An interview with conservation biologists Dr. Gary Kleppel and Caroline Girard-Cartier, M.S.

By Elizabeth Peterson

Dr. Gary Kleppel is a Professor of Biological Sciences and the Director of the Biodiversity, Conservation and Policy Program in the Department of Biological Sciences at the University at

Albany-State University of New York. His current research focuses on the ecology of human-dominated ecosystems, particularly the use of livestock for managing vegetation on landscapes while producing food and fiber, and agricultural ecology. A primary objective of his research is to understand whether the use of livestock grazing behavior can be an effective tool for suppressing invasive species and restoring biodiversity to early successional stage ecosystems. The Conservation Behaviorist spoke with Dr. Kleppel and Caroline Girard, M.S. (a senior graduate student in Dr. Kleppel's laboratory and PhD candidate in the Department of Biological Sciences at the University at Albany-State University of New York) on their research and how nonscientists can utilize these conservation behavior techniques to manage invasive plants.

CB: What has inspired your efforts to use animal behavior as a tool to combat invasive species?

GK and CG: Management of invasive plants using domestic livestock is not new. This approach has been used to control a variety of species in Europe, Australia, the western United States and to a lesser extent in the mid-Atlantic and northeastern United States. Intensive Rotational Targeted Grazing (IRTG), the particular approach to grazing that we have been studying, is an ecosystem-based approach that addresses the larger plant community rather than focusing on individual populations. The ability to easily remove animals if their presence is resulting in negative impacts is a key benefit of any targeted grazing approach.

CB: In what ways has animal behavior contributed to your research?

GK and CG: Obviously, our work depends on the feeding behaviors of livestock. These behaviors, and, therefore, the conservation applications we develop and the outcomes we expect vary with livestock species and breeds. In addition, our work depends heavily on the herding dogs we use to move the livestock. Intensive rotational grazing is at the heart of our approach to invasive plant management and the frequent movement among feeding enclosures, sometimes separated by fairly large distances is facilitated by using sheepdogs.

CB: What are the negative effects of invasive plant species on the ecosystem and biodiversity?

GK and CG: Studies suggest that invasive species are the second greatest threat to biodiversity following habitat loss. Invasive plants generally spread rapidly and often crowd out native and naturalized plant species. When plant species are eliminated from an ecosystem, this may result in loss of food or habitat for animal species dependent upon the lost species. Ecosystem functioning may be disrupted in response to changes in soil dynamics and plant communities.

CB: Can you briefly explain targeted grazing?

GK and CG: Targeted grazing is the use of domestic livestock to achieve a specified plant management goal. The species of livestock used, the intensity of grazing, the frequency of grazing and the duration of animals on a particular landscape or portion of the landscape is dependent upon the specified plant management goal.

CB: In two of your papers that are in press, your students used intensive rotational targeted grazing. How is intensive rotational targeted grazing different from targeted grazing?

GK and CG: Intensive rotational targeted grazing is an ecosystem based approach that combines targeted grazing with intensive rotational grazing. Intensive rotational grazing is an approach to grazing in which the larger landscape is divided up into a series of smaller paddocks and animals are rotated through this series of paddocks. The animals generally remain on any portion of the landscape for a period of only 1-3 days before being moved to another paddock. Once the animals have been rotated through the series of paddocks another rotation through the paddock system will begin.

CB: Why is intensive rotational targeted grazing so effective?

GK and CG: With conventional grazing approaches animals generally spread out across a landscape and continuously graze, placing constant

pressure on vegetation. With an intensive rotational grazing approach vegetation is grazed and then allowed an opportunity to recover from grazing pressure. On the landscapes where we conduct our targeted grazing studies there is always a dominant invasive plant species. The animals will generally put a large amount of grazing pressure on the plants of the targeted species allowing other species in the plant community the ability to compete for resources.

CB: What were your major findings from these studies?

GK and CG: Our studies suggest that targeted grazing with domestic livestock has led to decreases in the cover and vegetative spread of the targeted plant species. In addition, the sexually reproductive phase of plants, flowering, has been significantly decreased with several of the targeted plant species. In terms of the larger plant community, our studies suggest that IRTG generally leads to an increase in vascular plant species richness.

CB: Can you conclude that intensive rotational targeted grazing is an effective management tool for returning biodiversity to early successional stage ecosystems?

GK and CG: It would appear so.

CB: Have these management tools been applied to native biodiversity management and conservation planning?

GK and CG: Currently they are being used in research being undertaken by Caroline Girard-Cartier and one of my undergraduate students.

CB: Are there other ways that animal behavioral studies can contribute in other areas of plant biodiversity and conservation research?

GK and CG: Animal behavior studies are widely used to understand ecological processes in human-dominated landscapes. In our lab, we are studying ecosystem dynamics in grasslands and other early-successional systems that are not infested with aggressive exotic plants as well as some that have been invaded. Understanding how livestock respond to ecological stimuli is critical to our research.

CB: Can these techniques be employed by the general public to combat invasive species? What helpful advice can you give a nonscientist who wants to employ these management tools at home or in their farm?

GK and CG: The use of targeted grazing to combat invasive plants requires knowledge about the biology of the plants as well as management of livestock. There are a number of resources available for individuals interested in livestock grazing for invasive species management. The University of Idaho has developed "Targeted Grazing: A natural approach to vegetation management and landscape enhancement" that provides valuable information for those individuals.

REFERENCE

Launchbaugh, K.L., R.J. Daines, and J.W. Walker. [Eds.] 2006. Targeted Grazing: A Natural Approach to Vegetation Management and Landscape Enhancement.



Interact with the Conservation Behaviorist

Send letters, announcements, comments and contributions to: The Conservation Behaviorist dshier@sandiegozoo.org. Deadlines for articles are the 15th of the month preceding the next news update. The next deadline is May 15th. Contributions submitted by members of the Animal Behavior Society and judged by the Conservation Committee to be appropriate will be published in the Conservation Behaviorist. The publication of such material does not imply ABS or the Conservation Committee endorsement of the opinions expressed by contributors.

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