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Authors

Miller, Sara

Bluher, Sarah

Bell, Emily

et al.

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WASPnest: a worldwide assessment of social Polistine nesting behavior

Sara E. Miller[1], **Sarah E. Bluher**[1], **Emily Bell**[2], **Alessandro Cini**[3], **Rafael Carvalho Da Silva**[4], **AndrÉ Rodrigues De Souza**[4], **Kristine M. Gandia**[5], **Jennifer Jandt**[6], **Kevin Loope**[7], **Amanda Prato**[4], **Jonathan N. Pruitt**[8], **David Rankin**[7], **Erin Rankin**[7], **Robin J. Southon**[2], **Floria M. K. Uy**[5], **Susan Weiner**[9], **Colin M. Wright**[10], **Holly Downing**[11], **Raghavendra Gadagkar**[12], **M. Cristina Lorenzi**[13,14], **Lidiya Rusina**[15], **Seirian Sumner**[3], **Elizabeth A. Tibbetts**[16], **Amy Toth**[17], **Michael J. Sheehan**[1,18]

[1]Department of Neurobiology and Behavior, Cornell University, Ithaca, New York 14853 USA [2]School of Biological Sciences, University of Bristol, Bristol BS8 1TH UK [3]Centre for Biodiversity and Environmental Research, Department of Genetics, Evolution and Environment, University College London, London WC1E 6BT UK [4]Departamento de Biologia, Faculdade de Filosofia Ciências e Letras de Ribeirão Preto, Universidade de São Paulo, São Paulo 14040-901 Brazil [5]Department of Biology, University of Miami, Coral Gables, Florida 33146 USA [6]Department of Zoology, University of Otago, Dunedin 9016New Zealand [7]Department of Entomology, University of California, Riverside, California 92507 USA [8]Department of Psychology, Neuroscience and Behaviour, McMaster University, Hamilton, Ontario L8S4L8 Canada [9]Department of Biology, Roosevelt University, Chicago, Illinois 60605 USA [10]Department of Ecology, Evolution, and Marine Biology, University of California, Santa Barbara, California 93106 USA [11]Black Hills State University, Spearfish, South Dakota 57799 USA [12]Centre for Ecological Sciences, Indian Institute of Science, Bengaluru, Karnataka 560012 India [13]Laboratoire d'Ethologie Expérimentale et Comparée, Université Paris 13, Villetaneuse 93430 France [14]Department Life Science and Systems Biology, University of Turin, Via Verdi, Torino 8-10124 Italy [15]Kherson State University, Kherson 73000 Ukraine [16]Department of Ecology and Evolutionary Biology, University of Michigan, Ann Arbor, Michigan 48109 USA [17]Department of Ecology, Evolution, and Organismal Biology, Iowa State University, Ames, Iowa 50011 USA

Abstract

Cooperative breeding decreases the direct reproductive output of subordinate individuals, but cooperation can be evolutionarily favored when there are challenges or constraints to breeding independently. Environmental factors, including temperature, precipitation, latitude, high seasonality, and environmental harshness have been hypothesized to correlate with the presence of cooperative breeding. However, to test the relationship between cooperation and ecological constraints requires comparative data on the frequency and variation of cooperative breeding across differing environments, ideally replicated across multiple species. Paper wasps are primitively social species, forming colonies composed of reproductively active dominants and

[18] Corresponding author. msheehan@cornell.edu.

foraging subordinates. Adult female wasps, referred to as foundresses, initiate new colonies. Nests can be formed by a single solitary foundress (noncooperative) or by multiple foundress associations (cooperative). Cooperative behavior varies within and among species, making paper wasps species well suited to disentangling ecological correlates of variation in cooperative behavior. This data set reports the frequency and extent of cooperative nest founding for 87 paper wasp species. Data were assembled from more than 170 published sources, previously unpublished field observations, and photographs contributed by citizen scientists to online natural history repositories. The data set includes 25,872 nest observations and reports the cooperative behavioral decisions for 45,297 foundresses. Species names were updated to reflect modern taxonomic revisions. The type of substrate on which the nest was built is also included, when available. A smaller population-level version of this data set found that the presence or absence of cooperative nesting in paper wasps was correlated with temperature stability and environmental harshness, but these variables did not predict the extent of cooperation within species. This expanded data set contains details about individual nests and further increases the power to address the relationship between the environment and the presence and extent of cooperative breeding. Beyond the ecological drivers of cooperation, these high-resolution data will be useful for future studies examining the evolutionary consequences of variation in social behavior. This data set may be used for research or educational purposes provided that this data paper is cited.

Keywords

Belonogaster; cooperation; eusociality; foundress; Mischocyttarus; paper wasp; Parapolybia; Polistes; Ropalidia; social insects

Supplementary Material

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