

## WASPnest: a worldwide assessment of social Polistine nesting behavior

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**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 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 Data were assembled from more than 170 published sources, previously unpublished field observations, and photographs contributed by citizen scientists to online natural history repositories.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.

**Key words:** *Belonogaster*; cooperation; eusociality; foundress; *Mischocyttarus*; paper wasp; *Parapolybia*; *Polistes*; *Ropalidia*; social insects.

The complete data set is available as Supporting Information at: [to be completed at proof stage]. In addition, data are available in GitHub: <https://doi.org/10.5281/zenodo.1236498>

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