

Supplementary Information

The history of option quality affects nest site choice in the acorn ant, *Temnothorax curvispinosus*

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Nest designs

Each nest was made from a cardboard sheet (2.0 mm thick) sandwiched between glass microscope slides (50 x 75 mm). The cardboard had an entrance 3 mm wide and 10 mm long leading to a rectangular cavity of 45 x 25mm (Figure S1). A secondary roof was composed of two glass microscope slides, and we inserted light filters (Rosco Cinegel) between them to adjust the interior light level.

Subjects

Thirty colonies of *T. curvispinosus* were collected at Keown Falls (34°36'47.7"N 85°05'17.8"W) in 2019 and 2021 and at Sandy Creek Nature Center (33°59'13.1"N 83°23'03.2"W) in 2020. All had at least one queen, with worker populations ranging from 68 to 216 and brood populations ranging from 8 to 140. Each colony was housed in a nest like the one described above without the secondary roof. Each nest was kept in a plastic box (11 x 11 cm), the walls of which were coated with Fluon to prevent the ants from escaping. Each box was provided with a water-filled plastic tube capped with cotton, spam meat, and an agar-based diet [23] that were refreshed weekly. Twenty-nine colonies used in the follow-up trend condition was collected at Keown Falls in 2022. All had at least one queen, with worker populations ranging from 58 to 224 and brood populations ranging from 5 to 154.

Logistic regression

We ran a logistic regression to test if the numbers of workers and brood items have any effect on the nest choice. In the regression, the choice was chosen as a dependent variable, while the numbers of workers and brood were used independent variables. We used a “glm” function with the binomial family in R (v. 4.1.2). These tests show that the colony size (the numbers of workers and brood) does not have significant effects on the choices in each condition (Table S2).

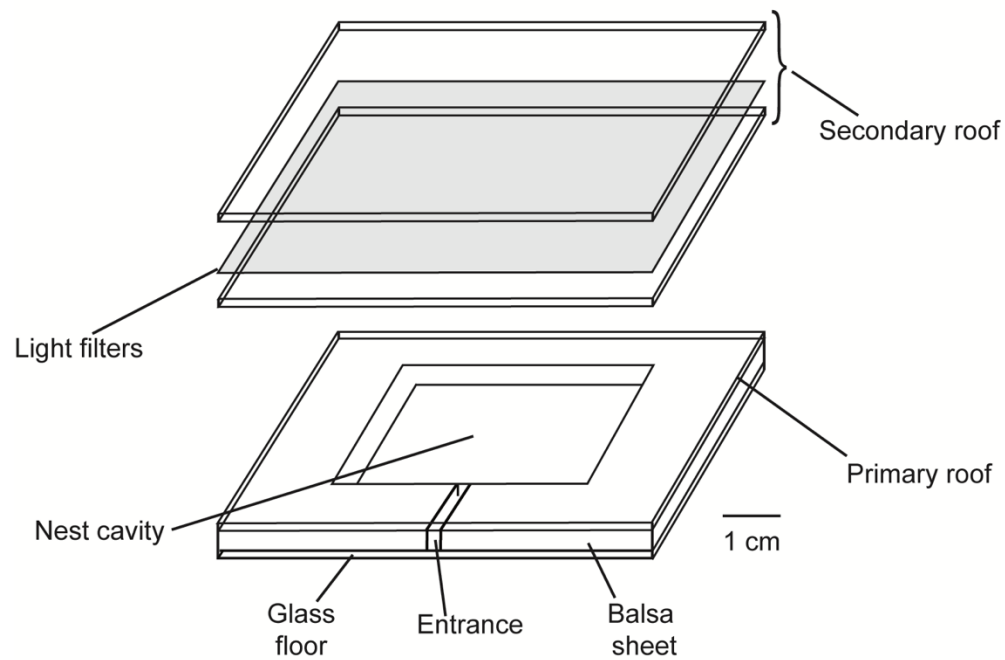


Figure S1. Nest design. A nest was constructed from a cardboard sheet with a rectangular cavity and an entrance tunnel on the side. The roof and floor were made of glass microscope slides. The primary roof was a single glass slide, while the secondary roof was composed of two glass slides and light filters.

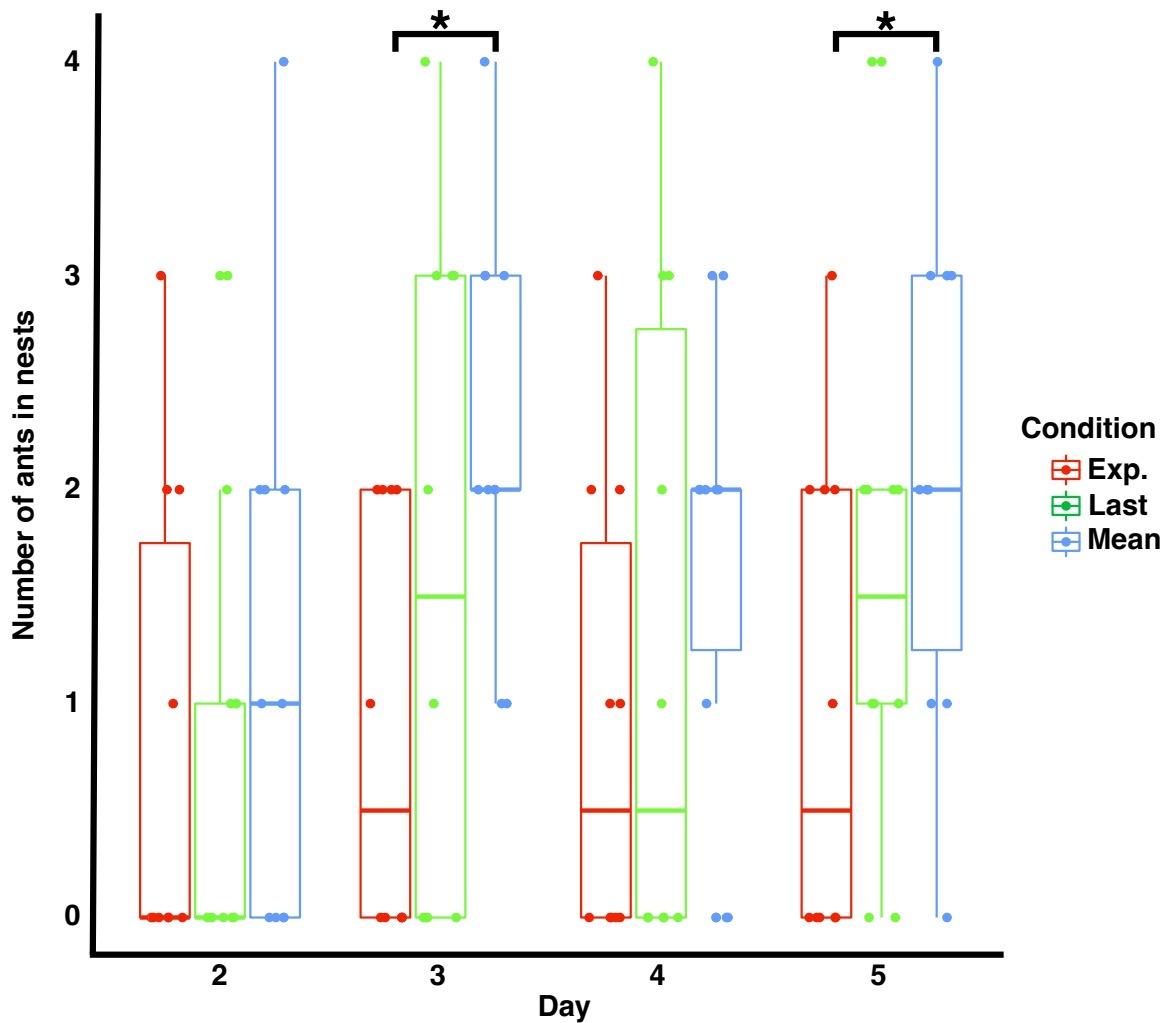


Figure S2. Total number of ants in target nests over four days (day 2nd to 5th). All data points overlay boxplots. Each box extends between the lower and upper quartiles, a horizontal line within the box indicates the median, and whiskers show the range of the data, except for outliers. The asterisk indicates $p < 0.05$ based on the post hoc test, the Dunn's test, after the Friedman test for the repeated measured design.

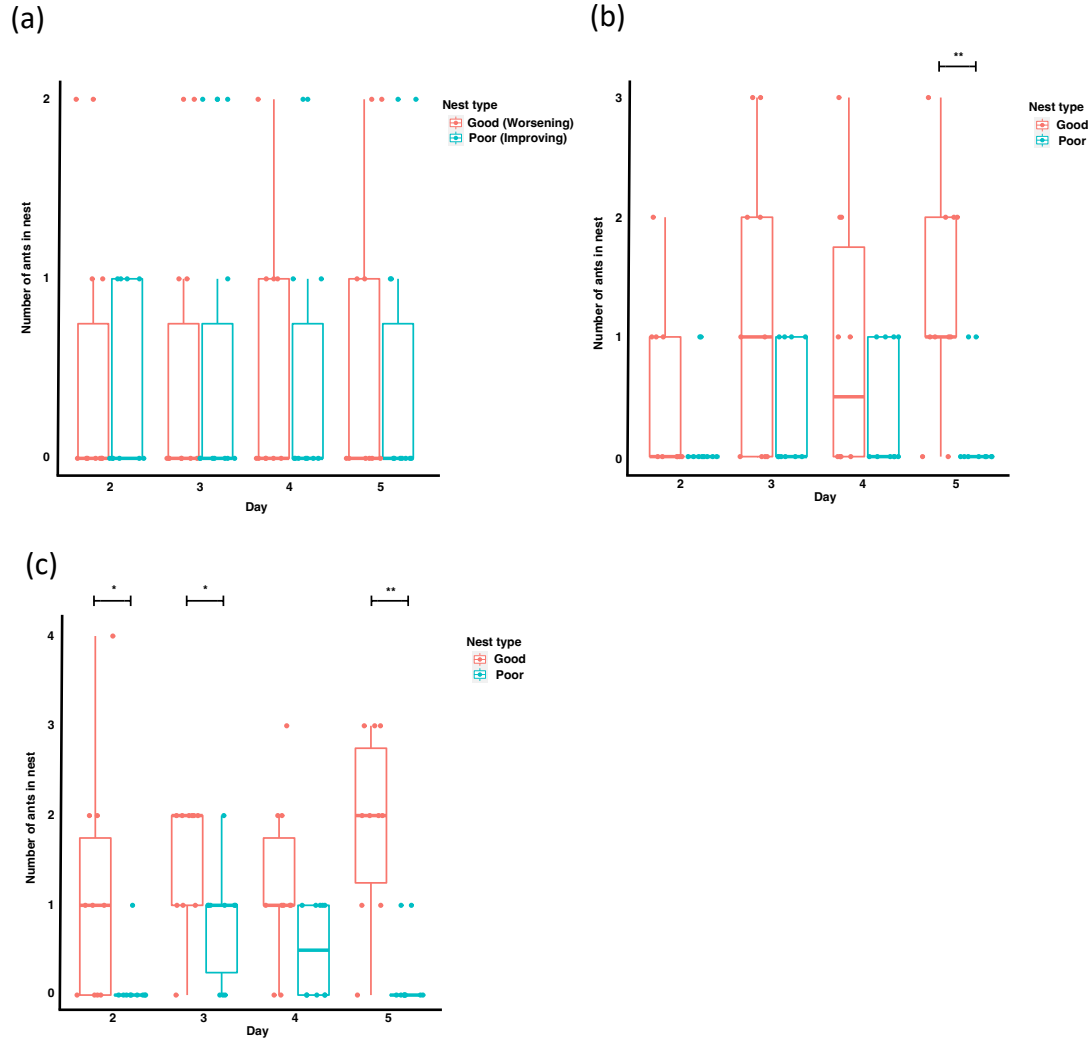


Figure S3. Number of ants in each target nest over four days (day 2nd to 5th). a) Experimental condition, b) last-point condition and c) average condition. While there was not a significant difference for the number of ants between the good nest and the poor nest in the experimental condition, there were significant differences on certain days in the control conditions. All data points overlay boxplots. Each box extends between the lower and upper quartiles, a horizontal line within the box indicates the median, and whiskers show the range of the data, except for outliers. * and ** indicate $p < 0.05$ and $p < 0.01$ based on the Wilcoxon test, respectively.

Table S1. The light levels and schedules in the trend condition, two control conditions (average condition and last point condition) and the follow-up trend condition. While the light levels of target nests changed over the first four days in the trend condition, they were consistent in the control conditions. After day 4, the light levels of the target nests were identical (400 levels) in all the conditions until when colonies made nest choices on day 5.

[illegible]

Table S2. Results of the logistic regression

Trend		
	Z value	P
Worker	0.61	0.53
Brood	0.29	0.77
Average		
	Z value	P
Worker	0.99	0.32
Brood	1.21	0.23
Trend		
	Z value	P
Worker	1.64	0.10
Brood	1.54	0.12
Follow-up		
	Z value	P
Worker	1.13	0.26
Brood	0.15	0.88