Patterns of Urban Hummingbird Nest Distribution on the LMU Campus

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Introduction

- Urban environments provide numerous benefits to hummingbirds including feeders, planted flowers, and nesting sites.
- The thermal environment, among other factors, may be important to hummingbird's choice of nesting microhabitats (Calder 1974).
- Allen's and Anna's Hummingbird (*Selasphorus sasin sedentarius*) breeds during the winter months in Los Angeles (Clarke 2017).
- Between 2012 and 2016, five active hummingbird nests were discovered and monitored on the LMU campus.
- In 2017, 15 active nests were monitored on the LMU campus. The locations of these 15 active nests and 45 older nests seemed to exhibit a clustered pattern, and individual nests often were in close proximity to built structures.
- **Question**: How does the distribution of 2018 nests across the LMU campus compare to the distribution of hummingbird 2017 nests? What are the microhabitats surrounding hummingbird nests?
- **Hypothesis:** The distribution of 2018 hummingbird nests across the LMU campus will be similar to the 2017 distribution. Most nests will be partially sheltered from the sun and wind by their surroundings, and many will be in close proximity to built structures.

Methods

Nest searches:

- Nest searches began 1/19/18
- Searches were completed thoroughly, branch by branch.
- Experience trains the eye to notice nests.
- Multiple team members search for nests, finding nests an individual searcher might overlook.
- New nests are added to the distribution maps.

Microhabitat:

- The distance to the ground (±10cm), substrate canopy (±.5m), and nearest structures (±10cm), were measured for each nest.
- The material of the nearest structures and the species of the nest substrate were documented.
- The distance to human activity and distance to flowering plants hummingbirds may feed on were estimated to 5, 10, or 20 meters.
- The exposure of each nest to sun, wind, human activity, was estimated on a scale of 1-3 (1 low, 2 medium, and 3 high).

Data

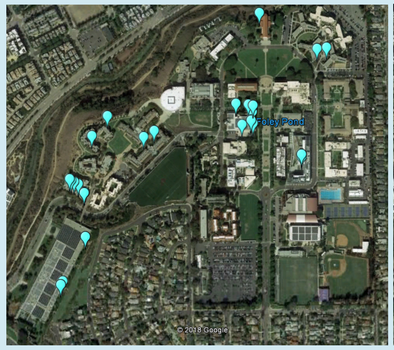

Figure 1. Recorded nests 2017

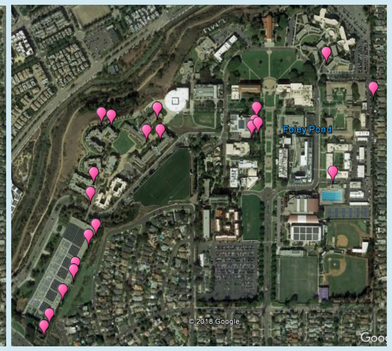

Figure 2. Recorded 2018 nests as of 3/1/18

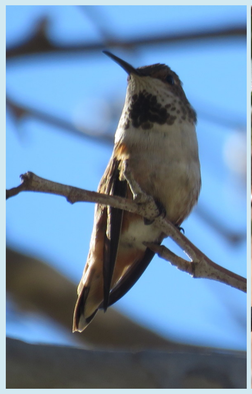

Figure 3. Hummingbird near Nest 3

Figure 4. Nest 3 with two hummingbird chicks

Figure 5. Nest 13 with two hummingbird eggs

Nest Number	Hummingbird Species	Nest Substrate	Height Off Ground	Height to Canopy Overhang	Distance to Nearest Wall	Distance to 2nd Wall	Wall Material	Wind Exposure	Sun Exposure	Proximity to Human Activity	Level of Human Activity	Proximity to Flowering	Proximity to Other Active Nests
1	Allen's	MT	3.4	0	5	n.a	W	2	1	5	1	20	
2	Allen's	MS	3.6	n.a	1.1	1.1	P	2	2	5	2	20	
3	Allen's	MS	1.7	n.a	n.a	n.a	n.a	2	2	20	1	20	
4	Allen's	MT	2.5	0	1.5	n.a	B	2	2	5	3	20	
5	Allen's	MT	2.9	0	5	n.a	B	2	2	5	2	5	
6	Allen's	MS	1.1	2.8	1.2	2.5	B	1	1	10	1	10	
7	Allen's	T	2.4	0	1.1	n.a	W	2	2	5	3	20	
8	Allen's	T	2	0	1.8	n.a	W	2	2	5	3	20	
9	Allen's	T	2.4	0	1	n.a	W	2	2	10	2	20	
10	Allen's	T	1.7	0.6	0.9	1.1	P	2	2	5	2	20	
11	Allen's	V	2.6	0	0.5	n.a	C	2	2	5	2	20	
12	Allen's	MT	1.6	0	n.a	n.a	n.a	2	1	5	2	5	
13	Anna's	V	1.7	0	0.4	n.a	C	2	2	5	2	20	
14	Allen's	V	3.3	0.5	0.7	2	C	3	3	5	1	20	
15	Allen's	V	3.2	0	0.6	n.a	C	2	2	5	2	5	
16	Anna's	MT	2.9	0	5	n.a	P	3	2	5	2	20	
17	Allen's	V	3.4	0	0.5	n.a	C	2	1	5	1	20	
18	Allen's	V	3.2	0	0.4	n.a	C	2	2	5	1	20	
19	Allen's	V	2.2	0	0.7	n.a	C	2	2	5	1	20	
20	Allen's	MT	2.6	0	0.5	n.a	P	2	2	5	2	20	
21	Allen's	MT	1.5	2.2	2.2	3	W	1	2	5	1	0	

Key: W = Window, P = Plaster, B = Brick, C = Concrete
Key: V = Vines, T = Trellis Vines, MS = Misc. Shrub, MT = Misc. Tree

Figure 6. Microhabitat data of 2018 active nests

Results

		Height Off Ground	Height to Canopy Overhang	Distance to Nearest Wall	Distance to 2nd Nearest Wall	Wind Exposure	Sun Exposure	Proximity to Human Activity	Level of Human Activity	Proximity to Flowering	Proximity to Other Active Nests
Total Instances out of 21		21	19	19	5	0	21	21	21	21	
Average (m)		2.5	0.3	1.6	1.9	2.0	1.9	6.2	1.8	16.4	
Standard Deviation (m)		0.7	0.8	1.6	0.8	0.4	0.5	3.5	0.7	6.7	
Range	Min.	1.1	0	0.4	1.1	1	1	5	1	0	
	Max.	3.6	2.8	5	3	3	3	20	3	20	

Figure 7. Totals, averages, standard deviations, and ranges of 2018 Microhabitat data

Discussion

- **Most 2018 nests are in close proximity to many of the 2017 nests, supporting the hypothesis that the distribution of new hummingbird nests will be similar to the distribution last year.**
  - The 2018 nests as of 3/1/18 seem to be in clustered patterns, similar to the 2017 nests.
  - The distribution of active nests will be more rigorously analyzed later in the season once more nests are found and available for comparison.
- **Mapping and analyzing the distribution of hummingbird nests has already helped locate 21 nests in just 2 months. Last year, it took 3 months just to locate 15 nests.**
  - New nests improve the distribution analysis, increasing the likelihood of a new find.
  - Each new nest is a valuable find for the CURes, as each active nests is observed for multiple studies.
- **A significant number of nests are located in microhabitats that may be slightly warmer than their immediate surroundings.**
  - Of the 21 nests, 19 were near at least one wall of a structure, and 5 of those were near 2 or more walls.
  - The materials of these structures are mainly concrete, brick, or plaster, materials that may retain and re-radiate heat captured during the day. Five nests are built near windows, which likely leak some internal heat from the building throughout the day.
  - Data loggers are currently collecting the temperature of multiple of the active nests, in case this preliminary data confirms the above observations and can base a future study.

Literature Cited

- Christopher J. Clark (*2017*) eBird records show substantial growth of the Allen's Hummingbird (*Selasphorus sasin sedentarius*) population in urban Southern California. The Condor: February 2017, Vol. 119, No. 1, pp. 122-130.
- Calder, W. (1974). The Thermal and Radiant Environment of a Winter Hummingbird Nest. *The Condor, 76*(3), 268-273. doi:10.2307/1366340

Acknowledgements

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