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Name Dr. Olga Milenkaya (Olya)

Title Assistant Professor of Biology

Institution Young Harris College

Division Math & Sciences

Work address 1 College Street, Young Harris GA 30582

Home address 5875 Brasstown Creek Road, Young Harris GA 30582

Email olmilenkaya@yhc.edu, olm@vt.edu

Cell (956) 606 - 7434

Office (706) 379 - 5153

SUMMARY OF PILOT FIELD SEASON (WINTER 2015 – SUMMER 2016)

Based on my Research Proposal submitted in 2015 to HPAS, I had the following objectives for the 2015 – 2016 field season:

Objective #	Timeframe	Objective
1	Winter 2015 – 2016	Begin mist-netting and banding birds.
2	Winter 2015 – 2016	Purchase Carolina chickadee boxes.
3	Winter 2015 – 2016	Build Carolina wren boxes.
4	Winter 2015 – 2016	Install both types of boxes.
5	March 2016	Begin nests for correlational study.
6	Spring 2016	Monitor nest boxes for occupancy and clutch and brood size for correlational study.

Objective # 1 was attempted but quickly abandoned as I realized that I did not have the time to succeed with this objective. This means that I need to redesign my research program to exclude the need to individually identifying adult birds.

Objective # 2 – 6 were successfully accomplished.

Box set-up Lindley McKay, the facilities crew at Young Harris College and I set up 99 new bird boxes of three different styles: A – small entry hole, B – larger entry hole, and W – Carolina wren style box. Of these 99 boxes, 75 boxes were set up as 25 triads where each triad included one of each style box. An additional 24 W boxes were set up as singles (not part of a triad). Boxes were set up in Young Harris, Georgia at Young Harris College, Brasstown Valley Resort, and nearby private, residential properties.

Box monitoring Lindley McKay and I monitored the above mentioned 99 boxes, as well as 7 additional boxes that had been set-up by others in previous years but were no longer being monitored. These boxes are of various designs, but area all “Eastern Bluebird” style boxes and although I did not measure the size of their entrance hole, is probably a B-sized hole. Therefore, a total of 106 boxes were monitored in this year’s pilot study. Monitoring began in mid-March and was suspended in late June due to time constraints (Lindley and I had a wedding!). At that time, only house wrens and a couple of Eastern bluebirds were still nesting and therefore their occupancy and nesting statistics are likely to be underestimated in this report. However, Carolina chickadees had completed their nesting season and their corresponding statistics should therefore be accurate.

Overall conclusions Nest boxes had high occupancy rates and therefore serve as a great resource for research on Carolina chickadees and/or Eastern bluebirds. I will continue to utilize these boxes in my research but will have to change the research objectives because individual monitoring of adult birds is no longer realistic given the challenges of banding adults.

Boxes by the numbers

3	Styles of boxes
25	Boxes of size A
25	Boxes of size B
49	Boxes of style W
7	Old boxes that were monitored
106	Total boxes monitored

Timing

January	Triads of boxes were set-up at Young Harris College and other private properties
11-March	Single W boxes were set up at Brasstown Valley Resort
16-March	Box monitoring began
	First nests found: Carolina wren, Carolina chickadee, brown-headed nuthatch
28-March	First eggs were laid (by Carolina wren)
29-March	First Carolina chickadee eggs were laid
3-April	First Eastern bluebird eggs were laid
16-April	First house wren nest found
25-April	First house wren eggs were laid
11-June	Last Carolina chickadee young fledged
24-June	End of nest monitoring

Result Carolina chickadees, Carolina wrens, and brown-headed nuthatches are the earliest to nest, followed shortly by Eastern bluebirds. House wrens begin to build nests about one week before the earliest Carolina chickadee young fledge. Carolina chickadees appear to be single-brooded, ending their breeding season by early June.

Conclusion In future field seasons, nest monitoring of Carolina chickadees should begin in early March to be conservative. Among other possible reasons, Carolina chickadees may breed early in the spring in order to avoid nest-site competition with house wrens. This interspecific interaction may be particularly fruitful for future research. Among other reasons, W-style boxes may have been poorly used because many were not set-up until March.

Occupancy by the numbers

64	Boxes were occupied	Out of 106 total boxes	= 60% occupancy rate
18	A boxes were occupied	Out of 25 A boxes	= 72% occupancy rate
26	B boxes were occupied	Out of (25 B boxes + 7 Old boxes)	= 81% occupancy rate
20	W boxes were occupied	Out of 49 W boxes	= 41% occupancy rate

Result Although all styles of boxes were used by breeding birds, the A and B boxes were much more used than the W-style boxes.

Conclusion Although I originally proposed to pursue a research program with Carolina Wrens by using the W-style boxes, the low occupancy rate of these boxes suggests that I should reconsider.

Nests by the numbers

Note that here, I consider a “nest” to be any nesting attempt which includes any nesting material that was placed into a box, regardless of whether or not any eggs were laid.

84	Nests found		
	Out of 64 occupied boxes		= 1.3 nests per occupied box
	Out of 106 available boxes		= 0.8 nests per available box
24	Nests in A boxes		
	Out of 18 occupied A boxes		= 1.3 nests per occupied A box
	Out of 25 available A boxes		= 0.96 nests per available A box
37	Nests in B or Old boxes		
	Out of 26 occupied B+Old boxes		= 1.4 nests per occupied B+Old boxes
	Out of 32 available B+Old boxes		= 1.2 nests per available B+Old boxes
23	Nests in W boxes		
	Out of 20 occupied A boxes		= 1.2 nests per occupied W box
	Out of 49 available A boxes		= 0.47 nests per available W box

Result & Conclusion As above

Species by the numbers

32	Nests of Carolina chickadee	
	16 nests in A boxes	
	10 nests in B boxes	
	6 nests in W boxes	
21	Nests of Eastern bluebird	
	16 nests in B+Old boxes	
	5 nests in W boxes	
16	Nests of house wren	
	7 nests in A boxes	
	7 nests in B boxes	
	2 nests in W boxes	
8	Nests of Carolina wren	All in W boxes
3	Nests of tree swallow	All in Old boxes
2	Nests of unknown species	
1	Nest of tufted titmouse	In B box
1	Nest of brown-headed nuthatch	In A box

Result Eastern bluebirds do not nest in A boxes, Carolina wrens do not nest in cavity boxes, Carolina chickadees and House wrens nest in any style of box.

Conclusion Most parsimonious explanation for Eastern bluebird nests being in B and W boxes is that they simply do not fit into A boxes. W boxes were never preferentially chosen by Eastern bluebirds, but were instead used after a failure in the nearby B box. Carolina wrens only chose W boxes as they are known to not be cavity nesters. Carolina chickadees nested in W boxes only in areas that did not have either A or B boxes. House wrens are able to fit into A boxes, and therefore utilized all styles of boxes. Tree swallows used only Old boxes, presumably because these happened to all be located in suitable habitat (open fields near standing water).

Carolina chickadee preferences

To assess preference for box-style, I considered only nesting attempts of Carolina chickadees that were either the first or only nesting attempt in their triad of boxes. In this way, we are considering only those nesting attempts for which the chickadees had the full spectrum of options between A, B and W-style boxes.

17 Carolina chickadee nesting attempts fit this criteria for a comparison between A and B style boxes. Of these 17 nesting attempts, 13 were placed in A-style boxes compared to 4 in B-style boxes.

16 Carolina chickadee nesting attempts fit this criteria for a comparison between all three styles of boxes. Of these 16 nesting attempts, 13 were placed in A-style boxes compared to 3 in B-style boxes and 0 in W-style boxes.

Result When given the option of A, B and W-style boxes, Carolina chickadees overwhelmingly chose A-style boxes for their nesting attempts.

Conclusion Carolina chickadees prefer A-style boxes over B and W-style boxes. That they did not nest in W-style boxes is unsurprising since they are known cavity-nesters. That they prefer A over B-style boxes contradicts Dr. Ballentine's suggestion that they may prefer B over A-style boxes. An analysis of the Highlands and Franklin data would be informative here as to whether there are site differences in chickadee preference. It is important to highlight here that these results are for "nesting attempts" and therefore include all cases of nesting material being placed into a box, regardless of whether or not that nest was subsequently used for egg-laying.

Nest outcomes by the numbers

- 33% of all nests found were abandoned (mostly during nest building stage).
- 27% of all nests found were successfully in fledging at least one young (based on feeding observation within 2 days of expected fledging and/or fledgling re-sighting).
- 19% of all nests found were depredated (e.g., snakes, feral cats, house wrens, etc.). Some house wren nests were found within days or 1 – 2 weeks after “predation” on the previous occupant, suggesting that some predation events may have been predation/usurpation by house wrens. The extent of this is unclear.
- 17% of all nests found had an unknown outcome (primarily because our monitoring of house wren nests was lacking, and because we suspended nest monitoring while some birds were still nesting in late June).
- 3.6% of all nests found failed due to brown-headed cowbird brood parasitism. Two of these nests were of Carolina chickadees and one of Carolina wren, and all were in W-style boxes which have openings large enough for cowbirds to access.

Result Approximately 1/3 of all nesting attempts are abandoned (mostly during building), 1/3 are successful, and 1/3 fail for other reasons, including brood parasitism, predation and possibly house wren activity.

Conclusion The relatively high failure rate may be caused by edge-effects because all boxes were placed near edge habitat to facilitate accessibility for researchers. I should consider predator guards for nest year (however, these are unlikely to be approved at Young Harris College for “aesthetic” reasons). The house wren observations warrant further research on interspecific interactions. That 1/3 of nests were abandoned is consistent with my previous experience with other passerine species, but I do not know if this is normal for these species, or in this area. Although anecdotal, I noticed many nesting attempts being abandoned after finding wasp nests in the bird boxes. Next year, I will apply soap to the inside of the boxes to discourage wasps from using/usurping the boxes.

Banding by the numbers

- 44 Eastern bluebird nestlings banded. Of these, 11 individuals were later re-sighted as fledglings and sub-adults on 15 separate, opportunistic occasions.
- 44 Carolina chickadee nestlings banded. Of these, 1 individual was re-sighted (opportunistically, ~ 1 mile away).
- 4 Brown-headed nuthatch nestlings banded. None were re-sighted.
- 4 Carolina wren nestlings banded. All four were re-sighted shortly after fledging in the vicinity around the nest. This re-sighting effort was strategic, not opportunistic.
- 4 Tufted titmouse adults were banded during mist-netting. None were re-sighted.
- 100 Total passerine individuals that were banded during winter 2015 – summer 2016 field season.

Result More Eastern bluebirds were re-sighted than any other species, including Carolina chickadees despite the same number of individual nestlings being banded.

Conclusion Eastern bluebirds were easy to opportunistically re-sight, presumably because the fledglings stay near their nest boxes for at least several weeks. They also occupy open habitats that makes them more conspicuous and easier to see. By contrast, Carolina chickadee fledglings seem to leave their area shortly after fledging and presumably occupy denser forest and are higher in the canopy, making re-sighting very challenging. Mist-netting and banding of adult birds was a failure that required a lot of time, and yielded too few captures of target species. In the future, adult banding is ill-advised given my time constraints and low success rate, and nestling banding is only meaningful among Eastern bluebirds. If my future research is with Carolina chickadees, I will likely abandon all banding.