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Project Perch's BuOw Blog 14

Friday, March 21, 2014

### **Burrow Visitors: Commensalism or Mutualism**

#### **The Tiny Visitor**

We called the small bird the tiny visitor. We asked Ken Schneider to help us identify it and he sent back "Looks like a Palm Warbler. Line over eye, long legs, constantly moves tail up and down."<sup>1</sup> The bird was always flicking its tail and he had described it perfectly. Ken even got a picture of the tiny bird the one day he photographed the owls.



**November 14, 2013 - Palm Warbler by Ken Schneider**

We thought the bird must be snacking on bugs at the burrow, but it was so small, it looked like owl food to us. So we asked Dr. Mealey why this small bird kept visiting the owl burrow. Dr. Mealey confirmed exactly what we thought. "They are omnivores, simply being opportunistic with bugs that are attracted to the remaining prey."<sup>2</sup> Dr. Mealey wrote "There's also a possibility of commensalism/mutualism in which the warblers pick off parasites from the owl benefiting one or both of them."<sup>2</sup> So off we went to find exact definitions and to try and categorize the relationships we were watching.

### **Commensalism and Mutualism**

Commensalism is a relationship between two species in which one species obtains food or a different benefit from the other without either harming or benefitting the latter.<sup>3</sup> The word derives from "commensal"; from the prefix "com" which means together and "mensa" which means table or meal; it means to eat at the same table.<sup>4</sup> In biology, the term was originally used to describe the eating of food waste by second animals, like the carcass eaters that follow hunting animals, but wait until they have finished their meal.<sup>4</sup> We definitely saw the Tiny Visitor scavenging bugs from around the burrow but never when the owls were actively eating themselves.

We also never saw any direct interaction between the burrowing owls and the Palm warbler but before the hawk arrived on March 7, 2014 we could hear the tiny bird chirping loudly. One of the primary avian predators of the Palm warbler is also the Cooper's hawk who specializes in small to medium sized birds.<sup>5</sup> So the Burrowing owls and Palm warblers share a predator and their alarm calls can alert each other to danger. So the owls benefit too. Mutualism is a relationship between two species in which each species is benefitted, also known as symbiotic.<sup>6</sup>

### **The Squirrels**

There had been other visitors to the owl burrow. When the cam first went live, the squirrels were the first and most common visitors. They would run along the fence line, hop down in front of the owls and stop and look. Their visits were very fun. Too big to be a prey item for the owl, the squirrels seemed to be just nosey neighbors, but squirrels also have to worry about hawks.



**June 8, 2013 - Squirrel Face Off by Nancy Boyle, SFAS**

In her thesis research in 2012, Lisa Ann Hendersen investigated whether ground squirrel calls reduced predation on nearby Western burrowing owls.<sup>7</sup> Her research showed that 60% of the time the ground squirrels responded first to a predator whereas burrowing owls only responded first 30% of the time.<sup>7</sup> The squirrels stand up, whistle, chatter, chip, make a tonic call, run towards and dive into their burrows.<sup>7</sup> Living in close proximity to and having squirrels around makes a lot of sense for the owls.<sup>7</sup> Both species benefit by being alerted more often to the same predators.

### **Smaller Scavengers and Predators: Flies, Dragonflies, Grasshoppers, Lizards and Skinks**

The parent owls were defecating in the area to increase the bugs available for their owlets. Once the owlets were hatched, there was a lot of feeding going on and the amount of remains around the burrow dramatically increased. There were carcasses strewn everywhere, bugs crawling around and the burrow was literally buzzing with flies. We would say the burrow looked like a macabre scene from a horror movie. There were several scavengers small, medium and large who came to feed. One morning there were 4 flies on the perch and we also saw grasshoppers and dragonflies.

When the owls had their first set of nestlings there was a lizard on the perch. For two days we saw a Southeastern five lined skink hanging around the burrow and even going inside. We thought the owls must not be home at the time, but later the owls were seen at the burrow on both days so they could have been home. Father owl brought their nestlings a live lizard and a grasshopper to help them learn. Smaller scavengers and predators came to the burrow to find food items for themselves and for the most part they benefit, except when there are owlets and then maybe they become the food items.

## The American Crow, Mottled Duck and Mockingbird

Then a medium sized scavenger, the American crow, showed up at the burrow. Crows are omnivores and have a very diverse diet.<sup>7</sup> They will eat almost anything including bugs, other birds, frogs, snakes, nestlings, mice and carrion also makes up a small percentage of their diet.<sup>7</sup> The crow wanted a carcass that was very close to the burrow but the male owl was guarding the owlets inside the burrow and so he chased the crow away. The crow tried again and the male owl chased him off again. Then father owl went back into the burrow and left the carcass right where it was and the crow grabbed it and took off with it. Some viewers wrote that the crow stole the owls' lunch, but the owl had plenty of time to take it back into the burrow if they still wanted it, but the owls were done with it and so the crow could have it.



**February 20, 2014 – Crow Trying to Get a Snack**

Crows are not bad neighbors to have because crows will mob a predator. A mob is an assemblage of individuals around a potentially dangerous predator.<sup>9</sup> Mobbing is an anti-predator behavior and mobbing calls are used to summon nearby individuals to join in.<sup>9</sup> Mobbing has evolved independently in many species whose young are frequently preyed upon.<sup>9</sup> Crows mob Cooper's, Sharp-shinned and Red-tailed hawks which are predators they share with the burrowing owls. So the crows benefit from the food at the burrow and maybe the owls get some help detecting predators.

Besides the ability to drive the predator away, mobbing draws attention to a predator, making stealth attacks impossible. Mobbing plays a critical role in the identification of predators and inter-generational learning about predator identification.<sup>10</sup> The reintroduction of species have failed because the population lacks the cultural knowledge of how to identify local predators.<sup>10</sup> Scientists are exploring ways to train populations to identify and respond to predators before releasing them into the wild.<sup>10</sup> Perhaps there is some inter-species learning about predator identification, where owlets can also learn from crows how to spot hawks.

When feeding the first set of owlets, we saw the owls bring nestlings and ducklings back as prey items. We also saw a mother Mottled duck parade her ducklings past the burrow. The ducklings snacked on insects and rested while the owls were all down in the burrow. We wondered if this mother duck was already missing a baby and why would she bring them to the burrow to snack, but she did. We saw a mockingbird standing on the perch and fiercely displaying at the owls not long after one of the nestling prey items showed up. Mockingbirds, like crows, also mob their predators. Had they too lost a nestling to the owls and were the mockingbirds mobbing the owls? Were these relationships just predator and prey? Or did the ducklings also benefit from increased foraging at the burrow? Did the owls also benefit from better predator detection because Mockingbirds mob hawks too?



June 20, 2013 - Mottled Duck and Ducklings

### **The Vultures**

Later, on the very same day the crow showed up, two kinds of vultures showed up at the burrow, the Turkey and Black vulture. Fans were concerned for the owls, but they were safely down in the burrow and the vultures walked around picking up all sorts of remains. The Turkey vulture rarely, if ever, kills prey, but instead follows the smell of recently deceased prey.<sup>8</sup> It is followed by the Black vulture, who cannot detect the smell of prey on its own but is stronger and can tear apart carrion that the Turkey vulture cannot.<sup>8</sup> Their relationship is often described as one of mutual dependence, but the Black vulture is larger and when in multiples can bully the food away from the scouts.<sup>8</sup> There were only a few vultures at the burrow that day and they peacefully cleaned up the area and then left. The vultures scavenging seemed to be one of the few examples of commensalism we saw; the vultures were eating carrion and the owls did not appear to benefit or be harmed.

### **A Completely Different Kind of Commensalism: Butterflies and Bees**

In the summer we documented two Peacock butterfly visits and there are always butterflies and skippers seen landing around the burrow. Butterflies and other insects engage in mud-puddling, where they aggregate on wet soil, dung or carrion and obtain nutrients like salts and amino acids.<sup>11</sup> For male butterflies it increases their reproductive success and they transfer the nutrients to the female during mating because the nutrients enhance the survival rate of the eggs.<sup>12</sup> When the owls dig and reshape their burrow they take soil from underground and transfer it to the surface. They also deposit carrion and dung around the burrow, everything a butterfly needs to puddle. In an urban landscape that is mostly concrete, pavement and sod, places to puddle are hard to find.

We also saw a lot of bees around the burrow and one day we even saw an owl moving out of their way. Another time we were observing the owlets from a safe distance and noticed all of these Halictid green bees in the area when we realized they were nesting underground in very close to proximity to the natural burrow. Had the owls tilled the area for bees and did that loosen up the soil and allow them to burrow into the ground?

### **Another Complex Relationship: Fire Ants**

We spent a considerable amount of time this fall trying to protect the owls from nearby fire ant mounds (see BuOw Blog 10). Then the owlet laid down one day and Dr. Mealey taught us about “anting”.<sup>2</sup> Anting is a behavior where the owls literally lay down in the ants, which allows the formic acid from the ants to clean their feathers from parasites (see BuOw Blog 13).<sup>2</sup> Anting may also strip the ants of their formic acid and make them edible.<sup>2</sup> We did see the owlet eating some small bugs, which could have been ants. So their relationship is not always commensalism but sometimes a parasitic relationship, where some of the ants are definitely harmed. Every once in a while something goes terribly wrong for an owl and the ants get the upper hand; because the local wildlife care center has treated an immobilized juvenile that had sustained too many fire ant bites on its legs. Burrowing owls and ants have a complex relationship indeed.

## The Burrowing Owl's Ecosystem

"The plants and animals that are found in a particular location are referred to as an ecosystem. These plants and animals depend on each other to survive. In a delicate balance, these life forms help to sustain one another in regular patterns."<sup>13</sup> The cam teaches us not just about burrowing owls, but about the entire burrow ecosystem and there is a lot that goes on in and around the burrow. When we first started watching the cam, we expected to see mostly owls, hoped for owlets and knew we would see some prey, but we've seen so many other players in the owls' community and learned so much more.

### **Sources:**

<sup>1</sup> Schneider, Dr. Ken. 2014. Personal Communication.

<sup>2</sup> Mealey, Dr. Brian. 2014. Personal Communication.

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<sup>4</sup> Harper, Douglas. Online Entymology Dictionary. <http://www.etymonline.com/index.php?term=commensalism>

<sup>5</sup> University of Michigan Museum of Zoology Animal Diversity Web, [http://animaldiversity.ummz.umich.edu/accounts/Dendroica\\_palmarum/](http://animaldiversity.ummz.umich.edu/accounts/Dendroica_palmarum/)

<sup>6</sup> Encyclopedia Britannica, <http://www.britannica.com/EBchecked/topic/399884/mutualism>

<sup>7</sup> Henderson, Lisa Anne. 2012. Burrowing Owl Predation in the South Bay; Do California Ground Squirrel Calls Reduce the Risk? San Jose State University Thesis Research, [http://www.scvas.org/pdf/BUOWConsortium/BUOWPredation\\_LisaHenderson.pdf](http://www.scvas.org/pdf/BUOWConsortium/BUOWPredation_LisaHenderson.pdf)

<sup>8</sup> The Cornell Lab of Ornithology, All About Birds Bird Guide, <http://www.allaboutbirds.org/guide/>

<sup>9</sup> Curio, E. 1978. The adaptive significance of avian mobbing. I. Teleonomic hypotheses and predictions. *Zeitschrift fur Tierpsychologie* 48: 175–183.

<sup>10</sup> Griffin, Andrea S., Daniel T. Blumstein and Christopher S. Evans. October 2000. Training Captive-Bred or Translocated Animals to Avoid Predators. *Conservation Biology* 14 (5): 1317–1326. <http://dx.doi.org/10.1046/j.1523-1739.2000.99326.x>

<sup>11</sup> Boggs, CL & LA Jackson 1991. Mud puddling by butterflies is not a simple matter. *Ecological Entymology* 16(1):123-127. [doi:10.1111/j.1365-2311.1991.tb00199.x](http://dx.doi.org/10.1111/j.1365-2311.1991.tb00199.x)

<sup>12</sup> Medley S.R. & Eisner, T. 1996. Sodium: a male nuptial gift to its offspring. *PNAS* 93(2):809-813.

<sup>13</sup> Geography for Kids, Ecosystem. <http://www.kidsgeo.com/geography-for-kids/0164-ecosystems.php>