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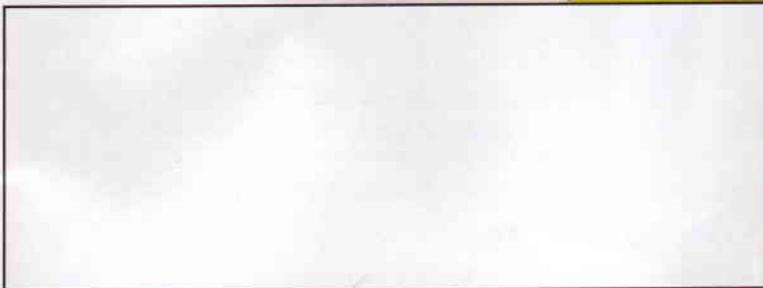
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REDEFINING BITE SIZE PORTIONS



Articles & photos by Jessica Rozek

New research sheds light on Amazon parrot **food-size preferences.**

Some have sought to scientifically demonstrate that companion parrots have a preference for specific products — that certain items may engage parrots more than others and, in doing so, may improve their welfare.

For example, Lillian Kim's research at the University of California, Davis, determined that orange-winged Amazon parrots prefer chewing wooden blocks that are yellow over blocks that are green, blue or violet.

In tandem to these research efforts, investigators are also trying to understand the biological reason behind these observed preferences. Kim suggested that yellow blocks were more appealing to Amazon parrots because they mimic foods such as ripe fruits that are found in their wild habitat.

However, there is little scientific information on the impact of feeding behaviors in companion parrots. How long do captive parrots spend foraging? What time of day do they eat? Do parrots prefer particular pellet types? And how does all of this match up to the behaviors that have been observed and documented in wild parrots?

I was fortunate enough to spend two years working with the most enjoyable (and loudest) colleagues I may ever have: an orange-winged Amazon parrot colony.

QUEST FOR INFORMATION

I came to the University of California, Davis, in 2008 as a new graduate student in the Avian Sciences program to pursue my interests in animal welfare, environmental enrichment and, of course, birds. With The Marguerite Winn Endowment for Parrot Research and the UC Davis Department of Animal Science funding my research, I was fortunate enough to spend two years working with the most enjoyable — and loudest — colleagues I may ever have: an orange-winged Amazon parrot colony.

My colony was made up of 15 Amazons aged 7 to 19, with males and females

fairly evenly represented. The birds were housed in the same room in individual large cages with various perches. They received regular enrichment of toys and out-of-cage time and occa-

sional food enrichment, such as almonds and fruits. Their daylight schedule mimicked that of their native habitat: 12 hours of light and 12 hours of dark.

First, we wanted to determine how long Amazon parrots spend foraging on a pelleted diet. To answer this question, we constructed a system of infrared beams that crossed through the cage at key locations; in front of the food and water stations, and across the length of the perches.

The beams were connected to a computer that downloaded information once every second. This information informed us as to where the parrot was in the cage and how long it was there. Our parrots were fed low-fat maintenance pellets, size "small," which is recommended for this species.

PATTERNS EMERGE

What we learned was new, interesting information that had never been previously documented. First, our parrots had the same feeding pattern as that observed in wild birds: a peak of morning feeding, followed by a period of rest, and then another feeding in the late afternoon. Another notable pattern was that parrots in adjacent cages visited their feeders at nearly identical times.

This feeding synchronicity may reflect a strong affinity between birds. For example, in pair-bonded cockatiels synchronous behavior can be a predictor of pair-bond strength and reproductive success. However, the last piece of information we gathered was startling. Our parrots were only spending about 5.9 percent of their day foraging (just 42 minutes of a 12-hour day).

This low figure immediately prompted our second question: Can foraging time be extended by using differ-

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FOOD SIZE & FORAGE TIME

The ingredients of the small pellets and the over-sized ones were identical; the only difference was size and shape. The small ones were little cylinders that were less than half an inch long and less than a quarter inch in diameter, while the over-sized pellets were roughly spherical and about an inch in diameter, like a large marble. Importantly, the over-sized pellets were comparable to the size of palm fruits, while the small pellets were smaller than any fruits normally consumed by wild Amazons.

We conducted the trial again with the over-sized pellets. The same patterns of feeding time and synchronicity were observed. However, foraging time increased more than four-fold. The birds now spent 25.7 percent (or just over three hours) of their day feeding on the over-sized pellets. This amount

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of foraging time much more closely resembles foraging times of wild parrots. The birds also used their feet and beaks to manipulate the over-sized pellets, which is a natural feeding behavior, for a longer period of time.

Our third question stemmed from the results of the first experiment: Do parrots

prefer one pellet type over the other? To answer this, birds were simultaneously presented with either small or over-sized pellets in identical feeders, and data was collected by both visual observation and the weight of the unconsumed feed.

Parrots overwhelmingly chose the over-sized pellets (seven times more often) and hardly removed the small pellets at all when the over-sized ones were also

available. This demonstrated a strong preference for the over-sized pellets.

However, a preference may not mean much; without other data, it is difficult to tell if a preference is weak or strong. To determine if the parrots strongly preferred the over-sized pellets, we tested their motivation to access them. The birds were trained to lift a lid in order to gain access to their feeders. Gradually, weights were added to the lids to make it more difficult to retrieve pellets. In one experiment, a feeder was full of small pellets with no lid to lift (free), while another feeder contained over-sized pellets with a lid and weights.

In this situation, the parrots were so motivated for the larger pellets that they not only ignored pellets in the adjacent "free" feeder, but they also lifted lids weighing more than their own body weight (480 grams) to gain access to the over-sized pellets.

WILD AMAZONS

See how they feed.

Wild birds also follow a predictable schedule that revolves around food. In the forests and swamps of northern South America, an Amazon parrot's day typically begins around dawn with calls from the roosting flock and, perhaps, gentle preening from its mate. This peak of morning activity continues with a burst of color and excitement when the parrots depart from their roost site in search of food.

Within the first three hours of daylight, Amazons fly above the canopy, sometimes for miles, until they reach their foraging grounds. They typically travel in pairs but have also been observed in small flocks of three to five birds, possibly a small family group.

FORAGING HABITS

Their foraging ground is full of seasonal fruits and seeds from various trees like ebony, strangler fig, coma and, importantly, palm. Orange-winged Amazon parrots in the Trinidadian wild feed almost exclusively on the fruit of just two species of palm trees, almost 85 percent of their annual diet! The other 15 percent of non-palm fruit is only consumed during the late dry season, when palm fruit is not readily available, and the parrots are forced to change their feeding habits. For other species, like the red-bellied macaw, palm fruit can make up a staggering 97 percent of its annual diet.

Palm fruits come in a variety of sizes; the two species the orange-winged Amazon feast on range in size from about the size of a shooter marble, to the size of a small grape. Strangler fig and coma fruits and seeds, which are also consumed by Amazons, show comparable size variation as the palm fruit. To feed on these items, parrots must use both their beak and feet in a coordinated effort to actively manipulate and rotate the food. This style of feeding, where food is lifted directly to the beak for access, is highly developed in parrots. Other avian species, including some parrots, must lower their heads to feed, which may increase vulnerability and the risk of predation.

After the morning activity wanes, there is a period of calm and rest before another spike of feeding and travel in the late afternoon. This is a pattern that has been observed in numerous birds around the globe, including many parrot species.

The total time spent foraging by parrots differs among species and by season, even for birds found in the same location. For example, galahs (rose-breasted cockatoos) and red-rumped parrots from the Canberra region of Australia differ in foraging time throughout the year. Galahs show little variation across seasons and consistently spend about 50 percent of the day foraging.

In contrast, red-rumped parrots spend about 40 percent of their day foraging in the winter months compared to more than 70 percent during the breeding season. Other species, like lilac-crowned Amazons, have been observed foraging for seven hours of the day, dividing their time into four hours in the morning and three hours in the late afternoon; this would comprise about 60 percent of a 12-hour day.



INTERPRETING RESEARCH

This information does not necessarily mean that over-sized pellets are appropriate for captive Amazons, mainly because we don't understand all the reasons behind the behaviors we observed. It means that our birds demonstrated that they prefer these larger pellets. Currently, it is impossible to tell if their overall welfare has improved, but we know that their foraging time is greatly extended, and other research has shown that this can prevent and reduce problems that captive birds encounter, like feather-damaging behavior.

There are several possible explanations for why the birds preferred the larger pellets. They might have been selecting them because, like economical shoppers, each pellet contained more food. Or perhaps they preferred their roughly spherical shape to the cylindrical shape of the smaller pellets. Maybe, as in Kim's hypothesis, the Amazons were guided by their natural history and preferred pellets that resemble the size and shape of palm fruit, which may elicit natural manipulation behaviors.

Further studies are needed to narrow down the possibilities. The quest for reliable information continues as researchers hope to provide parrot caretakers with knowledge that will allow them to make informed decisions in the interest of their bird's welfare. ●

Jessica Rozek recently accepted a job with Wildlife Reserves Singapore, the parent company of Jurong Bird Park and Singapore Zoo.