Puerto Rican Plain Pigeon Food Intake in a Captive Breeding Program

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Puerto Rican Plain Pigeon at the aviary of the Puerto Rican Plain Pigeon Project, Humacao Campus of the University of Puerto Rico. Photo courtesy of Fr. Alejandro J. Sánchez Muñoz, Puerto Rico.

The Puerto Rican Plain Pigeon (*Columba inornata wetmorei*) is one of the endangered species in the island of Puerto Rico. A captive breeding program was established from 1984 to 2001 at the University of Puerto Rico (UPR) Humacao Campus as a way of combating the decline of this species. The captive breeding program in UPR Humacao had the objective of establishing appropriate techniques for reproducing the species and produce individuals to be freed in the state forests. The captive program has been successful in its use of pigeon milk to feed the hatchlings by a surrogate mother or by hand. This led to the successful breeding of 44 pigeons in 1989, a record in captive breeding programs (Perez 2004). Despite the longevity and successes of the program, specifics for this particular race of plain pigeon are not well known. For the first time in this study we measured the amount of feed that the pigeons consume in captivity to determine their caloric intake and needs in case daily feeds are not available or illness arises in an individual.

The plain pigeon is the size of a domestic pigeon with a pale blue-gray color, and dark red beak and legs. Historically, it was widespread in the western foothills and valleys of Puerto Rico. General habitat types used include lowland swamps and woodland, open woodland and cultivated land in the mountains, limestone karst, and coffee plantations in upland hills. The main source of food for the Plain Pigeon are day jasmine seeds (*Cestrum diurnum*), but they also feed on royal palm (*Roystonea borinquena*), mountain immortelle (*Erythrina poeppigiana*), West Indies trema (*Trema lamarckiana*), and white prickle (*Zanthoxylum martinicense*). (USFWS 2004)

Extensive destruction of natural forest habitat and overhunting are given as causes for the decline of the species. We can see this pattern manifested in the development history of Puerto Rico. By 1912, Puerto Rico had been largely cleared for agriculture and other purposes with one estimate placing the amount of remaining forest at no more than 5,000 acres of virgin or slightly-culled timber. By the middle 1930s the plain pigeon population was considered to be extinct, until, in 1963, a population was rediscovered in the town of Cidra, also following the pattern of forest regrowth in the island. Studies of that population between December 1973 and September 1975 attributed the majority of nest failures observed to human-caused disturbances. Habitat loss due to the rapid development of the Cidra area is the most serious threat to the species' existence. Though breeding occurs throughout the year, this species only lays one egg, and a maximum of 3 broods has been recorded. This contributes to decreased population growth when its nesting areas are reduced every year. Furthermore, it is thought that establishment of new populations has been limited by the bird's reluctance to colonize new areas. (USFWS 2004)

For this study, the diet for the captive individuals usually consisted of grains, supplemented with day jasmine (*Cestrum diurnum*) seeds, when in season. For the captive program, the amount of feed was determined based on the estimated protein and fat requirements of the family *Columbidae* (Baer 1984). However, such estimates are not precise and despite of the lon-

gevity of the captive program, the exact dietary requirements of the plain pigeon and the effects of captivity on its feeding behaviors are largely unknown. As the nature of captive programs make daily feedings difficult, insights into dietary requirements of the plain pigeon are critical, not only to evaluate the health of captive individuals, but also to make necessary adjustments to avoid food deficits.

Our objective was to determine the average caloric intake of the Puerto Rican plain pigeon in captivity. Each pigeon was kept in individual cages, and we chose 8 individuals for this study from the smallest cages in the captive breeding project, due to ease of handling. The daily feed for the captive plain pigeons consisted of grains, containing 15% protein, 2.5% fat, and 10.5% fiber, well within the range of proteins (12-28%), and fat (1%) suggested by Dierenfeld (Dierenfeld and Kreger 1992). Each bird was given 45-55g of feed each morning in a marked cup. A small carton box was placed under each cage to collect the feed spilled during the day. Unconsumed feed was collected from the cup and the carton box and weighed each day between 6 and 7pm to determine the daily consumption of each of the birds (the original weight of feed minus the weight of unconsumed feed). To determine the daily caloric intake the weight of feed consumed was then converted to a caloric equivalent. This procedure was repeated each day of every other week from February through April in 2001.

We found that the captive Puerto Rican plain pigeon consumes an average of 11.425 grams of feed daily or 54.383 cal. This average daily caloric intake is considerably smaller than the average for the *Columbidae* family (Perez 2004). Approximately one third of the pigeons would had no food intake for days, despite readily available food, and when they did eat, it was in very small quantities. On average, the older plain pigeons ate much less than expected under normal conditions for *Columbidae*.

Some possible reasons for these results are 1. Plain pigeons in captivity eat less than pigeons in the wild because they don't have to spend energy on flying, looking for food, and/or mating rituals 2. Food consumption of the pigeons decreases with age, and this was a likely factor in this study (pigeons on average were 10 years old). Further studies are needed to determine if the effect of captivity, age, or an interaction of these two factors caused the decrease in food intake of the captive individuals. Potential future research may include monitoring of wild individuals parallel to a similar set-up of this study with younger actively breeding captive individuals. Further research may help us to better understand and improve the health of the captive individuals and the success of the captive breeding program.

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