

Food preferences of cockatiel chicks (*Nymphicus hollandicus*) in captivity

[*Preferência alimentar de filhotes de calopsitas (Nymphicus hollandicus) mantidos em cativeiro*]

D.A.S. Naves, T. S.G. Carvalho, M.G. Zangeronimo*, C.E.P. Saad, J.D. Scalon

Universidade Federal de Lavras – Lavras, MG

ABSTRACT

In order to improve the management and maintenance of the quality of life of captive wild birds, this study aimed to assess the food preferences of cockatiel chicks (*Nymphicus hollandicus*) kept in captivity. Thirty-two cockatiel chicks, three to 12 months of age, were kept in a galvanized, wire-netted vivarium with six ceramic feeders, two for an extruded diet, two for a dry-mashed diet and two for a seed mixture. Both extruded and dry-mashed food are commercial psittacine diets. Three round ceramic pots were used to provide water. The birds were exposed to 12 hours of artificial light (40 W incandescent lamps) during the experimental period of 27 days. The birds were observed by video filming, daily, through an ad libitum observation technique. The food consumption was 3.34 ± 0.42 g/bird/day of extruded feed, 1.58 ± 0.44 g/bird/day of dry-mashed diet and 3.73 ± 0.10 g/bird/day of seed mixture. In conclusion, the cockatiel chicks preferred the seed mixture and the extruded food over the dry-mashed diet.

Keywords: Animal behavior, psittacines, extruded food, food intake, seeds

RESUMO

Considerando a busca por melhorias no manejo e na manutenção da qualidade de vida de aves selvagens cativas, este trabalho teve como objetivo a avaliação da preferência alimentar de filhotes de calopsitas (*Nymphicus hollandicus*) mantidos em cativeiro. Trinta e dois filhotes de calopsitas com idade entre três e 12 meses de idade foram alojados em um viveiro de arame galvanizado contendo seis comedouros de cerâmica, sendo dois para ração extrusada, dois para ração farinhada e dois para a mistura de sementes. Tanto a ração extrusada quanto a ração farinhada são dietas comerciais para psitacídeos. Três potes redondos de cerâmica foram usados para fornecer água. As aves foram expostas a 12 horas de luz artificial (40W lâmpadas incandescentes) durante o período experimental de 27 dias. As aves foram observadas por filmagens de vídeo, diariamente, por meio de uma técnica de observação ad libitum. O consumo alimentar foi de $3,34 \pm 0,42$ g/ave/dia de ração extrusada, $1,58 \pm 0,44$ g/ave/dia de ração farinhada e $3,73 \pm 0,10$ g/ave/dia de mistura de sementes. Em conclusão, os filhotes de calopsitas preferiram a mistura de sementes e a ração extrusada em relação à ração farinhada.

Palavras-chave: comportamento animal, psitacídeos, ração extrusada, ingestão de alimentos, sementes

INTRODUCTION

The cockatiel (*Nymphicus hollandicus*) is the smallest existing species of cockatoo in the world, weighing approximately 100 g with a length of about 29 to 32 cm (White *et al.*, 2011), and is native to the desert regions of Australia (Forshaw, 2010). Due to the fact that it is a docile bird with colorful plumage that easily imitates sounds, including the human voice (Sick, 1997), it has become one of the most popular parrot

species kept as a pet. Its popularity has led to increased interest in its captive husbandry; however, information on this species is still scarce in the literature.

In general, the cockatiel is classified as a granivorous bird (Koutsos *et al.*, 2001), and under natural conditions its diet consists of a wide variety of seeds, fruits, leaves, flowers and insects (Harcourt-Brown, 2000). However, in captivity, the nutritional requirements of birds are modified. Under natural conditions, these

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*Autor para correspondência (*corresponding author*)

E-mail: zangeronimo@dmv.ufla.br

animals often fly for kilometers to get food and have the ability to choose one of their preferences, which does not occur when they are kept in cages or aviaries (Carciofi and Saad, 2001). Furthermore, captive cockatiels are commonly provided with a constant supply of food in quantities above those required for survival, which makes it difficult to understand their food preferences (Saad and Machado, 2000).

For cockatiels in captivity, the wide availability of commercial food, such as seed mixtures or feed manufactured in many different physical forms, makes it necessary to understand the feeding preferences of captive chicks and adults in order to improve animal welfare. Thus, the aim of this study was to evaluate the feeding preferences of cockatiel chicks kept in captivity.

MATERIAL AND METHODS

All procedures involved in this study were approved by the Ethics Committee on Animal Use of the Federal University of Lavras (protocol number 010/14). The study used 32 cockatiel chicks three to 12 months old from the Sector of Wild Animals located in the Animal Science Department, Federal University of Lavras. Before entering the experiment, the animals remained with their parents in breeding cages (dimension of cages: 43cm long x 27cm wide x 62cm high), until they were one month old when they were transferred to the experimental vivarium (dimension of vivarium: 3.0m long x 1.0m wide x 1.80m high) made of galvanized wire. The vivarium contained bird perches made of crimped galvanized wire (10mm diameter) and four ceramic feeders of approximately 10cm in diameter, of which two were used for a commercial psittacine diet and two for a seed mixture. Three round ceramic pots (6cm diameter) were used as water drinkers. During this period, we used a 12-hour lighting system of artificial light (Forshaw, 1989) maintained with 40 W incandescent lamps.

During the experimental period of 27 days, three diets were tested in six feeders (two for each diet) homogeneously distributed on the aviary floor, such that all birds had the same opportunity to access food. The animals were fed with: 1) extruded food for cockatiels (Complete Food for Birds Bambito Extruded Biotron, Rio

Claro, São Paulo, Brazil); 2) dry-mashed diet for psittacines (Complete Food For Birds CC Parrots Biotron, Rio Claro, São Paulo, Brazil) and 3) seed mixture in the proportion of 50% of millet, 30% birdseed, 15% oats and 5% sunflower formulated following the recommendations by Torloni (1991). Food consumption was measured daily by providing a known amount of food and then evaluating leftovers and waste the next day. Water was provided *ad libitum* and excreta were collected daily with the help of newspaper sheets covering the aviary floor. The lighting system was the same used during the pre-experimental period.

The birds were observed daily in the afternoon, after their daily management, by the *ad libitum* observing technique (Castro, 2010). Room temperature and relative air humidity were measured daily by a digital thermo-hygrometer (model 7666.02.0.00, Incoterm, Porto Alegre-RS, Brazil).

The experimental design was completely randomized consisting of a longitudinal design in which the experimental plot was the group of 32 cockatiels, and the food intake was measured every day throughout the 27 days of the experimental period.

The data were statistically analyzed, and the Kolmogorov-Smirnov test was used to verify the null hypothesis of the variables (Peat and Barton, 2005). Next, the test suggested by Mauchly (1940) to test against the null hypothesis sphericity was applied. Univariate analysis of the variance of food profiles was conducted to test the hypothesis that the average food consumption profile was the same for the three types of food (Crowder and Hand, 1995). Finally, Tukey's multiple comparison test was applied (Peat and Barton, 2005). Data were analyzed using the statistical program R (R Development..., 2014).

RESULTS AND DISCUSSION

The room temperature during the experimental period was $28.5 \pm 1.7^\circ\text{C}$ with a maximum of $35.2 \pm 2.7^\circ\text{C}$ and a minimum of $21.9 \pm 1.0^\circ\text{C}$. The relative air humidity was $51.0 \pm 7.3\%$ with a maximum of $68.6 \pm 6.1\%$ and a minimum of $34.1 \pm 8.9\%$.

Food preferences...

There was no interaction between time and type of food ($P>0.05$). During the experimental period, cockatiels showed ($P<0.05$) a higher intake of the seed mixture and the extruded food

compared to the dry-mashed diet diet (Table 1). This result agrees with what is expected for wild cockatiels, which prefer nuts and other seeds (Forshaw, 2010).

Table 1. Food intake of cockatiel chicks (*Nymphicus hollandicus*) during the experimental period (n = 32)

Type of food	Food intake (g/day)	Standard deviation (g/day)	Coefficient of variation (%)	P-value
Extruded food	3.34 a	0.41	12.4	<0.01
Dry-mashed food	1.57 b	0.44	28.0	
Seed mixture	3.72 a	0.10	2.5	

Means followed by the same letter do not differ by Tukey's test.

The majority of parrots are generalists with respect to their feeding behavior, and their diet includes many kinds of seeds and fruits that are obtained in the tree tops or on the ground (Sick, 2001; Paranhos *et al.*, 2007; Silva, 2007). However, for captive chicks this information has been unknown. However, by the *ad libitum* technique, it was found that once the food was introduced into the aviary, approximately 85% of the birds were immediately directed to the pot with the seed mixture while others preferred to stay on the perch grooming, grooming another bird or staying with their beak fixed in the aviary screen.

In captivity, the extruded feed resulted in similar intake to the seed mixture. Figure 1 demonstrates that initially, between the second and third day of the experiment, the birds expressed interest in the extruded food which was introduced to the birds during the beginning of the experiment. This result may be related to the physical form of the food. However, from the third day onward, the food preference was the seed mix. Coincidentally

from that same period, the intake of the dry-mash diet, to which the birds were already adapted, was reduced, indicating a greater preference for diets with larger particles. According to Klein (2009), the physical form of the food stimulates food demand and intake, and prevents or reduces the selection of ingredients, improving the nutritional status of the birds. Thus, as in other adult birds, the chicks seem to seek food particles with greater geometrical diameters. This behavior can be related to the size and shape of the beak and not necessarily related to the chemical composition of the food (Nir *et al.*, 1990). Furthermore, according to Arruda *et al.*, (2008), the birds have a preference for brightly colored foods, such as red and brown, compared to white. In this study, the intake of the extruded food and seed mixture, both of which had brown coloration, was higher than the dry-mashed psittacine diet which had a yellow color. Thus, further studies with foods of different colors and physical forms should be performed in order to clarify the food preferences of cockatiel chicks.

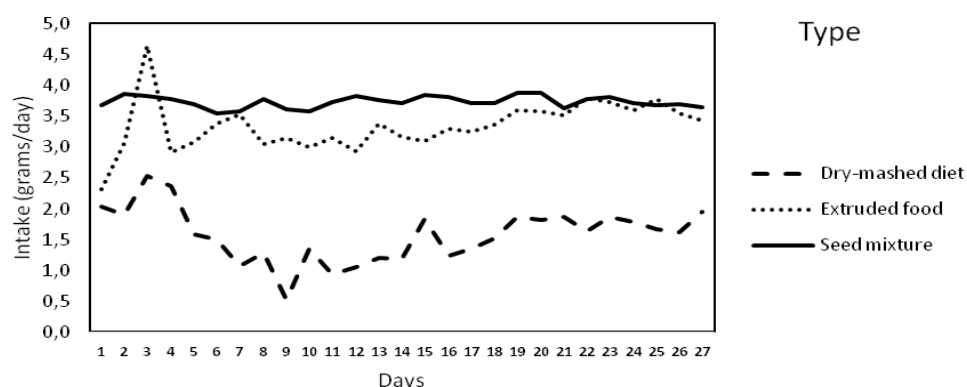


Figure 1. Food intake by cockatiel chicks (*Nymphicus hollandicus*) (n = 32) of three different foods during the experimental period.

CONCLUSION

Cockatiel chicks prefer larger food particles such as seed mixtures or extruded food.

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