

First Captive Breeding of the Black Hornbill at Jurong Birdpark

Anthracoceros m. malayanus

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General Description

The Black Hornbill (*Anthracoceros m. malayanus*) is distributed throughout most of southeast Asia, from Sumatra east to Borneo and north to Southern Peninsular Thailand. They are found in low land areas stretching up to an altitude of 4,000 feet.

In most hornbill species, sexes can be differentiated by the size of bill and casque; some by the color of the iris.

The general plumage of the adult male is glossy black with a blue green sheen. The color of the eyes is brown

and sometimes there can also be a white or grayish streak above the eye. The outer four remiges at the tail are broadly tipped with white. The color of the bare skin around the eye is bluish black with a patch of yellow beneath. The casque is high and projects forward. Seen from the side, the outline of the casque is convex. The bill and casque are white in color.

The general plumage of the adult female is similar to the male except for some features. The color of the eyes is orange and the color of the bare skin



This female and her six-month-old chick stayed close together in this well-planted aviary.

around the eye including the patch beneath the eye is pinkish. The casque is much smaller and has a nearly straight frontal edge. Both the bill and casque are blackish in color.

History of Birds

Six Black Hornbills (two male and four female) were introduced to one aviary of the Exhibit on July 25, 1990.

On November 29, 1990, one male was found dead (attacked by the dominant male).

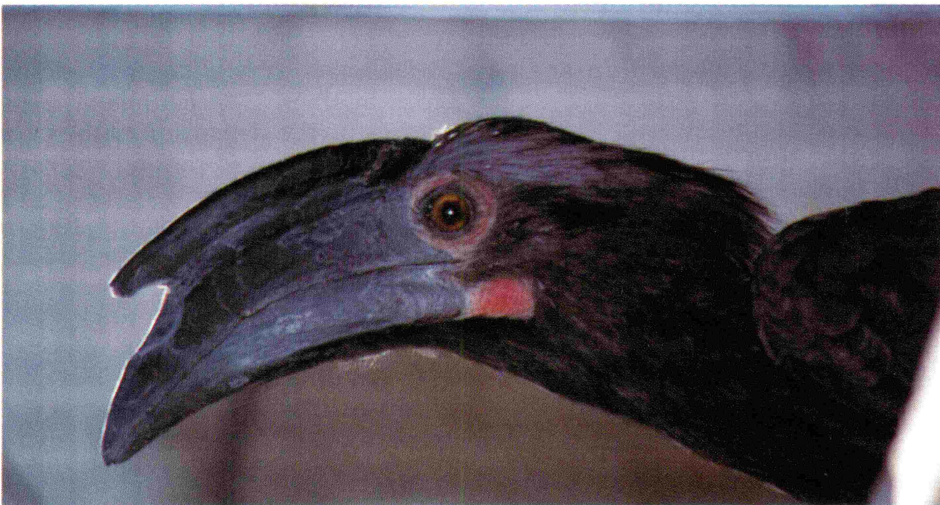
On November 7, 1990, one female was transferred to the sick bay (weak).

On November 5, 1991, two females were transferred to the transit aviary because the pair was showing signs of aggression.

One pair was left (the breeding pair).

Aviary

There are 21 compartments in the hornbill exhibit. Arranged in two rows, comprising of nine compartments in the front row and 10 compartments at the rear with two smaller



The smaller casque and darker color indicate that this Black Hornbill is a female.



Black Hornbill male. This species is found in Borneo and Sumatra.

compartments sited apart. The Black Hornbill is housed on the left most compartment of the row at the rear. The dimensions are 6m x 12m x 10m (20' x 40' x 33'). The right side of the aviary is covered with a green screen to preclude the birds from seeing the neighboring birds (visual isolation), due to their aggressive behavior. A pond is provided in the aviary for drinking and bathing purposes.

Aviary Vegetation

Both sides of the aviary are planted with Fish-tail Palm (*Caryota mitis*) and MacArthur Palm (*Ptycosprema macarthuri*) to cover the green screen. Old World Heliconias are planted near the pond area and an Indian Coral Tree (*Erythrina glauca*) at the center of the aviary provides good shade for these Hornbills.

Normal Diet

Mixed fruits (diced bananas and papaya) - 700g/once a day

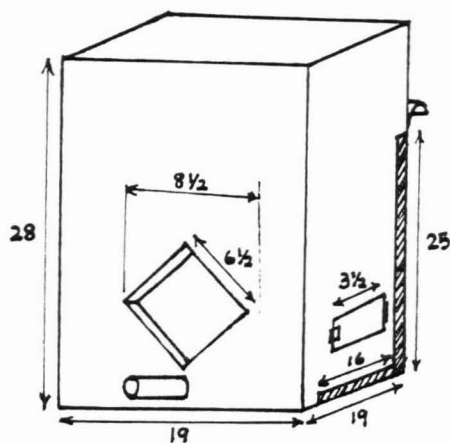
Bread mixed with minced meat and hard boiled eggs - 100g/once a day

Crickets - 20/twice a week

Mealworms - 40g/twice a week.

Nest Box

Rectangular in shape (Measurement in inches). See Diagram below.



Metal brackets are fixed to the rear and below to support the nest box which hangs from the aviary's lateral metal beam. There are observation windows on both sides of the box.

1. Depth of the nest entrance is two inches.

2. The height of the nesting box from the ground is eight feet.

3. The nesting box is constructed out of plywood (one half inch thick).

4. Generally, the nesting box is faced towards the west.



The hornbill aviary is arranged in two rows containing 21 compartments. The Black Hornbills are housed in the far left flight.

Nesting material

In early December 1991, earth and mud were placed inside all the nesting boxes.

Maintenance

Plants were left overgrown and the pond was cleaned with chlorox (sodium hypochloride solution) every two days. Minimum time was spent inside the aviary to avoid disturbance to the female, since this was their first breeding attempt.

Observation

On January 12, 1992, we noticed that the female had started covering the nest entrance. The female completed the process three days later.

Sealage

The female sealed the entrance with a mixture of mud and earth which had been put inside the nest box earlier. This seal was two inches thick at the edges (ie, the same thickness as the side walls of the nest box), tapering to one half inch at the centre of the entrance. At the side of the entrance, the wall is two inches thick. The female completed the process before egg-laying.

January 18, 1992 — First egg was noticed.

January 25, 1992 — Second egg noticed.

January 26, 1992 — Third egg noticed.

January 27, 1992 — Fourth and fifth eggs were noticed.

The eggs were white in color and oval in shape. We cannot give any details on the dimension of the eggs, as we had to avoid causing any stress to the female.

We discovered that the female started to molt only after she had laid the fifth egg. Her feathers were used to cushion the clutch.

Incubation Period (Diet)

Mixed fruits (diced bananas and papaya) - 700g/once a day.

Bread mixed with minced meat and hard boiled egg - 100g/once a day.

Crickets - 20 ps/twice a week.

White mice - 4 ps/three times a week.

Mealworms - 40g/twice a week.

During the incubation period, the male usually preferred bread mixed with minced meat, crickets and mice, which the male later regurgitated to the female. Later, the mixed fruits were consumed. In the afternoon, the male was seen approaching the nesting location and feeding the female in response to the female's soft chattering noise. The male ended up perching in the shade and preening. The incubation period was 26 days.

Hatching

The first young was hatched on February 13, 1992, the second on Febru

ary 21, 1992, the third on February 24, 1992, the fourth on February 27, 1992, (but discovered dead on February 29, 1992). The fifth egg was not fertile.

By this time, it was possible to check the female and the young every three days. Difficulties were encountered on checking the nest box because whenever we opened the observation window, the female would attack us.

Fledging

On April 20, 1992 at 08:00 hrs, the female broke open the sealed entrance; two of the chicks then emerged. Ten days later on April 30, 1992 the youngest chick came out of the nest box. First chick came out on day 67, second chick on day 59 and third chick on day 66.

We observed that the juvenile differed from the adult in bill and casque (white in both sexes). The casque appeared as merely a knob at the base of the calmen which was not fully developed, but the babies' plumage was similar to that of the adults.

After-hatching Diet

For the first few weeks, the amount of mixed fruits and mixture of bread fed remained the same. The other items in the diet were slowly increased according to the development of the young.

Once all the three young had hatched, the diet was increased to: crickets - 30 ps/day, mealworms - 40g (three times a week), white mice - 12 ps/once every two days.

The male continued to feed the two chicks who had come out of the nesting box as well as the chick still inside.

On April 28, 1992, we moved the male because he appeared to be weak. With the absence of the male, the female continued the responsibility of feeding the young. The young are currently still housed in the same aviary as the female. The sexes of the young have been determined as one male and two females.

After two years of operation, the main objective of breeding the hornbills at this theme exhibit was realized. This will, in turn, lead to more breeding of other hornbill species in the Jurong Bird Park. The achievement of breeding this species of hornbill is just a small step in Aviculture but a milestone in conservation. ➤

The Conservation of Hornbills in Captivity

*By Wendy Worth
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While captive propagation has played a significant part in rescuing many endangered species such as the California Condor, the Bali Myna and the Guam Kingfisher, the sad fact is that we do not yet have sufficient knowledge to use captive propagation to rescue hornbills. Developing reliable husbandry techniques should be a top priority for all of us who are interested in hornbills. This is especially true for those species found in southeast Asia where they are severely threatened by massive loss of habitat.

To date, there has been little input from the private sector as to their progress towards the development of reliable hornbill propagation techniques. We urgently need to get together all the people with knowledge on the subject and pool the information. Until now, the private sector and zoological institutions have been working separately on these issues. Collaboration could produce more success and hopefully save some species from extinction.

Large hornbills are among the most spectacular of zoo exhibits; however, they do not breed well in captivity. In fact, only five species of Asian hornbills have bred in zoological institutions in the United States, the Great Hornbill being one of them. Poor nesting success makes it imperative that more effective methods of captive propagation be developed.

This is where the private sector can make an important contribution! Here are the problems on which we need to work together:

- (1) Incomplete knowledge of nesting requirements.
- (2) Incomplete knowledge of dietary needs.
- (3) Incomplete knowledge of courtship and pair bonding cues.
- (4) No hand-rearing experience.

But problem solving alone is not enough: communicating with other individuals and institutions is also of the

utmost importance.

Hornbills have served humankind for centuries in myth and ritual throughout southeast Asia; they bring the rain for the crops in Borneo; they are the national bird of Sarawak; and their carved casques brought good luck to Chinese families for eons. And yet almost all large Asian hornbills are now seriously threatened by the logging industry which is taking away their nest sites. Recent articles tell the doleful story of the demise of the Malayan forests. Without the knowledge gleaned from captive propagation it is quite possible that these dramatic and special birds will become extinct in the wild.

The smaller African hornbills are neither as threatened in the wild nor as difficult to breed in captivity. However, their breeding strategy is similar to that of the Asian hornbills in which the female incarcerates herself in a nest hollow for several months while she incubates the eggs and raises the chicks. This makes the African species excellent candidates for breeders to work with to develop techniques that can then be applied to more endangered species.

One factor is known, and that is that the pair bonds are very important; however, the behaviors that indicate a potentially good pair are not. Another thing of known importance is the size of the nest opening as well as the placement of it in the nest log. In Thailand, Pilai Poonswad has been studying the nesting preferences of wild hornbills for ten years. She has found one shape that is chosen most frequently. Several zoos have redone the nest openings using this shape and have had immediate interest from pairs that had previously shown no nesting behavior.

Private sector breeding successes include endangered species like the Nene Goose, waterfowl in general and many pheasant species. They have also had excellent success with psittacines, most recently with parrotlets and lorries as good examples. By specializing their in-