



This baby palm cockatoo was photographed in the wild by Richard M. Schubot as it emerged from its nest on the Cape York Peninsula, Australia.

Black Palm Cockatoos

King of the Cockatoos

by Richard Schubot and staff
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The Palm Cockatoo, *Probosciger aterrimus*, is considered by some to be regal, the king of cockatoos. Others feel it has a sinister appearance but most will agree the Palm Cockatoo is a unique and fascinating bird.

The species is characterized by black plumage which is greyed by powder down. Its heavy beak is adapted for cracking hard seeds, which it does with ease. The highly specialized beak structure would seem to indicate co-evolution with a favored food item which, in this case, may be pandanus. Its naked red facial skin, capable of blushing, is unique in cockatoos. Oral and pharyngeal anatomy is also unique and highly specialized. Unlike other psittacines, the long bones of legs, especially the tibiotarsus, is unusually elongated and that part of the leg is sparsely feathered. The significance of these adaptations warrant further study.^{1,2}

Another area in need of study is Palm Cockatoo taxonomy. *Probosciger* is a monotypic genus. Palms range primarily on the Island of New Guinea which is divided into the independent country of Papua New Guinea on the east and West Irian, an Indonesian territory on the west. Palms are also found on some

surrounding islands and the Cape York Peninsula in North Queensland Australia.^{1,2,3,5}

Most authors refer to three subspecies of *Probosciger aterrimus*, all three found on New Guinea. *P.a. aterrimus*, the nominate subspecies, is reported from the Cape York Peninsula, but also ranges from the Aru Islands through southern Irian, eastward to the Gulf of Papua. Mr. Joseph describes the Cape York population as intermediate in size between *goliath* and *aterrimus*, speculating that it may be unique. The distance from the southern coast of New Guinea to the Cape York Peninsula is approximately 150 miles. Mr. Joseph also reported that the Cape York habitat was recently given protection from mining and agricultural utilization. *P.a. goliath* is the largest subspecies and ranges from the western Papuan Islands through western New Guinea (West Irian or Irian Jaya) in the region of the Vogelkop Mountains and eastwards through Papua New Guinea. *P.a. stenolophus* is similar in size to *P.a. goliath* but reportedly has narrower crest feathers. It ranges from Japen Island through northern West Irian eastwards to Collingwood Bay in Papua.^{1,2,3,4,5}

Subspecies distinctions are

extremely vague and may, in fact, represent geographical races. Overlapping size and physical characteristics makes current pairing difficult. Genetic analysis may be necessary to determine the validity of described subspecies.

Size difference between sexes has been observed. The average weight for all males in the Avicultural Breeding and Research Center (ABRC) collection is 721 grams (range: 545 to 1092 grams), while the average for all females is 602 grams (range: 503 to 950 grams). Weight for *P.a. goliath* is generally considered to be 800 to 1100 grams and for *P.a. aterrimus*, 500 to 750 grams. Palms are monomorphic making surgical sexing (or other techniques) necessary for proper pairing.^{1,5}

Habitat preference is rain forest edges and adjacent eucalyptus forests. It often moves considerable distances from rain forest areas through drier eucalyptus in search of food. Wild diet includes fruits, nuts, berries, seeds and vegetable matter. A favored food item is the fruit of the Pandanus. While often referred to as a palm tree, Pandanus species are in a separate family, *Pandanaceae*, which is closely allied with palms. The thick, fibrous hull of Pandanus fruit is easily pried open by Palm Cockatoos to obtain the seeds.^{1,3,6}

Nesting season in the wild is reported to be August to January. The nesting site is usually a vertical hollow trunk with a deep cavity which is filled with chewed wood debris supposedly to allow drainage of rain water.

In 1987, Palm Cockatoos were added to Appendix I of the Convention on International Trade in Endangered Species (CITES). The species is also protected in both Indonesia and Australia. Several shipments of birds were imported in 1983 utilizing Malaysian documentation. Two shipments were confiscated and subsequently were distributed to zoos and private aviculturists with the stipulation they must be maintained in a studbook and Species Survival Plan (SSP). ABRC is participating in the SSP program.

Palms have been bred inconsistently and infrequently. The first reported captive breeding was in Australia in 1912 by W.R. McLennan. Reports typically detail attempts which often end in failure. Sindel and Lynn determined, after extensive review of the literature, that Bob Lynn of Sydney, Australia, had the world's

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first breeding in 1968. The chick was parent reared.

Breeding Palm Cockatoos at ABRC

A large group of Palm Cockatoos is maintained at ABRC for breeding, observation and non-invasive research. All birds are housed outdoors, year round in semi-secluded aviaries. Birds are maintained in pairs in a variety of caging types including suspended cages measuring 4' x 4' x 8' to large flights measuring 4' x 8' x 19' to 7' x 8' x 24'. Pairs have bred successfully in all three cage types. One pair housed in a large flight can barely fly and still have been very productive.

The diet is varied with an emphasis placed on the provision of natural foods as available. As Palms don't appear to have the obesity problems which have been observed in some cockatoo species, they are fed the standard macaw seed mix used at ABRC. This mix consists of sunflower, safflower, buckwheat, pine nuts, spray millet, red peppers and cuttle-bone pieces. In addition, the birds are offered a variety of fresh fruits according to seasonal availability.

Pandanus fruits are provided when available. Pandanus is a tropical tree which is used as an ornamental, and fruits are often available in the south Florida area. *Pandanus utilis* is the most common variety utilized. Plants have been planted for future production at ABRC. In addition, eucalyptus, acacia, and pyrocantha are also grown for the birds. Fresh branches are placed in the cages twice weekly to provide chewing material for entertainment and nest building. Pomegranates and the fruits of queen palms (*Syagrus* species) are items relished by Palm Cockatoos and are provided seasonally.⁶

When copulation has been observed, it was not preceded by courtship behavior. They do, however, display a typical threatening behavior when approached by humans. It consists of bowing with the crest thrown forward and wings extended, accompanied by a disyllabic call. The pair usually bow alternately, with the male and female facing each other while calling. This is followed by foot stomping. Foot stomping behavior has been observed in hand-fed chicks as early as three weeks of age.

Palms typically lay a single egg and at ABRC they have laid in almost



A breeding pair of palm cockatoos at A.B.R.C. Note the large entrance hole in the nest log which enables the parent to take larger branches and twigs into the nest.

every month of the year. A definite breeding season has not been identified; however, when a new pair lays for the first time it has always been in November or December. After the initial egg is removed from the nest, the pairs at ABRC have continued to lay almost year round. After the egg is laid, nest building stops. One pair laid every 28 days for a series of eight eggs. The egg laying interval has typically been 17 to 38 days.

Two types of vertical nest boxes have been utilized. Some boxes are open at the top, simulating a natural, deep cavity such as would be common in a eucalyptus tree. Closed-top boxes have a large entrance hole so the pair can easily fill the box with chewed branches when nest building. Boxes measure 24" x 24" and are 48" to 72" deep. The boxes have been constructed of two layers of plywood with wire sandwiched between. Some boxes have been veneered with cypress planks in the front to make them look like a tree. Palms utilize the branches provided for nest building, a behavior which is uncommon in psittacines. Branches are stripped of leaves and bark, then the wood is chewed to the size of toothpicks and arranged in the nest. Acacia is preferred for nest building.

Over the past 26 months, 24 eggs have been produced by five pairs of Palm Cockatoos at ABRC. Four of the five pairs had fertile eggs, while the male of one pair ate two eggs. Of the 24 eggs, 17 have hatched, four were dead in the shell and at the time of writing three eggs were in the

incubator.

Eggs are being pulled from the nest immediately after laying. Palms usually lay in the early morning. Some pairs have been allowed to incubate eggs in which case both male and female have shared in incubation. A variety of incubation techniques are then utilized including artificial incubation, and fostering under chickens and other psittacines.

After internal pip, eggs are placed in the bottom of the incubator and no longer turned. After external pip, they are transferred to a hatching incubator and watched very closely. The pip (external) to hatch interval of

Palm nuts and pandanus fruit are food items relished by the palm cockatoos and are supplied seasonally.



the eggs is averaging 48 to 72 hours. Total incubation period is 28 to 30 days. One *goliath* egg hatched after 31 days. (See Figure 1)

Palms are difficult to hand-raise from the egg. The cause of this difficulty is unknown but may be primarily nutritional. The trial and error period is continuing at ABRC, however, this protocol has been successful.

After hatching, each chick is transferred to the nursery and placed in a private brooder. The temperature is maintained at 93° to 95°F. The temperature is slowly lowered as the chick matures by opening the brooder door, or by moving the bird out of the brooder into a heated room. The comfort of the bird and skin color are used to determine proper temperature for each chick. Chicks are kept in brooders until approximately 21 days old at which time they are moved into tubs and kept in a heated room, approximately 89°F. When they reach 80 to 100 days of age, they are moved to cages for weaning. The room is kept at about 85°F.

Birds are weighed daily and records are kept of weight and volume of food given. The standard formula consists of one quart dry monkey chow biscuits, one quart water, two tablespoons peanut butter and four ounces of a dry infant oatmeal cereal with banana. The formula is diluted four to one with water (20% solids). A more dilute formula is given to chicks in the first few days. Twelve ml of liquid (water, Pedialyte or Lactated Ringer's Solution) is added to 25 ml of the standard formula for the first day (6.5 to 1 or 15.5% solids). For the next three days the dilution is 8 ml fluids to 25 ml standard formula. The first two feedings are 0.1 or 0.2 ml of Lactated Ringer's Solution or Pedialyte. Each feeding is increased in volume by about .1 cc up to about .7 or .8 ml per feeding by the end of the day. In the first few days, the chick is

fed whenever it is empty. Feeding times are from 5 a.m. to 7:30 p.m. and the bird is allowed to rest all night. (a)

As the quantity of food is increased, the number of feedings is reduced to four feedings per day at approximately four to six days, then to three feedings per day at nine to 22 days. Feeding schedules and volumes are adjusted to the individual.

Palm chicks are very susceptible to candidiasis and Nystatin has been used as a preventative for birds handraised at ABRC. Each chick is cultured weekly and, if candida is found, alternative drugs are used, such as Ketoconazole (b, c).

If the crop becomes distended or atonic, it can be physically supported by using a "crop bra." This is a wrap, constructed of an elastic bandage material which may be adhesive or non-adhesive but self sticking. Such a bandage raises the crop up to the level of the entrance to the proventriculus (d).

When the bird is old enough to wean, it is offered soaked bread sticks, Stella Dora Almond Toast, or peanut butter cookies. Foods may be offered as early as 45 days, but they usually don't pick at food until about 60 days. Chopped greens and steamed vegetables are then offered. Finally a seed mix and fruit and vegetable mix are offered. *Aterrimus* chicks are usually weaned by 120 to 135 days of age, *goliath* usually by 150 days.

Of 17 hatched chicks, 14 are still living. One chick died at six days of age due to a *Pseudomonas* septicemia from a poorly sealed umbilicus. One chick died of kidney failure at 142 days of age. A third chick, which failed to thrive from the age of six days, died at six months of age. Apparently this chick had aspirated food at a young age and she never weighed more than 200 grams.

Yellow flecking has been described as characteristic of juvenile plumage. Examination of 11 chicks less than

Figure 1
Characteristics of Palm Cockatoo Eggs and Chicks

	<i>P.a. aterrimus</i>	<i>P.a. goliath</i>
Incubation period	28 - 30 days	30 - 31 days
Dimensions of egg	44 mm x 32 mm	48 mm x 36 mm
Initial egg weight	23 gms	33 gms
Average weight loss	18.6%	19.23%
Average hatch weight	15 gms (12.2-16.26)	21 gms (21.0-21.7)



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Figure 2
Flecking or Barring of Plumage in Chicks
(chicks grouped are siblings)

Name	No flecking	Axilla only	Breast	Sex
New York Zoo Soc.				
Chuck	+			M
Bronco	+			F
P.a. goliath				
Dipper		+	+	M
Angel		+		M
Sunrise		+		M
Milky Way		moderate		M
Eclipse		+	+	F
P.a. aterrimus				
Patty Cake		slight		F
Baby Cake		slight		M
Princess F Cake		moderate		F
Devil Cake		Moderate		F

two years old revealed a lack of uniformity in yellow flecking. The white marking of the maxilla (upper beak) of young birds was variable in amount of beak which was white, but was always present. Feathers of under wing coverts (axillary area) and breast were variably barred or flecked with yellow or yellow-white. Two of these chicks, which were raised at ABRC for the New York Zoological Society have no yellow barring or flecking. Flecking was observed on the breast and axilla of *goliath* chicks, while only in the axillary area of *aterrimus* chicks. These markings, however, are not unique to juvenile birds. At least one adult female at ABRC has yellow flecking on the chest and many have it in the axillary area. (See Figure 2)

Palm Cockatoos have been considered difficult aviary subjects, despite the fact that they are hardy and long lived in captivity. These initial successes experienced at ABRC may be helpful to other aviculturists who are attempting to breed Palms. Comparisons are now being made between parent-fed and hand-fed chicks with the hopes of gaining insight into the nutritional requirements of chicks. Investigation of the validity of described subspecies will also be important in future management of the species in captivity.

New Guinea is presently very sparsely populated and, according to sources in Indonesia, the Palm Cockatoo population is stable. Population (human) relocation programs are now underway in Indonesia to relieve overcrowding on the Island of Java.

This, and development of natural resources on the Island, may change the character of New Guinea in the future.

If you're in trouble trying to raise a baby Palm, we will try to help you with your problem. Our phone is U.S.A. (407) 793-5135.

The following ABRC staff (alphabetical order) contributed to this article: Matthew Bond, D.V.M., staff veterinarian; Everett Butler, aviculturist; Kevin J. Clubb, director; Susan L. Clubb, D.V.M., research director; Richard Schubot, president; Dreama Skidmore, nursery manager; E. Trent Swigert, curator of birds; Sharon Wolf, veterinary technician.

Footnotes

- a. Pedialyte — Ross Laboratories, Columbus, Ohio 43216
- b. Nystatin — Rugby Laboratories, Rockville Centre, New York 11570
- c. Nizoral — Janssen Pharmaceutica Inc., Piscataway, New Jersey 08854
- d. Vetrap — 3-M Animal Products, Medical Products Division, St. Paul, Minnesota 55144.

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4. Joseph, Leo; *A Review of the Conservation Status of Australian Parrots in 1987*, Biological Conservation 46 (1988), 261-280
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