Coraciiformes TAG:
by Kevin Graham, Dallas Zoo

**TAG MISSION STATEMENT**

The Coraciiformes TAG promotes in situ conservation of species in the order Coraciiformes and their habitats through participation in and support of field programs, by improving captive management and by using exhibition of birds to influence public opinion to favor conservation activities.

Welcome to the inaugural volume and issue of the Coraciiformes Taxon Advisory Group Newsletter, titled “From Inside the Cavity”. The goal of this newsletter is to provide information related to Coraciiformes species (or what was previously known as solely the Coraciiformes TAG but now also includes the Bucerotiformes) to as wide of an audience as possible. Information and articles will be sought from a wide variety of sources scattered across the world, as members of this taxonomic group are widely found on six of the seven continents.

Articles may be related to husbandry requirements, conservation efforts, nutrition in captivity or the wild, training, enrichment, public education, etc.

The target for publication timeframes for this newsletter will be set at two issues per year, one to be distributed in the winter and a second in the summer. Articles for submission will be solicited through the Coraciiformes TAG Listserv, the Avian Scientific Advisory Group Listserv, and through personal contact of any number of persons with potential authors.
Coraciiformes TAG Regional Collection Plan
by Kevin Graham, Dallas Zoo

The Coraciiformes TAG covers all species in Coraciiformes and Bucerotiformes. There are excellent exhibit species in this taxon, because many habitually sit on open perching, searching for prey. While there are threatened forms in most of the families in this order, the majority, and the most threatened forms are the large Asian Hornbills. Ironically, these species are the most challenging to breed, possibly requiring an opportunity to choose mates that is difficult to provide in zoos. In the most recent Regional Collection Plan produced in 2011 (the next publication is due in Summer 2016) there were eight goals identified. These goals were:

1. Identify priority exhibit species for long-term display in AZA institutions and develop long-term population management programs for them.
2. Promote and support taxon priorities and population management programs identified in the Regional Collection Plan, for AZA institutions and others. In order to guide institutions that propose to work with Coraciiformes, each species, and in some case sub-species, has been separately considered, using criteria described below.
3. Minimize the need for importation of wild specimens for captive programs. Importation of wild birds, whether for display or propagation is costly, difficult and stressful for the birds. It can negatively impact wild populations, by giving them market value, by changing population structure or reducing population numbers. By focusing our efforts on particular taxa and improving our programs, we can reduce the number of birds taken from the wild.
4. Improve management and propagation techniques. Replicable and predictable techniques for management and propagation are necessary, to ensure availability of birds for our collections and for applications to conservation in the field.
5. Document successful husbandry protocols, starting with those species in active management programs. Documentation is important, if programs are to progress and build on one another. We will start by documenting priority species, and then expand to related species, looking for common techniques and trying to identify species specific differences.
6. Develop communication resources to ensure wide availability of information relating to all aspects of TAG taxa, both ex situ and in situ. We need to take advantage of new communication technology, while remaining aware that these are not available to all that need the information we wish to disseminate. The TAG has an active listserv, with members from five continents, as well as an excellent website: [http://www.coraciiformestag.com/](http://www.coraciiformestag.com/)
7. Increase cooperative interaction with zoos in other regions, as well as the private sector. The Coraciiformes comprises taxa from all continents except Antarctica. Zoos in every region are beginning to develop active programs, often for species held in low numbers. By collaborating, we can increase the size of managed groups, pool information and reduce duplication of effort.
8. Identify and support field projects that contribute to conservation of wild hornbill populations.

Incidence of Squamous Cell Carcinoma and Role of Carotenoids in Three Species of Captive Bee-eaters.
by Dr. Kathryn Gamble, TAG Veterinary Advisor, Lincoln Park Zoo

The objective of this study is to determine the occurrence of squamous cell carcinoma within three species of Bee-eaters (Northern Carmine, White-throated, and White-fronted). It has been noted that the tumor is occurring in the uropygial gland which is an overlooked area of the bird; and may be related to carotenoid consumption.

Information collected from AZA institutions will be used to investigate the incidence of this disease over the past 20 years for species housed within AZA holdings. This project is important to understanding how this disease affects these species, while examining the management practices for these captive populations to see if there is a potential problematic source previously unknown. Thank you to all of the current institutions that have been involved, your time and information has been greatly appreciated!

To Participate Please contact:
Dr. Kathryn Gamble, TAG Veterinary Advisor (kgamble@lpzoo.org)
or
John Bender, research project coordinator (benderj17@gmail.com)
The Philippines Hornbill Conservation Program and the rediscovery of the Rufous-headed hornbill *Rhabdotorrhinus waldeni* in Negros Island, Philippines

by Lisa J. Paguntalan¹, Philip Godfrey Jakosalem², Andrew Ross Reintar³, Joanne Mae Justo¹ and Lucia Lastimoza²

The Philippines supports an unusually high number of endemic hornbills, with at least eleven species and six subspecies being generally recognized (e.g. del Hoyo and Collar; Gonzalez et al 2013), proposes the elevation of 3 formerly recognized subspecies to full species status, making a total of twelve species and six subspecies. This latter review also proposes various other important changes, such as the re-assignment of both *Aceros* species to the Genus *Rhabdotorrhinus*, along with the (similarly formerly recognized) Sulawesi Tarictic *P. exarhatus*; thereby re-defining *Penelopides* as a Philippine endemic genus comprising no less than six species and four subspecies.

The Philippines supports an unusually high number of endemic hornbills, with at least eleven species and six subspecies being generally recognized (e.g. del Hoyo and Collar; Gonzalez et al 2013), proposes the elevation of 3 formerly recognized subspecies to full species status, making a total of twelve species and six subspecies. This latter review also proposes various other important changes, such as the re-assignment of both *Aceros* species to the Genus *Rhabdotorrhinus*, along with the (similarly formerly recognized) Sulawesi Tarictic *P. exarhatus*; thereby re-defining *Penelopides* as a Philippine endemic genus comprising no less than six species and four subspecies.

All that apart, all species of Philippine hornbills were already regarded as threatened by IUCN/BirdLife International. Philippines (even before these changes) was distinguished by having many more seriously threatened endemic hornbills than any other country. These included the world’s two most endangered hornbills, namely the Visayan writhed hornbill (*Aceros = Rhabdotorrhinus waldeni*) and the Sulu hornbill (*Anthracoceros montani*) - both IUCN Critically endangered; not to mention the first human-induced extinction of any hornbill, i.e. the Ticao Island Tarictic (*P. ticaensis*) and *Rhabdotorrhinus waldeni* in Negros Island which most likely constitutes along with Sulu hornbill, *A. montani* (wherein total population numbers may have been reduced to as few as c. 40 individuals; I. Sarenas, pers. comm.). Add to this the facts that we not only don’t know, but are unlikely to be able to better assess current population levels of this species – much less those of the newly recognized Basilan Tarictic (*P. basilanicus*), owing to continuing local insurgency problems severely restricting access to these areas; that we are indeed faced unparalleled levels of anthropogenic threats and consequences.

In response to this situation, the ‘Philippines Hornbills Conservation Program (PHCP)’ was conceived and initiated under the auspices of the ‘Philippines Biodiversity Conservation Program (PBCP)’ in 1994. The PHCP was formally inaugurated and endorsed by the Department of Environment & Natural Resources (DENR, Govt. of the Philippines) via the signing of a covering Memorandum of Agreement (MOA) between the DENR, the North of England Zoological Society (NEZS, Chester Zoo, UK) and Vogelpark Avifauna (VA, Netherlands) in June 2002. By these means, NEZS and VA have provided crucial institutional, technical and funding assistance for the PHCP over the past 10-12 years; without which assistance this Program would not have been possible. Since then, a suite of inter-related projects focused on and around each of the most threatened taxa; especially the Visayan, Polillo, Mindoro and (with some difficulty owing to periodic local political unrest) Sulu hornbills. Relevant activities have included distribution-wide field status and ethnobiological surveys, wide-ranging education/awareness campaigns, assistance in the development of new protected areas, pioneering habitat restoration and local community forest schemes, diverse local personnel training and other institutional capacity building initiatives. The latter include the establishment of: a) new, locally-based, biodiversity conservation foundations which now constitute the principal non-governmental conservation agencies in Cebu, Negros-Panay, Mindoro and the Polillo Islands; b) the first regional network of new protected sites (i.e. ‘Local Conservation Areas or LCAs’, in effect ‘municipal reserves’) in the Polillo Islands, and currently developing a similar network of new reserves in the Camiguin Sur Island and on Negros (Negros Oriental); and local rescue/breeding centers and development of properly structured conservation breeding and research programs for the two threatened Visayan endemic hornbills; each of the latter having not only included ‘world first’ captive-breeding records for these species, but also seemingly achieved more sustained annual conservation breeding records than almost any other institution in the world thus far.
Kookaburra’s Laughter-
an Australian Legend

Long, long ago, only the moon and stars lit the Earth. No one had ever felt the warmth or seen the light of the sun.

The spirits who lived in the sky looked down on all the birds and beasts, and they were concerned that the creatures were not happy. One day a generous spirit decided the world needed more light, and so this spirit gathered others, and together they collected wood, and this they began to stack, higher and higher and higher. When the wood was stacked so high they could no longer see the top, they decided to light a fire.

“The creatures of the Earth will delight in our light,” the spirits said, “but we must announce its arrival.”

The spirits sent a star out into the sky — the first morning star and instructed it to announce the arrival of the light that would soon warm the world.

The star shimmered and sparkled, but few noticed it there in the dimly lit sky, and when the birds and beasts first saw the light of the great fire, they were shocked. Soon, though, they began to delight in its warmth, but seldom did they notice that tiny morning star. The spirits decided they must find another way to announce the dawn.

“We'll need a noise,” one of the spirits said.

“Yes, something loud. Something unusual, something startling,” the others agreed.

Time passed, and the morning star shone more brightly, but still many creatures did not notice the star and were startled by the sudden light of the great fire.

Then one day, just after the morning star began to shine, the spirits heard a most amazing sound. Kookaburra peered down at the ground and spied a mouse. He launched himself from his perch in the treetops, and when he had conquered his prey, he began to laugh. He laughed like no creature in the world laughed. When the spirits heard that sound, they knew that Kookaburra must become the world’s morning trumpeter.

That very night the spirits visited Kookaburra in his home inside the gum tree.

“Kookaburra,” they said, “every day, just as the morning star begins to fade, you will laugh as loudly as you can. It is your laughter that will wake all the sleepers before our fire lights the sky.”

Kookaburra laughed when he heard this. “What if I say no?” he asked.

“If you say no, we will send no more light to the Earth. All the creatures will again live in the darkness.”

Kookaburra realized that he could become a hero, and oh, how he would love to be important and respected. “I’ll take the job,” he said, and the very next day, just as the morning star began to fade, Kookaburra looked up at the sky and began to laugh, “Garooagarooagaroooga…”

When the spirits heard that sound, they lit their fire, and slowly the Earth below began to glow. The warmth seeped down slowly, building as the fire blazed higher and higher.

Many years passed, and every morning Kookaburra laughed loudly, and every morning the spirits lit the fire to warm the Earth below.

When the Creator brought people into the world, the spirits instructed them: “You must never tease Kookaburra,” they said. The elders instructed their children: “If Kookaburra hears you making fun of him, he will never laugh again. Then we will no longer have light or warmth.”

So all the people learned, just as the beasts and birds had learned, that Kookaburra must be respected, and to this day he prepares all the people to greet the dawn.
Hornbill Nest Adoption Program - India

Information Supplied by Eric Kowalczyk, Woodland Park Zoo

http://ncf-india.org/projects/hornbill-nest-adoption-program

This is the fourth breeding season of the ‘Hornbill Nest Adoption Program’ in India.


This year, 29 nests of three hornbill (Great, Wreathed and Oriental Pied Hornbill) species are being monitoring by 16 nest protectors (local villagers). This year, 21 nests are active.

This year, we have received support from only 40 donors due to which we experienced a little financial crunch, especially as we had committed to increasing salaries and hiring more nest protectors. The Arunachal Pradesh Forest Department generously accepted to pay salaries for 10 people for 6 months. We also received some new support from the Rotterdam Zoo and a continuation grant from the Greater Vancouver Zoo in May, which allowed us to breathe easy again.

Forest fires are increasingly becoming a threat to nest trees, thus again with financial support from the Arunachal Pradesh Forest Department, fire-lines were cut around all nest trees in May to avoid damage or disturbance at nest trees. In most villages, members from every household were involved in this work. They got daily wages for the work and indirectly helped create awareness about the HNAP work amongst villagers and fostered a sense of participation among the villagers.

One of our donors, Mr. Adarsh Raju spent one month with the HNAP team to see our work on-ground and make a small documentary on the program to help raise funds and awareness.

We were contacted by Shri Tashi Mize, a remarkable officer who is Divisional Forest Officer of D’ring Wildlife Sanctuary (Pasighat, Arunachal Pradesh) in May. In February, we had discussed with him the possibility of expanding the Hornbill Nest Adoption Program to sites in his area (Pangi village, Pasighat, East Siang, Arunachal Pradesh). He has invited us to come visit the place, check out the nests, talk to the villagers and see how we can take this forward. The villagers have already located a few nests, which could potentially be of Rufous-necked Hornbills (from the description of villagers and identification done using hornbill picture plates and bird field guides). We are very keen to take this forward as it will be great to expand this project to another site with another community especially for the Rufous-necked hornbill which is globally threatened. We will be making a visit to the area in the first half of June 2015 and see how this can be taken forward. In addition, villages from Dissing-Passo circle which adjoins Seijosa (our present work area), that are located on the eastern boundary of Papum Reserve Forest have shown interest in starting similar conservation activities in their area. We are also considering expanding our efforts to this area. We will start looking into it later this year.

This is exciting stuff but to implement both the current work and to expand, we really require your continued support. This program was initiated with the idea of ‘shared parenting’ where urban citizens got involved in helping to conserve hornbills and their habitats. We need this financial support and participation/partnership to continue to sustain this program. We did not want this program to be only dependent on short-term sporadic grants from funding agencies, which are not reliable for a long-running community conservation project.

Along with protecting hornbill nests, in May 2014, we initiated a small nursery (space given by the Forest Department) to grow native trees (ecologically and economically important) with the objective of restoring degraded habitats for long-term survival of hornbills in the area. After one year, we have grown about 700 saplings of 8 tree species (mostly animal-dispersed). This year, so far we have sown more than 1000 seeds of ~ 15 tree species. We now have a full-time local person (Anita) who looks after the nursery under our supervision. The rest of our various research team members and our field staff/volunteers pitch in and help as and when they can. In June, there will be a volunteer from Tata Institute of Social Sciences, Guwahati who will be trained to help in systematic seed collection, maintain records, monitor germination and survival and supervise nursery maintenance. We have invested in a water storage tank and other equipment for the nursery, and will be putting up chain link fencing to protect the area from foraging goats. This work has been partly supported by the Forest Department, and by the Whitley Fund for Nature in 2013-14, and now from Serenity Trust, Ahmedabad and the grants from the zoos.
Diet selection is related to breeding status in two frugivorous hornbill species of Central Africa


Abstract:
Avian diet selection is hypothesized to be sensitive to seasonal changes in breeding status, but few tests exist for frugivorous tropical birds. Frugivorous birds provide an interesting test case because fruits are relatively deficient in minerals critical for reproduction. Here, we quantify patterns of fruit availability and diet for two frugivorous hornbill (Bucerotoidea) species over a 5.5-year period to test for patterns of diet selection. Data from the lowland tropical rain forest of the Dja Reserve, Cameroon, are used to generate two nutritional indices. One index estimates the nutrient concentration of the diet chosen by Ceratogymna atrata and Bycanistes albotibialis on a monthly basis using feeding observations combined with fruit pulp sample data. The second index is an estimate of nutrient concentration of a non-selective or neutral diet across the study area based on tree fruiting phenology, vegetation survey and fruit-pulp sample data. Fifty-nine fruit pulp samples representing 40 species were analyzed for 16 nutrient categories to contribute to both indices. Pulp samples accounted for approximately 75% of the observed diets. The results suggest expected patterns of nutrient selection. The two hornbill species selected a diet rich in calcium during the early breeding season (significantly so for B. albotibialis in July and August). Through the brooding and fledging periods, they switched from a calcium-rich diet to one rich in iron and caloric content as well as supplemental protein in the form of invertebrates. Calcium, the calcium to phosphorus ratio and fat concentration were the strongest predators of breeding success (significant for calcium and Ca : P for B. albotibiais in June). We conclude that hornbills actively select fruit based on nutritional concentration and mineral concentration and that the indices developed here are useful for assessing frugivore diet over time.

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Recently Updated SSP Documents

Species Survival Plan Studbooks and Breeding/Transfer Plans are recommended to be published at a minimum of every three years. Many SSP Coordinators work with the Population Management Center and the Population Adjuncts to publish their documents on a more frequent basis.

Within the scope of the Coraciiformes Taxon Advisory Group there are twelve species recognized with SSPs; several species that are currently being monitored but do not meet the criteria for inclusion as an SSP, and a Regional Collection Plan that is produced every five years (next published in 2016).

Great Hornbill:
SSP – N/A
Studbook – Feb 2013

Rhino Hornbill:
SSP – July 2015
Studbook – June 2014

Southern Ground Hornbill:
SSP – Nov 2011
Studbook – Jan 2012

Abbyssian Ground Hornbill:
SSP – June 2012
Studbook – Jan 2012

Wrinkled Hornbill:
SSP – Dec 2014
Studbook – Dec 2014

Trumpet Hornbill:
SSP – Mar 2015
Studbook – Jan 2015

Red-billed Hornbill:
SSP – Feb 2012
Studbook – Feb 2015

Laughing Kookaburra:
SSP – May 2015
Studbook – Dec 2014

Guam Kingfisher:
SSP – Nov 2014
Studbook – Dec 2012

Blue-bellied Roller:
SSP – Jul 2015
Studbook – Mar 2015

Blue-crowned Motmot:
SSP – August 2015
Studbook – July 2015

Green Woodhoopoe:
SSP - July 2015
Studbook – July 2015
Growing interest for student research supports conservation of Philippine Hornbills

by Juan Carlos T. Gonzalez, DPhil

UPLB Museum of Natural History and Institute of Biological Sciences, University of the Philippines Los Baños, College, Laguna 4031 Philippines

After the 6th International Hornbill Conference (IHC) held in Manila last April 2013, there has been resurgence of student-based research on Philippine Hornbills, addressing the need for baseline data crucial for the conservation of these threatened endemic birds. This growing interest in hornbill studies from academia is timely response to an earlier call made by world-renowned ‘bucerologist’, Dr. Alan Kemp in his plenary for the 5th IHC held in Singapore on March 2009, which emphasized the gaps of information amongst West African and Philippine hornbills (Kemp & Kemp 2013). During that time, several ongoing studies on hornbills were already evident in the Philippines, including a comparative study on the basic ecology of two sympatric species inhabiting Northern Sierra Madre Natural Park in Luzon Island (Gonzalez 2012). This focused on estimating populations of Northern Rufous Hornbills *Buceros hydrocorax* and Luzon Tarictic Hornbills *Penelopides manillae* across a disturbance gradient, to evaluate the impacts of deforestation, and characterization of their nest and diet preferences. Results of this field study were presented at the 2010 Student Conference for Conservation Sciences in Cambridge, UK, the 2010 Philippine Biodiversity Symposium in Legaspi, Albay, the 2011 International Hole-Nesting Bird Conference in Oxford, UK, and the 6th IHC in Manila, Philippines. Alongside this study, Españañola et al. (2013) also estimated populations of parrots, pigeons and hornbills across 14 different forest sites within Luzon Island, and similarly found a decline in Rufous Hornbill numbers (0.3–3.0 individuals per km²). Both studies used distance sampling techniques implemented by Mallari et al. (2011) on forest birds at Puerto Princesa Subterranean River National Park, which included density estimates for the Vulnerable Palawan Hornbill *Anthracoceros marchei* (9.6–19.6 individuals per km²).

The plight of threatened endemic hornbills in the Philippines is best exemplified by the Critically Endangered Sulu Hornbill *Anthracoceros montani*, which is confined only to the Sulu archipelago. Once regarded as common, their inherently small range coupled with habitat loss and hunting led to the drastic decline, with possibly fewer than 20 pairs remaining (BirdLife International 2013). Apart from the mounted type described by Oustalet (1880) from Jolo Island, some 14 specimens were collected in 1891 from Sulu and Tawi-tawi (Bourns & Worcester 1894), and another eight specimens collected in 1972 (duPont & Rabor 1973) from Tawi-tawi and Sanga-sanga. Majority of these skins are kept in the United States (DMNH, YPM, AMNH, USNM, CM) and Europe (BMNH, MNHN), with only a single specimen known in the Philippines (Aga Khan Museum). Successive visits have confirmed the persistence of Sulu Hornbills on Tawi-tawi, such as in 1991 by Lambert (1993), in 1995 and 1999 by D. Allen (Allen 1998), reconfirmed in 2009 by I. Sarenas (DOT-WBCP 2009) and more recently in 2012 by L. Vinciguerra (ibc.lynxeds.com) and R. Hutchinson (surfbirds.com). Field studies on its basic ecology have yet to be done locally, possibly even student-based given the proximity of Mindanao State University (MSU) Tawi-tawi College of Technology & Oceanography. However, risk from terrorists and kidnappers hampers any potential for academic research to estimate current numbers of the Sulu Hornbill, and document feeding and nesting preferences, as well as continued threats from hunting and shrinking habitats. Data is crucial for the effective evaluation of its threat status.

A more accessible threatened species to study is the Rufous-headed Hornbill *Rhabdotorhinus waldeni*, a critically endangered species restricted to the West Visayan Endemic Bird Area. The Mari-it Conservation Park of West Visayas State University in Lambunao, Panay Island and the NFEFI Biodiversity Conservation Center in Bacolod, Negros Island continue to successfully breed both the Rufous-headed Hornbill and the Endangered Visayan Tarictic Hornbill *Penelopides panini*. Captive hornbills at both facilities provided DNA samples invaluable to the completion of graduate research focused on phylogenetic and biochemical analysis, including a paper on the Molecular phylogeny of Hornbills (Bucerotidae) by Gonzalez et al. (2013), and Characterization of the mtDNA control region and mitogenomics of Philippine hornbills by Sammler et al. (2011, 2012). Earlier studies conducted by undergraduate students from Ateneo de Manila University have amplified mtDNA from selected Philippine hornbills using PCR techniques (M.K. Canlas in litt. 2008). Gonzalez (2012) sequenced the mtDNA cytochrome b gene of all known species, subspecies and island populations of Philippine hornbills, in order to conduct a phylogeographic analysis to evaluate species limits in Asian hornbills.

Captive management and field research are key outcomes of BMB-DENR and PBCFI’s Philippine Hornbill Conservation Program. PBCFI mentored undergraduate students in biology from MSU Iligan Institute of Technology, which conducted *In situ* conservation research in Northern Negros Natural Park (NNNP), Negros Occidental. Both hornbills were reported from the park by the following student papers — Diversity, status and challenges in conserving the avifauna in NNNP (Reintar et al. 2015), Distribution and Habitat Preferences of
Restricted-range Bird Species in NNNP (Lumontod et al. 2015) and Diversity and abundance of canopy birds in NNNP (Amer et al. 2015). The latter two were awarded Best undergraduate oral presentation award and Best undergraduate poster presentation award, respectively, during the 24th Annual Philippine Biodiversity Symposium held at the University of Eastern Philippines in Catarman, Northern Samar.

Until recently, student research focused on Philippine hornbills had proliferated at the University of the Philippines Los Baños. It had first started with a study on the Density and feeding preference of the Polillo Tarictic Hornbill Penelopides manillae subnigra in fragmented forests of Polillo Island (Mamangun & Gonzalez 2007). After some lag period, it was followed by a DVM thesis conducted by J.B. Devanadera on the Microanatomy of down feathers collected from different Hornbills in the Philippines. Devanadera (2014) examined the microstructure of plumaceous hornbill feathers, with a comparison of barbs and barbules between Philippine hornbills sampled from Avilon Zoo in Rodriguez, Rizal, which houses at least six species. Microscopy revealed some differences in the barbules amongst hornbill genera, but also described the overall barbules structure for Bucerotidae.

Currently, three undergraduate researches focused on hornbills as their model system. This includes a study on the Mallophaga (Phthiraptera: Amblycera, Ischnocera) of Philippine hornbills (Bucerotiformes: Bucerotidae) from Philippine National Museum and UPLB Museum of Natural History by N. Fabrigas (2015). Following the methods used by Elbel (1976) to collect feather lice from pre-collected hornbill study skins, Fabrigas was able to acquire over 400 samples of feather lice from nearly all the represented hornbill species in the Philippines, except Sulu Hornbill, and derived from two museum collections. The second study focuses on the Nesting ecology and Diet analysis of the Luzon Tarictic Hornbill Penelopides manillae manillae in Mount Makiling (G. Cagampan in litt. 2015), which identifies the nest-cavity and fruit preferences of this dwarf hornbill. In order to represent the diet of the Luzon Tarictic Hornbill, seeds will be extracted from the tree holes and cavity middens. Identified fruits will be collected as fresh or as near ripe fruits from the forests of Mount Makiling, and subjected to proximate analysis. This study examines the nutritional content of large-seeded fruits eaten by wild hornbills, which is important in improving the diet of captive birds. This also facilitates understanding of fruit selection in the Luzon Tarictic Hornbill, which is possibly driven by seasonality and preference for oil-based sugary pulp. Thirdly, another undergraduate student will determine the Parasite diversity on captive hornbills and its potential issues to public health (J.J. Binares in litt. 2015). Binares intends to collect endoparasites and ectoparasites from captive hornbills within the Bicol Peninsula, South Luzon. The Bicol region is recognized for their rampant sale of wildlife species, and hunting or poaching poses severe impacts on local hornbill populations. Overall health of hornbills examined also reflects environmental health, and its implications to human public health.
Managing Hornbill Aggression Using Operant Conditioning

by Kaycee Bridges, Keeper, Bird Department
Kristin Dvorak, Assistant Lead Keeper, Bird Department
Lincoln Park Zoo, Chicago IL

Many institutions, including Lincoln Park Zoo (LPZ), use operant conditioning as a tool for husbandry practices, veterinary care and facilitating improvements in the well-being of their animals. The Bird Department at LPZ uses operant conditioning as a training technique for many of the birds in its collection, including the Papuan hornbills (Rhyticeros plicatus). One of the benefits of having such a program is the ability to manage undesirable behaviors.

Operant conditioning is an important technique that was utilized in our development of a training protocol used to manage aggression by the male Papuan hornbill toward keepers. The aggression displayed by the male hornbill was only directed at certain individuals and involved him flying down to the keeper’s level and attacking in various ways, including snapping at the feet, arms, or head of the keeper.

When in the exhibit, keepers carry a tool at all times to defend themselves if need be; however, when keepers would protect themselves, it appeared to reinforce and encourage the aggressive behavior. This aggressive behavior has been repeatedly documented for the past five years and usually starts in February, two months prior to the female hornbill entering the nest cavity for the breeding season. The hornbills are housed in an indoor enclosure without the option of shifting the individuals off exhibit during servicing.

The current training protocol was started in October 2013 and continues today. The protocol has three different phases: the off-season phase, the courtship phase, and the nesting phase.

The off-season phase generally starts in July, after the female hornbill has left the nest cavity, and ends in December. During the off season, both the male and female hornbills can choose to participate in daily stationing training. Stationing consists of both birds coming to perch on the gunite branch specified for training, which was chosen for proximity to the keeper entrance to the exhibit (Figure 1). Once stationed, the birds receive reinforcement in the form of grapes.

A clicker is used as a bridge. After both birds are stationed, the trainer has the option to go to one of two food bowl locations in the exhibit. The choice of location is based on individual trainer progress on this behavior. The first food location is in the front of the exhibit, closest to the area where the keeper trains. It is considered “low risk” in terms of the hornbills breaking from station. The second location is in the back of the exhibit, past the female’s nest cavity (Figure 2). This second location is where the birds prefer to eat; however, it requires the hornbills to station longer. Once the food bowl is placed in one of the locations, the trainer walks back to the training area and reinforces both the male and female hornbills with one fuzzy mouse each and then ends the session by leaving the exhibit. Fuzzies are only offered if the birds remain stationed during the entire training session.

The courtship phase starts in January and goes through March. Historically, aggression from the male hornbill increases at this time; however, there is no change in the training protocol.

The nesting phase starts in approximately March and goes to July. During this phase, the female hornbill is in the nest cavity and does not participate in the training sessions. Due to this fact, the training protocol for the male hornbill changes slightly. When the male hornbill stations, he is no longer offered grapes as reinforcement since he will typically break station to offer grapes to the female in the nest cavity (Figure 3). Once the male hornbill is stationed, the trainer will then proceed to food location number one. This location is the only one used during the nesting phase due to the proximity of the second food location to the nest cavity. If the male hornbill remains stationed, he then receives both fuzzies, which he will usually offer to the female in the cavity.

Since starting the training protocol in October 2013, we have been successful in reducing the aggressive behavior shown by the male hornbill. His aggression went from an almost daily occurrence in the courtship and nesting phases (keeper dependent) to only a few reported instances in 2014/15. Overall, the protocol has benefited both the birds and the training staff by providing a less stressful environment and promoting a positive relationship between the birds and staff.

We would like to thank Sunny Nelson, Andy Van Laan, Bird Department Staff, James Seidler and Anita Yantz.

Figure 1: Male and female hornbills stationing together in off-season phase.

Figure 2: Second feed location by nest cavity.

Figure 3: Male hornbill stationing by himself in nesting phase.
“Blue-crowned Motmots”...

by: Kevin Graham, Dallas Zoo

The motmot taxonomy in the last several years has been contested several times and a proposal put through the South American Classification Committee (SACC) has been approved to modify the grouping significantly. The lead researcher working towards the change, Gary Stiles, had proposed splitting the species based primarily on morphology, biometrics, geography, and vocalizations.

As described in the graphic above from SACC, what has been referred to as the Blue-crowned Motmot (Momotus momota) for decades has been both combined and split into a total of five South American species and one Central American species with Momotus lessonii being included. In addition, there are now twenty-three subspecies in the grouping. The most common of the group has retained the species name momota and is now referred to as the Amazonian Motmot. In addition to the now-named Amazonian Motmot, there are now Blue-crowned Motmot, Andean Motmot, Whooping Motmot, Blue-diademed, and Trinidad Motmot. These six species and their various subspecies are:

Amazonian Motmot (Momotus momota)

M. m. microstephanus P. L. Sclater, 1858 – lowlands E of Andes in E Colombia, W Venezuela, E Ecuador, NE Peru and NW Brazil (E to upper R Negro).

M. m. momota (Linnaeus, 1766) – from R Orinoco E to N Brazil (Amapá), S to N bank of lower Amazon.

M. m. ignobilis Berlepsch, 1889 – E Peru, N Bolivia, and probably W Brazil.

M. m. simplex Chapman, 1923 – N Brazil S of Amazon (from near Peru border E to upper R Xingu, S to N Mato Grosso and C Goiás).

M. m. cametensis E. Snethlage, 1912 – lower R Xingu (probably from lower R Tapajós) E to R Tocantins.

M. m. paresis Sharpe, 1892 – E Brazil from Amazon mouth E to Piauí and probably W Alagoas.

M. m. marcgravianus Pinto & Camargo, 1961 – Paraíba to Alagoas, in NE Brazil.

M. m. nattereri P. L. Sclater, 1858 – N & C Bolivia (mainly along Andean foothills).

M. m. pilcomajensis Reichenow, 1919 – E & S Bolivia and N Argentina (Salta) E to S Brazil (to S Goiás, W São Paulo and NW Paraná).

Trinidad Motmot (Momotus bahamensis)

None

Whooping Motmot (Momotus subrufescens)

M. s. conexus Thayer & Bangs, 1906 – C Panama to NW Colombia.

M. s. subrufescens P. L. Sclater, 1853 – Caribbean coast of N Colombia (S to Magdalena Valley) E to N Venezuela (Aragua).

M. s. spatha Wetmore, 1946 – Guajira Peninsula (Serranía de Macuira), in N Colombia.

M. s. osgoodi Cory, 1913 – NW Venezuela (C Zulia to NW Táchira and W Mérida) and adjacent Colombia (to Norte de Santander).

M. s. olivaresi Hernández & Romero, 1978 – NC Colombia (Santander, Boyacá).

M. s. argenticinctus Sharpe, 1892 – W Ecuador and NW Peru W of Andes.

Blue-diademed Motmot (Momotus lessonii)

M. l. goldmani Nelson, 1900 – E Mexico (Veracruz, N Oaxaca, Tabasco) and neighbouring Guatemala (Petén).

M. l. exiguis Ridgway, 1912 – Yucatán Peninsula.

M. l. lessonii Lesson, 1842 – S Mexico (Chiapas) SE to W Panama.

Andean Motmot (Momotus aequatorialis)

None

Blue-crowned Motmot (Momotus coeruliceps)

None
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