The Ratite Review

THE AZA STRUTHIONIFORMES TAG ANNUAL NEWSLETTER 2017





Emu chicks at Baton Rouge Zoo, Photo by Lee Schoen



Ostrich chick at Franklin Park Zoo, Photo credit Franklin Park Zoo



Brown kiwi chicks at SCBI, Photo by Jim Jenkins



Out and About with Ostrich

Return of the North African ostrich to Tunisia Dr. Tim Woodfine, Director of Conservation | Marwell Wildlife





ostrich *Struthio camelus camelus* is the largest form of this giant, flightless bird. Also named red-necked ostriches for the characteristic bright color of their skin, these birds once occupied much of the Saharan region. Despite its previously extensive range, the North African ostrich is now thought to be restricted to just a few fragmented populations in Cameroon, Chad, Central African Republic and Senegal. Ostriches were once abundant in the south of Tunisia, but disappeared by the end of the Nineteenth Century due to overexploitation with the species last recorded in 1887. However, reintroduction efforts are now underway through a partnership between Tunisia's Forestry Directorate and Marwell Wildlife.

Male displaying in Dghoumes National Park. Photo by Marie Petretto

A founder population

of North African ostriches was created in Tunisia using birds imported from Souss Massa National Park in Morocco (themselves descended from stock originally acquired from Chad), and the National Wildlife Research Centre in Saudi Arabia (stock originally acquired from Sudan). During the initial phase of the project, young birds were raised to adulthood in captivity until breeding age, while local personnel were trained in husbandry and monitoring techniques. Finally, at the end of 2014, nine adult birds were released into Dghoumes National Park, marking the return of the North African ostrich to Tunisia after an absence of 127 years.



Abdelkader Chetoui with young birds imported from Saudi

Arabia

Photo by Marie Petretto



Dr. Marie Petretto examining captive bred chicks. Photo by Tim Woodfine

This was followed shortly afterwards by the establishment of a group of ostriches in a more controlled, but still semi-free ranging environment at the Orbata Faunal Reserve, and an initial release of birds into the Sidi Toui National Park in 2015. By the end of 2016, Tunisia's formative population of North African ostriches had steadily grown to 70 birds (54 adult, 14 chicks), spread across the three sites and including five individuals maintained at Friguea Zoo in Sousse.

Managerial and logistical challenges lie ahead, but from these humble beginnings, the plan is to create a meta-population of North African ostriches across a network of several of Tunisia's semi-arid and desert protected areas. This in turn contributes to a wider vision of restoring these neglected, but surprisingly rich ecosystems including the previous return of species such as the scimitar-horned oryx and addax. Negotiations are now underway with colleagues in Morocco and Saudi Arabia to acquire additional North African ostriches for genetic augmentation, while capacity is built at sites around Tunisia to carry out ongoing management and monitoring. More broadly, the potential to create a regional programme for North African ostrich conservation drawing together initiatives such as those in Tunisia and the Sahara Conservation Fund led project in Niger is being explored.



Ostrich Recovery Project in Niger Progress Report December 2017

Birth, Deal and Fire

Thomas Rabeil, Regional Program Officer, Sahara Conservation Fund

SCF is trying to save the biggest bird on the planet from extinction. With the exception of a few small savanna populations, the North African ostrich has completely disappeared from its previously vast Sahelo-Saharan range. SCF's North African Ostrich Recovery Project aims to provide the framework, resources and technical support to restore to the wild this highly-adapted desert race of ostrich in Niger. In 2007, the Sahara Conservation Fund (SCF), The Saint Louis Zoo, the AZA Struthioniformes Taxon Advisory Group and a local Nigerien NGO, called CERNK, partnered on a groundbreaking effort to save the endangered North African ostrich and aid its recovery in Niger. Our goal is to produce enough birds at SCF's breeding site in Kellé, Niger to begin returning small numbers of ostrich safely to the wild in 2018.

During the second part of 2016, a crucial deal was reached in-country between SCF, the Republic of Niger, and two additional private holders of North African red-necked stock to implement a national strategy for North African Ostrich conservation in Niger. Another breeding season at SCF's ostrich compound in Kellé has launched, with two breeding pairs hatching out eight chicks before year's end. A catastrophic event was averted when SCF's dedicated ostrich care team thwarted a brush fire with carefully planned firebreaks. And in November 2016, several international SCF partners, including Marwell Wildlife, Smithsonian's National Zoo, Saint Louis Zoo, San Diego Zoo Global and Zoo Hannover, agreed to collaborate on their North African Recovery Projects in Niger and Tunisia, with the goal of facilitating the development of an Action Plan to conserve the remaining populations of North African Ostrich within their historical range.



The 4 chicks of the pair Aicha and Moustapha aged of 3 weeks old

SCF continued....

Birth

Both breeding pairs started to display early this season, in August. Males were in full red color and thanks to good rainfall, the lush vegetation present in and around the pens seemed to serve as great source of motivation to breed. By September, two pairs carved out a total of nine nesting sites (four by one pair, and five by the other) in preparation for egglaying. By mid-October, 18 eggs had been laid, eight by Maria & Aouyale and ten by Aicha & Moustapha. At the same time, the old male Julien paired with and young (less than three years old) female Salma, her first pairing. They started to mate very quickly and a first set of six eggs was laid by the end of October. This new pair eventually laid 11 eggs total. While none of Salma's first clutch proved fertile, we are, nonetheless, very encouraged by the speciesappropriate courtship and egg-laying this pair displayed, as well as their fidelity to incubation Julian is the oldest bird in the center and may not be fertile anymore. He will be kept together with Salma until the end of the breeding season next June to give him one more chance to reproduce. If they produce a second infertile clutch, young Salma will be paired with another unrelated male (Moustapha).

For the other two breeding pairs, eight chicks hatched by the end of November (four chicks each) after 42 days of incubation. The pair Maria/Aoulaye had 50% fertility for this first set of eggs and the pair Aicha/Moustapha reached 40%. This is much better than the previous breeding season, when the fertility rate for these pairswas zero for 39 eggs total. We are particularly pleased by Aicha's performance this year, as she had previously only contributed one offspring to the growing flock. After a month, one of the Aicha's chicks died. A necropsy revealed compaction due to a huge quantity of citrullis melon consumed by the chick in a short period of time. Citrullis melons a a preferred wild food source for red-necked ostrich in the Sahara. In retrospect, this chick was the most assertive feeder in its cohort and though the food quantity was controlled by the keepers, they could not prevent this one chick from dominating access to the melons when the chicks are maintained in a flock with their parents.. The remaining seven chicks are doing fine under the watchful eyes of their parents, who lead them, guard them and "teach" them as if they were in the wild. In early February, when the chicks reach three months of age, they will be separated from their parents to encourage a second round of reproduction by the adult pairs.



The female Salma enjoying the lush vegetation inside the pen



The male Aoulaye checking his nest with 4 chicks and 4 eggs



The pair Aicha and Moustapha with their 4 chicks

SCF continued....

Therefore, it has become crucial to implement an international strategy for the conservation of the North African Ostrich with the other range States engaged in the species conservation. SCF and its partners including Marwell Wildlife, the Smithsonian's National Zoo, the Saint Louis Zoo, the San Diego Zoo Global and the Zoo of Hannover have made a deal to support the projects in Niger and Tunisia and facilitate the exchange of birds (eggs or chicks) between the two countries. They will also join their efforts to implement new collaborations with other partners from Morocco and Chad.

In addition, a series of actions like review the status and taxonomy of the bird, including the possibility to investigate more on the genetics of the North African Ostrich to consider it as a distinct species, draw up the Tunisian, Nigerien and regional management plan for the next two years, building linkages between the existing initiatives in West and North Africa are ongoing and will contribute to reach a global action plan for the North African Ostrich conservation throughout the range States. The preliminary outputs of these actions will be presented and discussed during a specific session of the Sahelo-Saharan Interest Group Annual Meeting in May 2017 in Senegal.

One important step will be the installation of solar infrastructures in Niger. A letter of agreement has been signed by SCF with Wildlife Conservation Network – WCN represented by Stephen Gold. The WCN Solar Project will provide an off-grid solar electric power system, incubation and hatchery containers, solar water pumping components and various other components to assemble a conservation center for the project in Kelle.

The solar system will include all solar modules, inverters, charge controllers, combiner boxes, racks and supports, batteries, wiring and required components. The containers for incubation and hatching will be custom built in San Francisco and shipped as complete laboratories. The remaining systems and components will be packed in individually constructed plywood boxes and loaded into containers in San Francisco. The containers will be shipped in late April from San Francisco (USA) to Cotonou (Benin) and then by road until Kelle (Niger). We hope the solar infrastructures will be ready to run right on time for the beginning of the next breeding season in September-October 2017.



North African Ostrich National Strategy workshop



Fire break made all around the pens



View from the plateau of the burnt area within the

National, Regional and Solar Deal

SCF is not alone in its efforts to breed and restore North African red-necked ostrich in Niger. There are at least two other private holders of ostrich (in Iférouane to the far north, and in Mainé Soroa to the southeast) attempting to produce chicks. What has been missing until now is coordination of those efforts for the good of the species. SCF, working with the national government of the Republic of Niger, helped to convene a meeting of all stakeholders. The stakeholders meeting for those working on North African Ostrich breeding and conservation in Niger took place on the 22nd of September in Niamey, and has led to the development of a National Ostrich Conservation Strategy. For the first time, all the stakeholders agreed to work together, and a document has been drawn up by SCF and circulated by the Nigerien Wildlife Authorities. This document will be used as a road map to reach critical milestones to restore the species in Niger and to raise new funds to finance the activities agreed by all the stakeholders.

The strategy is based on the strengths and weaknesses of the three breeding centers in Niger and aims to define a set of priority actions which will contribute to population growth and improved genetic diversity across the three the sub-populations, in the hopes of accelerating the release of the birds into the wild. Through SCF, action is underway to standardize the captive birds' diet on a national scale, train the keepers and site managers at Mainé Sora and Iférouane to give them more autonomy regarding ostrich husbandry and veterinary care, and as infrastructure and experience grows in Kellé, offer artificial incubation service at Kellé to the satellite ostrich facilities, as a way to ramp up chick production in the future.

Niger will also need to look beyond its borders for assistance to improve the demography and genetic diversity of its North African ostrich population. Additional birds from abroad will likely be needed to ensure the success of a long-term reintroduction. Therefore, it has become crucial to implement an international regional strategy for the conservation of the North African Ostrich with the other range States engaged in the conservation. SCF and its partners, including Marwell Wildlife, the Smithsonian's National Zoo, the species Saint Louis Zoo, the San Diego Zoo Global and Zoo Hannover held a meeting at Marwell Wildlife where all agreed to coordinate and collaborate on current North African ostrich restoration efforts in in Niger and Tunisia. The immediate goals are to share information and expertise developed in both sites to enhance husbandry and facilitate the exchange of birds (eggs or chicks) between the two countries in the near future, if possible. Additional collaboration with be sought with other partners from Morocco and Chad. Other points of action discussed included the need for a review the status and taxonomy of the bird, including the possibility to investigate more on the genetics of the North African Ostrich to consider it as a distinct species; the need for a Tunisian, Nigerien and regional management plans for the two next years; and how best to build linkages between the existing initiatives in West and North Africa that will contribute to a global action plan for the North African Ostrich conservation throughout the range States. The preliminary outputs of these actions will be presented and discussed during a specific session of the Sahelo-Saharan Interest Group Annual Meeting in May 2017 in Senegal.

We are pleased this year to report significant progress towards the installation of solar infrastructure at the Kellé site in Niger. A letter of agreement has been signed by SCF with Wildlife Conservation Network (WCN), represented by Stephen Gold. The WCN Solar Project will provide an off-grid turn-key solar electric power system, incubation and hatchery containers, solar water pumping components and various other components to assemble a conservation center for the project in Kellé. The solar system will include all solar modules, inverters, charge controllers, combiner boxes, racks and supports, batteries, wiring and required components. The containers for incubation and hatching will be custom built in San Francisco and shipped as complete biosecure laboratories. The remaining systems and components will be packed in individually constructed plywood boxes and loaded into containers in San Francisco. The containers will be shipped in late April from San Francisco (USA) to Cotonou (Benin) and then by road until Kellé (Niger). We hope the solar infrastructures will be operational in time for the beginning of the next breeding season in September-October 2017.

Fire

In 2016 a small brushfire was accidentally ignited at the site when sparks from an outdoor brazier being used by one of the keeper's family were dispersed by the wind. The fire started on the northern side of center behind the keeper's house and spread very quickly westward because of strong winds coming from the north-east. Fortunately, the wadi next to the hill at one side and the firebreaks made a few weeks earlier by the staff with the technical support of the local forester contained the fire expansion.

SCF continued....

A minor mistake of inattention, as it can happen sometimes, can provoke a bush fire and have a catastrophic impact on the breeding center and wipe out many years of effort in less than an hour if firebreak planning is not respected. Fortunately, this incident did not damage the facilities nor harm the birds. The site manager has used the incident as a teaching moment, forbading future use of this outdoor brazier for tea by the keepers and their family.

Main challenges for 2017

Looking forward to our new partnership with the other satellite ostich breeding sites in Niger, the Saint Louis Zoo has generously agreed to provide a year's supply of food for the birds at both lférouane and Mainé Soroa. With a national strategy in place we now need to redouble our efforts in order to build on the momentum of this collaborative agreement and deliver tangible and early "victories". Such progress would go a long way to cementing newly formed partnerships and engendering more stakeholder buy-in.

In 2017, SCF is looking for additional support to fund the following priority actions. Please contact us if you can help!

The recruitment of 2 new keepers for the breeding centers of Iférouane and Mainé Soroa for the next year who will contribute to manage and monitor a self-sustaining population of reintroduced ostrich:

US\$ 5,000 per year

Secure funds to complete the shipping of solar infrastructures in Niger:

US\$ 30,000 for 2017

Ensure the Kellé breeding center is fully operational with skilled staff providing appropriate veterinary cares, maintaining the infrastructure and providing the recommended diet:

US\$ 30,000 to run the center per year

Support the organization of a regional workshop to draw up the conservation strategy in a close collaboration with the range States (Chad, Morocco, Niger & Tunisia) involved in North African Ostrich conservation:

US\$ 20,000 for 2017

Based on the recommendations of the national strategy, translocate birds (chicks and eggs) from other breeding centers in Niger and abroad to increase the gene pool and number of breeding birds:

US\$ 15,000 for 2017

Your generous support in helping us meet these goals is very much appreciated

From 2015 to the present, this project has been made possible through the generous support of the following people and institutions: AZA's Struthioniformes TAG, Busch Gardens-Tampa, Detroit Zoological Society, Dickerson Park Zoo, Disney's Animal Kingdom, Fort Wayne Children's Zoo, Happy Hollow Zoo, Jan Chauncey, Larry & Tony Johnson, Kansas City AAZK, Milwaukee Zoo, Nature form Hatcheries Technologies, North Carolina Zoological Park, Omaha's Henry Doorly Zoo, Saint Louis Zoo, San Diego Zoo Global, Sara Hallager, Stephen Gold - Wildlife Conservation Network. Smithsonian's National Zoo, Toledo Zoo, Utah's Hogle Zoo, Weltvogelpark, Woodland Park Zoo, Zoo Atlanta, Zoo Hannover, Zoo Miami.

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Big Bird Family History Revealed!

Sheri Horiszny Deputy Director - Living Collections, Oregon Zoo

The biggest news of the past year for Care for Karamoja (C4K) was the confirmation of the ostrich subspecies living in the Karamoja region of Uganda as S. c. camelus. This finding is important as the working assumption by wildlife officials in Uganda had previously been that these ostrich were S. c. massaicus. Our incubator and hatcher may now be useful for reintroductions of this rare ostrich, as well as for producing chicks to begin a farming program to supplement the protein and revenue sources for local people as originally planned.

The diagram below shows the results of genetic testing conducted by Dr. Rob Fleisher at the Smithsonian Conservation Biology Institute. The samples collected were feather, fecal and blood samples from a group of confiscated ostriches now living at Uganda Wildlife Education Centre (UWEC) plus a fecal sample from wild ostriches in Kidepo Valley National Park within the Karamoja region. You can learn more about the Care for Karamoja project by watch-



ing a five minute video found in the "About" section at: <u>www.care4karamoja.org</u>.

Special thanks to Dr. Rob Fleisher, Smithsonian Conservation Biology Institute! And thanks also for ongoing support to: The Roosevelt Park Zoo, San Diego Zoo Global, NABU, Six Flags Discovery Kingdom, Milwaukee Chapter AAZK, Dallas Chapter AAZK, Detroit AAZK Chapter, and The Santa Barbara Zoo.

Care For Karamoja is a conservation project aimed at improving the lives of endangered wildlife and over 785,000 food insecure people in the northeastern corner of Uganda. Originally inspired by the plight of the Rothschild's giraffes in the region, Sheri Horiszny has become passionate about the rare ostriches and wonderful people of Karamoja as well. Sheri is thrilled to be partnering with Uganda Wildlife Education Centre (UWEC) and Uganda Wildlife Authority (UWA) to ensure a bright future for Karamoja.

Running with Rheas

Patagonia Park welcomes the first Darwin's Rhea chicks at the breeding center in the Chacabuco Valley of southern Chile

Cristián Saucedo G., M. Alejandra Saavedra, Paula Herrera G.

Wildlife Administration, Patagonia Park

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Three years ago, Conservación Patagónica created the Darwin's Rhea Recovery Program in Patagonia Park. Beginning with the establishment of a park ranger station, the program subsequently monitored the wild rhea population through patrolling, censuses, threat identification, and the use of camera traps.

In 2015, the Darwin's Rhea Breeding Center began operations in the Chacabuco Valley. The center is the first



PATAGONIA NATIONAL PARK - XI REGION, CHILE Figure 1. Geographic location of the future Patagonia National Park, Aysén district.

of its kind to be established in the Aysén district, specifically in the area of the future Patagonia National Park (Figure 1).

The breeding center began when the Chilean Border Control's Carabineros rescued two orphaned rhea chicks in the eastern edge of the Park. A couple of months later, another ten rheas from a commercial breeder were transported, in an unprecedented air operation covering in 5 hours 1,000 Km (620 mi), from the Araucanía district to Aysén. The establishment of this breeding center was carried out following the guidelines of Chilean Wildlife Law.

The breeding center is a key component of the Darwin's Rhea recovery program. The goal is to augment the current local population through the care and management of the species in semi-captivity, where they can safely repro-

duce. The healthy chicks produced will then be released into the wild in order to augment the threatened local population and avoid a localized extinction.

Today, the population of Darwin's Rhea in Patagonia Park does not exceed 30 birds. For over a century, this

population has been isolated by fences from other subpopulations in Argentina as well as in Chile, where the closest subpopulation is 200 km (125 mi) away.

A rhea habitat model, developed by University of Chile researchers, determined that there are a number of suitable habitats in the Chacabuco Valley where the species may flourish. As such, it is possible to project a numerical recovery and redistribution of the species in the area, with the support of our program.

Between August and November of last season (2016) the breeding center's rheas reached 2 years of age, and began to show courtship, mating and incubation behavior that presaged a probable first breeding season. Due to the youth of the birds, the results of this breeding season were uncertain and a low success rate was likely.



Adult male rhea during incubation

Patagonia Park continued....

The outcomes of this first reproductive season have surpassed any expectations, resulting in the birth of more than 25 chicks, with ages fluctuating from 6 to 12 weeks. Some of the new chicks currently reside with their parents in the breeding pens and others are in foster pens. Measures will be taken to ensure these chicks become the pioneers of the program, the first to begin augmenting the wild population. The hope is that this process continues in subsequent years, resulting in a significant boost to the local rhea population. As the breeding center develops, we intend to incorporate the genetics of other wild populations in the area into the current captive population in order to significantly increase the likelihood of a successful species recovery.



The care, breeding and management of the rheas has required much learning and work on the part of the team of park wardens and professionals involved. It has been a privilege to count on the support of experts and members of the Ratite TAG Advisory Group (Peter Smallbones, Sara Hallager), Daniel Sarasqueta (Argentinean rhea expert and collaborator), Fauna Andina (Fernando Vidal) and members of the Chilean Ornithologists Union (UNORCH-Aves Chile).

We hope that the recent birth of the program's chicks will mark the first step towards the recovery of the local Darwin's Rhea population. We look forward to the possibility of engaging new collaborators in our work to recover these iconic Patagonian Steppe megafauna.

January 2017 Darwin's Rhea Recovery Program Team Wildlife Administration Patagonia Park, Conservación Patagónica



Darwin's rhea male with eggs in the nest





Darwin's rhea male with young chicks

Group of Dawin's rhea chicks at a few days old

Darwin's rhea 2016 EAZA Update

Peter Smallbones, Senior Head Bird Keeper, Paignton Zoo Environmental Park



The year 2016 ended with the EAZA Darwin's rhea population numbering 44.59.9 individuals at 33 institutions. The population is rising slowly. 10.9.15 chicks hatched in 2016 with 0.0.7 that DNS. In 2015, 6.8.19 hatched, with 1.0.15 not surviving past the first month. The chick survival past the first month in 2016 was 79.4% compared to the 51.5% chick survival in 2015. This is an important step forward for the programme. Part of this improvement was the result of better hand-rearing techniques. Paris Zoo, Belfast Zoo and Zlin Zoo in the Czech Republic all had success. Their rearing protocols and experiences will add to Edinburgh Zoo's 2014 hand-rearing information and the historical rearing protocol produced by Mulhouse Zoo in France and will be used to aid other institutions when un.

dertaking the hand-rearing of this seemingly tricky to rear species.

Thanks to AZA, in 2016, the EAZA Ratite TAG was contacted by Conservación Patagónica with regards to the Zoo community offering advice and support to aid their Darwin's rhea conservation program. The aim of Conservación Patagónica is to breed and reintroduce Darwin's rhea back in to the Aysén region of Chile. The Darwin's rhea as endangered in that district. Incubation and rearing advice has Chilean Wildlife Service has classified

been given and hopefully the 2016 breeding results will be available soon. Raising funds and sending trained staff out to Patagonia is hopefully something EAZA Zoos will contributing to the project in the future.

As a result of being managed at an ESB level since 2013, few collections are now left with individual birds. Encouragingly there is a waiting list to join the programme; this is mainly due to the species having an ESB. Several collections are looking to phase out Greater Rhea as it is a species that isn't managed by EAZA, which favours Darwin's rhea. Some males are starting to nest build in January so as ever with being a Bird Keeper the new season is already nearly upon us.



Photo by Carolyn Ellis





Catching Up with Cassowary

New Partnership Seeks to Further Cassowary Conservation, Husbandry, and Research

By Ellen Dreyer, Animal Behavior and Wellness Coordinator, Brevard Zoo



Upcoming renovations posed a quandary for Brevard Zoo's animal care team. The female Southern cassowary, Ginger, would need to be moved to off exhibit holding during the year long process. Not only would suitable holding need to be constructed for her, she would also potentially miss out on two breeding seasons and the possibility of being introduced to a new male after her previous mate passed away. Not content with this prospect, zoo staff reached out to the Cassowary Conservation Project in Fort Pierce, FL. A short one-hour drive away from the zoo, the Cassowary Conservation Project is a cassowary lover's paradise with more than 20 cassowaries housed on two properties. The owners, Scott Snedeker and Glenn Hood, began the project to further conservation, husbandry, and research of cassowaries. They are a wealth of knowledge when it comes to breeding, incubating, and raising cas-

sowaries and have written a paper entitled *Cassowary Pediatrics* co-authored by April Romagnano, an avian veterinarian. Chris Carpinone, their nephew, also works at the facility and helps care for the cassowaries and other animals that live there including goats, ponies, and peacocks.

Brevard Zoo staff visited the facility to determine if it would be a suitable place for Ginger during renovations. Upon arrival, we were invited to meet last year's chicks. Then, we were given a full tour and listened while they described each bird's personality and quirks. A highlight of the tour was seeing the only single-wattled cassowary in the United States. Glenn, Scott, and Chris also introduced the staff to a potential mate for Ginger, a descendant of one of the last imported cassowaries from New Guinea. After speaking at length to the team at the Cassowary Conservation Project and touring the facility,

Brevard Zoo staff agreed it would be in Ginger's best interest to move her there and pair her up with their male. On March 8 after only a month of crate training, Ginger voluntarily crated and zoo staff transported her to



her new home. She has been paired with the male and breeding has been observed. The zoo has also made plans to take an unrelated pair of sub-adult cassowaries when the renovations are complete to continue breeding this endangered bird.



<u>Update:</u> In November, two of Ginger's former keepers headed to the Cassowary Conservation Project to visit her and the other cassowaries.

Ginger is doing well and getting along great with her mate. The zoo's two new cassowaries are growing fast and getting their adult plumage. They will be moving back to the zoo in May when the Australasia section re-opens.

Diet and food availability of the cassowary in the Daintree lowlands, 2014





Wren R. McLean Dip CLM, B EnvSci (hons) Supervisors Ross L. Goldingay ^A and David A. Westcott ^B ^A Southern Cross University, Lismore, Australia ^BCSIRO, Land and Water, Atherton, Qld, Australia

Introduction

Food availability may be a limiting factor for cassowary population size (Crome, 1975) and food shortages may have more adverse effects on chick and sub-adult populations (Bentrupperbaumer 1998). The lean season diet was of particular interest in this study as this often corresponds to the juvenile dispersal period and adds the additional risk of starvation to dispersing chicks.

A compilation of phenological fruiting studies across the Wet Tropics (Westcott et al. 2005b) identified periods of low fruit production from February to July and low richness from April to July making late wet to early dry season a distinct lean fruiting period. Challenges for frugivores are considered highest during this time and the costs and benefits of foraging choices may be determined by the nutritional and energy content of the fruit against the search and handling time to find and consume it as predicted by the optimal foraging theory (Pyke, 1984; Yahnke, 2006). Cassowaries rely heavily on nutrient rich fruits from the Lauraceae family (Crome, 1975; Wright, 2005; Bentrupperbaumer, 1998; Bradford et al 2008) followed by those from Elaeocarpaceae, Myrtacaeae, Arecaceae and Rutaceae families. Fruit productivity in the north Queensland's rainforests increases from July onward and peaks in December (Westcott et al. 2005b; Bradford et al. 2008).

Aims

This study had two aims: i) to describe the diet of the cassowary on the Daintree coast for the lean and abundant fruiting seasons using scat analysis; ii) to investigate the relationship between the inclusion of fruit in the diet and fruit resource availability on the forest floor.

Methods

Cassowary diet was determined from fruit and seeds found in cassowary scats and the fruit available on the forest floor between April and September 2014. A total of 10.85ha was surveyed during repeat surveys of 31 sites between the Daintree River in the south and Melissa Creek in the Daintree Iowlands. All cassowary scats encountered throughout the Daintree Iowlands were analysed by identifying and undertaking a fruit or seed count. Fruit encountered on the ground on transects were also identified and quantified to estimate the biomass and diversity of fruit resources available to cassowaries.

For this study, the 'lean fruiting season' is defined as the period of lower fruit production during April, May and July inclusive. The abundant fruiting 'season' is defined as a time of increasing fruit production encompassing the months of August, September and October.

Key Results

The estimated biomass of the 18 identified fruits common to both the dietary analysis and fruiting study were compared. An estimated 32.5kg of fruit was found in scats and 288.5kg was encountered as fruit fall on the ground. A comparison of the estimated biomass of species in scats with that on the ground suggests a preference for some species and an avoidance of other species. Five species made up 87.2% of the estimated biomass of fruits eaten. The other 13 fruit species collectively contributed to under 2kg of overall estimated scat biomass (Fig. I). Daintree cassowary continued....

The most readily utilized species over both the lean and abundant seasons was *Syzygium kuranda*. Whilst none was found on the forest floor during the abundant season a 3.4 fold increase of this species is seen in the scat between the lean and abundant season (Fig. 2) suggesting abundant season selective foraging. *Syzygium graveolens* highlights a similar trend, whereby it was not found on the ground during the abundant season yet consumption patterns show a 3.8 fold increase from lean to abundant seasons. Member of the Lauraceae family, *Beilschmiedia castrisinensis*, was primary

ly eaten over the abundant season (88.6% of total); however, patterns of potential preferential foraging are noticeable over both seasons with a total of 4.56kg eaten and only 1.83kg located on ground throughout the entire study.

The only species suggesting preferential foraging during the lean season is *Cerbera floribunda*, whereby 56.5% of the total biomass of this species was consumed during this time (Fig. 3). In stark contrast to the abundant season, large quantities of *S. kuranda* were found on the ground, suggesting that whilst this species was eaten it was not preferred during the lean season.

An increased knowledge of cassowary diet (Table I), in particular preferred lean season species, should make an important contribution to cassowary habitat restoration and species recovery plans. Re-vegetation plantings enriched with largefruiting species, a mix of continuous, biennial and annual fruiters, and, in particular, and a high density of the top five preferentially foraged fruits that make up 87.2 % of the diet in this study may best provide for cassowaries. These five species, Syzygium Kuranda, Syzygium graveolens, Cerbera floribunda, Elaeocarpus augustifolius, Beilschmiedia castrisinensis, along with Syzygium hemilampra, are all substantial contributors to the lean season diet and should be given special attention by seed collectors, native nurseries and rainforest regenerators. The use of these species in wildlife corridors throughout the lowland Wet Tropics may provide sufficient habitat for subadults and aid in population dispersal and expansion.





Figure 1: Estimated biomass contribution (%) of five top dietary species and 13 'other' fruits







Figure 3: Lean season biomass of five top fruits in scats and on ground

Daintree cassowary continued....

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Table I.

Identified fruit species in cassowary scats and on the ground the frequency with which they were found between April and October 2014 in the Daintree lowlands.

Family	Species	Scat frequency	Ground	Known food
		. ,	frequency	species
Annonaceae	Annona glabra	I	0	Y
Annonaceae	Cananga odorata	I	0	Y
Apocynaceae	Cerbera floribunda**	14	5	Y
Apocynaceae	Cerbera manghas	6	0	Y
Apocynaceae	Cerbera inflata	4	0	Y
Arecaceae	Normanbya normanbyi*	11	24	Y
Arecaceae	Archontophoenix alexandrae*	9	11	Y
Arecaceae	Laccospadix australasicus	I	0	NPL
Arecaceae	Ptychosperma elegans	I	0	Y
Celastraceae	Siphonodon membranensis	I	7	Y
Davidsoniaceae	Davidsonia pruriens*	2	5	Y
Elaeocarpaceae	Elaeocarpus augustifolius**	36	5	Y
Elaeocarpaceae	Elaeocarpus bancroftii*	3	15	Y
Elaeocarpaceae	Elaeocarpus culminicola	I	0	Y
Gentianaceae	Fagraea cambagei*		13	NPL
Icacinaceae	Apodytes brachystylis		0	Y
Lamiaceae	Gmelina fasciculiflora	3	0	Y
Lamiaceae	Vitex queensladica		0	NPL
Lauraceae	Beilschmiedia castrisinensis**		4	Y
Lauraceae	Cryptocarya oblata*	I	I	Y
Lauraceae	Endiandra insignis	I	I	Y
Lauraceae	Endiandra monothyra*	I	9	Y
Loganiaceae	Strychnos minor*	6	35	Y
Meliaceae	Dysoxylum alliaceum	I	0	Y
Meliaceae	Melia azedarach*	I	2	NPL
Meliaceae	Aglaia sapindina*	I	4	Y
Moraceae	Ficus congesta	I	0	Y
Moraceae	Ficus variegata	I	5	Y
Myrtaceae	Syzigium kuranda**	28	6	Y
Myrtaceae	Syzigium graveolens**	20	3	Y
Myrtaceae	Syzigium hemilamprum*	4	2	Y
Oleaceae	Chionanthus ramiflora*	2	10	Y
Piperaceae	Piper hederaceum	I	0	NPL
Rutaceae	Acronychia acronychioides*	5	6	Y
Sapotaceae	Planchonella myrsinodendron	I	0	NPL

NPL = Food species in this study not previously listed.

Scat frequency = occurrence per 85 scats; and

Ground frequency = occurrence per 124 surveys

*denotes the 18 species common to scat and ground

** denotes the five species that make up a majority of the diet

Cassowary Chicks at Pinola Conservancy

Jacob Kraemer, Curator

In February of 2016, we were presented with the opportunity to acquire a pair of cassowaries, our first ratites of any kind. Not just any pair of cassowaries, but a pair that had been housed together for many years without ever having been separated. In my research on their captive husbandry beforehand, I realized that this was a rarity due to seasonal aggression. The owner assured me that this pair was unique due to aforementioned circumstances and the fact that they were extremely mellow birds, particularly the female. "I go in with them all the time. They're like big puppies!" he said. I had known of the owner for a few years and knew he was very reputable. So we absolutely jumped on the chance to work with a pair like this. The caveat being that we only had two weeks to prepare for their arrival due to the owner needing to move them quickly. So we had to build a brand new cassowary enclosure in record time. After doing our homework and consulting with many folks, both within AZA and the private sector, who were experienced in building and designing cassowary exhibits, we built a cassowary enclosure in less than two weeks, just in time for their arrival on February 21. We trucked them from North Carolina to Louisiana through the night on a 16 hour drive. Once here and released into their new digs, I quickly realized that everything said about them was absolutely true. "They really are big, dumb puppies!" I said. I found out very quickly who the real dumb puppy was.

They both settled right in. The female was completely mellow right from the start. The male took a day or two to relax but eventually did. In the meantime, I'm still doing my homework on their care with the eventual hope to breed them as they had laid many eggs and produced a few chicks off and on in the past. Thinking that I had all the time in the world (always a big mistake with birds), I assumed it would be a while until we actually got to that point. So imagine my surprise when on the morning of March 28, I see a big bright green egg in their enclosure. Yeah, totally was not expecting that. Now I must familiarize myself with cassowary incubation in a hurry.

Over the next couple of weeks, she proceeded to lay 5 eggs total. She scattered the first 3 around the enclosure without any real attention paid to them by the male. So I picked up those 3 for artificial incubation since it seemed he wasn't interested in them. Let it be said that I was totally going in there nonchalantly to pick them up, like you would eggs in a chicken coop, like it was no big deal. (This is important later.) When she laid the 4th egg, I noticed that the male had taken an interest in it and later saw him sitting on it. I decided to split my risks and incubate the 3 I had and he could keep the rest since he was wanting to set them. She laid one more egg in his nest and that was it. As it turned out, my 3 eggs wound up being infertile. I was not sure about his 2 eggs, but I knew the day was fast approaching when I would know. I must say, during the entire time he was incubating, he was a rock. I never saw him get off of the nest in all of those days on it. Not once. So I never bothered him. On the afternoon of June 3, a very rainy afternoon, I went out for my check on the cassowaries to see if anything was happening be-

cause it was time for the eggs to hatch if they were going to. As I am walking up to the side of the enclosure where his nest is, I see a chick on the ground, away from the nest. It's in serious trouble. On its back, soaked, with a swollen umbilicus and flies on it. The male had obviously cast it aside. I naturally panic and the only thing I am thinking at this moment is that I have got to save this cassowary chick. It's my first ever and I'd look like



a jerk if I let it die in the rain. So with the combination of the rush to save the chick, my excitement to actually have a chick, and my nonchalant nature with this pair, I decided to just go on in and grab the chick. No big deal, right?

Wrong. Absolutely wrong. I grabbed a broken pine branch off the ground, you know just in case I had to shoo him away or something like the big puppy that he is. I was quickly schooled into why everyone says that cassowaries can be dangerous. As I walked up to the chick, the male decided to stand up. That was the most personality he had shown in 2 months. When he did, I noticed the second chick beneath him. This chick was nice and fluffy and in tremendous shape. The second he stood up, I knew what was about to happen. You ever have that moment of clarity where you realize that what you are doing right now is very stupid?



That was my moment of clarity. He was looking at me with death in his eyes. So I slowly start to back off as he starts towards me. Walking at first, he unleashed this loud hissing "I'm about to kill you" war cry sound that I had never heard before. He then began to run at me, very quickly closing in on me as I had my stupid little pine branch firmly gripped like a piece of Valryian steel as if it were going to save me. I was backed up against the fence and he jumped up to kick me and wouldn't you know, my stupid little pine branch actually worked. I was able to hit him square in the chest and back him off. He was not about to quit though. He was starting to come at me again when thankfully, the healthy chick started to call and he immediately turned his attention to the

chick and I jumped over the fence as fast as I've ever moved and out of the enclosure. You are probably thinking that I am the world's biggest idiot with this story, and you most certainly should be thinking that, but I'm the world's luck-

iest, biggest idiot. Everything I did in this situation was completely wrong and I am good with that because I learned a valuable lesson that day: cassowaries are dangerous. Don't let anyone tell you otherwise. If they do, they're lying. This pair of cassowaries' personalities may be an exception to the norm but my guard should have never been let down. They are still cassowaries and should be treated as such. Trust me, they are now.

After that near death experience, I figured out a much safer way to do things and we eventually got both chicks, and myself, out of the enclosure unscathed. The sick chick actually made it up to 10 days before ultimately succumbing to an infection. The healthy chick was flawlessly hand-raised with the help of countless AZA interns walking her many times



daily. She was kept here up to 6 months of age before we sent her on her way to her new home at the San Diego Safari Park. Hand-raising cassowaries requires a ton of time, attention, fruit, and space but was an extremely rewarding experience for everyone involved. She became very tame, that tameness likely the cause of her to be a future killer (sorry San Diego) but we enjoyed her while we had her. As of this writing, the male is sitting on a clutch of 3 eggs. I think I might stay out of his face on this one. He seems to know what he's doing a little more than I do. This dumb puppy learned his lesson. Here's hoping to a few more cassowary chicks in the near future.









Cassowary Vocalizations By Dr. Andrew Mack

Other than a few cassowaries in the endangered population in Australia that are habituated to people, these huge birds are usually extremely secretive and difficult to observe. In New Guinea where all three species occur, they are usually particularly elusive, and for good reason. Over eighty percent of the population of Papua New Guinea (PNG) lives off the land, and cassowaries are the largest native terrestrial vertebrates in PNG. This puts them in high demand as a food staple. So in the 40,000 plus years cassowaries and Papuans have been interacting, cassowaries have become quite adept at staying out of sight.

This is great for the cassowaries, but not so good for ornithologists hoping to study them. Usually cassowaries slip silently into the shadows well before a scientist crosses their path, leaving only their tracks and droppings to indicate their recent presence. These are very difficult birds to



observe in the wild, enhancing the potential value of captive birds to help fill in the large gaps in our knowledge of them. After many years in PNG largely dedicated to studying cassowaries, I now live in the USA and have begun capitalizing on research opportunities provided by captive cassowaries. In my field work I managed to record vocalizations and show that cassowary vocalizations extend into very low frequencies, in the range of infrasound inaudible to many people. Their booming is something often felt as much as heard.

I am beginning to collect recordings of vocalizations from captive birds-- something that can take weeks of hard field work just to get a poor recording. I hope to begin looking at when cassowaries vocalize and how they might respond to playback of vocalizations. Infrasound carries very well without dampening through vegetation, so wild birds could potentially be communicating over large distances. Possibly with captive birds we can measure how strong a signal must be for cassowaries to detect it. Possibly we can learn how well they can discern directionality of a signal-- something that is not easy with low frequencies.

I am interested in learning also how they produce these vocalizations. Clearly inflation of airsacs is involved. Does this help produce a resonance?

With colleague Josh Jones, I am looking more closely at the anatomy of cassowaries relative to sound production and reception. We are interested in learning if the casque could play an auditory role. Or is it more important for thermoregulation or maybe olfaction? Many ideas have been proposed but few are well substantiated, largely due to the paucity of good field observations and proper anatomical dissections.

Our work already, especially with the support of the Toledo Zoo, Smithsonian National Zoological Park, the Virginia Zoological Park, and the AZA Struthioniformes TAG is opening some tantalizing possibilities. We have some supplemental observations from captive cassowaries in PNG. But we will need more observations and data from birds in the USA before we approach more definitive answers regarding the function of the casque, sound production, thermoregulation, and sound reception. We are extremely grateful for the support of zoo staff who have allowed us to collect data from their birds and for the financial support we have received that helps subsidize the research and visits to zoos with cassowaries. We hope to meet more keepers and their cassowaries in 2017.

http://www.cassowaryconservation.com/



Keeping Up With Kiwi

Smithsonian Conservation Biology Update

by Wesley Bailey, Keeper

After the successful dieting of a chronically overweight male brown kiwi, the breeding pair at the Smithsonian Conservation Biology Institute hatched three chicks in 2016. The three brothers remain at the facility until they're old enough to travel. This is a marked success for the program, as the breeding pair in question was of significant genetic importance and had not previously had any chicks. The dieting remains an ongoing effort but we hope to have more chicks. As more kiwi hatch, space is invariably an issue; the present goal is to expand the facility such that more kiwi may be housed on-site. While the National Zoo bird house undergoes renovation for the next few years, all the remaining kiwi (3 males) will be moving out to SCBI this coming year.

Three Kiwi Chicks at the Smithsonian Conservation Biology Institute Receive Names

Names have been given to the first three brown kiwi chicks to hatch from eggs laid and incubated at the Smithsonian Conservation Biology Institute (SCBI). Kaha, Maori for strong, hatched on May 10th and was named by New Zealand Ambassador the United States, Tim Groser. The second male, named Hari meaning "joy," hatched on June 1st. He was named by a SCBI donor. Finally, Kake, meaning "to overcome," hatched on July 31st and was named by keepers.



Got Eggs? Using Training to Determine Kiwi (Apteryx mantelli) Egg Development

Carol Brackett, Zookeeper at A Bird's World, Franklin Park Zoo

Zoo New England's Franklin Park Zoo in Boston, Massachusetts houses 1.1 Northern brown kiwis (Apteryx mantelli), 1.0 Justus and 0.1 Aria. While we have exhibited kiwis since 2015, it was not until June 2016 that our two kiwis were placed together on exhibit in the hopes that they would breed. Northern brown kiwis are a Red SSP and of particular



importance due to their endangered status. So far, kiwi breeding in zoos has been difficult, with relatively few institutions outside of New Zealand having successfully bred. Any techniques that can be used to help detect egg development in regards to determining egg lay date would be useful to furthering the breeding success within AZA institutions.

The female, Aria, participates in a training program and has been conditioned to station, stand on a scale, enter into a crate, and allow abdominal palpitation. A clicker is used as a bridge and earthworms are used as reinforcement. Due to their nocturnal nature, the kiwis are displayed on an exhibit with a reverse lighting cycle, so training occurs in the dark, using a headlamp with a red light. Station training started in August of 2015, before the male and female were introduced. Training involved approximating Aria to a corrugated plastic board and getting her

to stand on it until bridged. The station board was then taped to a scale, allowing us to get voluntary weights. The male and female were introduced together in June 2016. Conditioning for voluntary abdominal palpations was introduced in October of 2016, before the first egg was laid. Aria's curious nature greatly aided in tactile approximations. She often greets keepers in the morning while diets are fed out and rarely reacts to brief touches. Training sessions occur during feeding, incorporating brief touching of the abdomen with the verbal cue "touch." Voluntary palpations can determine whether Aria is in breeding condition when her abdomen is stretched and fluid-filled (edematous). It can also determine when she is close to laying when her abdomen is stretched and firm. Currently, I am approximat-

ing increased tactile duration and pressure. Asking her to participate in these husbandry behaviors has provided stress-free opportunities to assess egg formation and estimate lay date.

Kiwi eggs take a month to form and can comprise 15 - 20% of the female's weight. Monitoring Aria's weight and abdominal condition may help identify when she has an egg and may be close to laying. Starting in September 2016, Aria's weight was taken two to four times a month. Through this method, we tracked a 17% increase in Aria's weight (1.8 kg to 2.1 kg) before she laid her first egg in October 2016, and a 10% increase (1.9 kg to 2.1 kg) before laying her second egg in December 2016. A third egg was laid in January 2017, but weights were not taken early enough prior to laying to record a change. Palpation



sessions, however, did show a change in Aria's abdominal firmness leading up to and after the third egg being laid.

At age four, this was Aria's first breeding opportunity, and to date she has laid three eggs. The first egg was broken by the male while incubating before fertility could be determined. The second and third eggs were artificially incubated. As Aria becomes more comfortable with abdominal palpations, and in conjunction with continued regular weights, we plan to get a better understanding of the physical signs of egg laying in female kiwis. This will hopefully give us greater success in our breeding program and allow Zoo New England to play an important role in supporting this fascinating species.

Kiwi Program Updates

Kathy Brader, Brown Kiwi SSP Coordinator, Smithsonian's National Zoological Park

The kiwi program has grown over the last year with new pairs, chicks and new zoos. We are growing and looking forward to having new members coming on board. The population is at 55 birds and we welcomed new partners and new countries this past year!

We hope to have more pairs successful in the next couple of years so please think about adding kiwi to your collection. They are a very exciting species to work with. With commitment and the right bird, kiwi can be a great ambassador bird. On that note, SNZP and SCBI will be publishing a paper on the results of cortisone/hormone stress study based on all of our kiwi. We hope to gain a better understanding of stress in kiwi in demo, public and off display arenas.

European Updates:

- Due to avian flu in Europe, birds haven't been able to move as planned. However, in 2017, plans are to re-pair female "Wha" (a female from New Zealand) with a new male in Berlin.
- A bird keeper from Gan Garoo, Israel visited Frankfurt and Berlin for training with kiwi. The keeper was supposed to take back a male from Berlin, but due to avian flu restrictions this was not

United Kingdom:

possible.

• A male "Manu" went to Paignton Zoo, the first time since 1986 that kiwi have been in England.

France:

• The program welcomed Villars-les-Dombes in France. This is the first time kiwi have been in this country.

Germany:

- The kiwi in Europe were moved inside due to the threat of Avian flu which may have led to a loss of an kiwi egg at Frankfurt Zoo. Fortunately, there is a second fertile egg (laid Jan 2nd).
- Vogelpark in Walsrode had their first kiwi egg by a new young pair. Although the egg was not fertile, this is an important first step.

Czech Republic:

• The program welcomed back Zlin-Lesna and kiwi "Gerry" from Berlin.



• The program hopes to bring some females from Europe to the US for new pairings. <u>Zoo New England:</u>

• Successfully paired their birds and early signs are encouraging (see article on p24).

<u>WCS</u>

Vorked very hard over the last two years to pair up their young female. Things looked very promising with an egg being produced but the female died very shortly afterwards which was heartbreaking all around (does not appear to be due to egg or reproduction problems). Once the restrictions are lifted in Europe they will be receiving a young female. My condolences to WCS, I know how hard they have worked on their kiwi program.





Kiwi "Manu", photo by Peter Smallbones

Toledo Zoo Works With Smithsonian Conservation Biology Institute to Hatch Kiwi Chick

By Chuck Cerbini, Toledo Zoo's Curator of Birds

Bird staff at the Toledo Zoo successfully hatched a North Island Brown Kiwi chick on December 14, 2016. The egg originated at the Smithsonian Conservation Biology Institute in Front Royal, VA. On Day 61 of incubation, it was transported by car to Toledo, OH by SCBI's Bird Programs Manager, Warren Lynch. After a quick candling, the egg was placed in a Grumbach incubator at the Toledo Zoo's off-exhibit Avian Breeding Center. The chick internally pipped on December 9, 2016 after 69 days of incubation and externally pipped four days later. Within 24 hours after the external pip, the chick was completely hatched at a healthy 284.9g. After the expected post-hatch weight loss, the young Kiwi surpassed its hatch weigh on day 25 and on January 22, 2016



Toledo Zoo's North Island Brown Kiwi chick at 18 days old. Photo: Chuck Cerbini

weighed 432g. The Kiwi chick is doing well and is currently being hand-raised at the Toledo Zoo's Avian Breeding Center in a habitat box designed after those used at Smithsonian's National Zoo.

San Diego Zoo hatches kiwi chick

By Nicole LaGreco, Animal Care Manager, San Diego Zoo



On 11 March 2016, keepers gathered in the incubation facilities to see if THE egg had hatched, they were rewarded with the sight they had been anxiously awaiting 5 days for, a kiwi chick. She was monitored over night by camera and the video was reviewed every morning to ensure everything was going as expected—to say it everything was normal is a bit of a stretch, as nothing is "normal" when it comes to rearing a kiwi chick. Over the next 12 days keepers checked for any evidence the young chick was eating. Finally, on 23 March 2016, success—a meatball was finally

consumed. Her appetite and weight gains took off from there, taking 23 days to regain her initial hatch weight. After years of infertile eggs and

false starts, San Diego Zoo it happy to say we have successfully reared a kiwi chick again.



Cecil's Corner



Remember last year, when my keeper's thought it would be so funny to share the story of my "hump bucket?" Well, apparently I'm not the only cassowary with this idea! Let me tell you a little story...

GoldiLauren and The Three Bowls

Once upon a time, there was a little bird keeper named GoldiLauren. She went on a walk down the pathway to the Cassowary holding. She knocked on the door and entered the building. GoldiLauren walked over to greet Wren, the two year old male cassowary, as he was huffing and puffing with his short booming and facial cheeks puffed out. It was then GoldiLauren noticed that there were three different sizes of bowls and wondered why Wren would need all those bowls!? Wren stopped vocalizing and walked over to his large water bowl. He attempted to mount it but water was spilling out everywhere. Wren walked over to his medium sized bowl but it was too awkward to put his foot on the top of it. He then went to his small food bowl and it was just the right size. Wren quickly stood up with his rump feathers raised, standing as tall as possible strutting outside into his yard. GoldiLauren understands why there are three different sized bowls in Wren's stall due to his new hormonal changes.







Story by Lauren Butler, Nashville Zoo

Emu Encounters

By Nicole Strauss; Curator, KidsZoo and Aquarium and Lee Schoen: Curator, Birds, BREC's Baton Rouge Zoo

In March, 2016 we hatched out three emus for hand rearing. After the first month we moved them to a stall in our Kid's Zoo barn. There the Emu chicks were a big hit with our guests who were able to get an 'up close and personal' view of them. Four months later, they were getting a little big for the stall and the decision was made to try to put them in the Australian Yard with the parents and a single Red Kangaroo.

The Australian Yard exhibit is about 50' \times 50' with a small pond and a barn. There is a small side yard 15' \times 30' that is separated from the main yard by a fence with a gate. We wrestled the 1.2 Emu chicks into crates and carried them out to the side yard where we released them. They were housed there where they were visible to the parents for a couple of weeks. The parents showed mild interest in the three youngsters and would often walk the fence line that separated them.



Finally, the fateful day arrived. We opened the gate and the parents ran in and immediately started pecking one of the chicks. The adults would single out a chick to peck and kick at, but would then get distracted by another and would start chasing that one instead. After a few minutes of this we split the birds up. It was August and it was hot so we didn't want to stress the birds out too much. We continued these short supervised introductions a few times a week for a couple of weeks with pretty much the same results.

After awhile we shifted them so that we were holding the parents in the side yard and the chicks had the run of the main yard. Around that time the introduction periods were increased to about an hour while the exhibit was being cleaned. This allowed the emus to be monitored while the keeper was in the exhibit. The chasing and pecking continued but to a lesser and lesser degree over time and eventually we just left them together. Some chasing still occurs, usually by the adult male, but it is infrequent. The yard is big enough and their attention span small enough that it currently seems to be working out.



Time for Tinamous

The most beautiful eggs in the world?



Tinamous are not ratites

The Palaeognathae, or paleognaths, consist of the ratites and the tinamous. All other groups of birds are Neognaths. Palaeognaths are separated from all other bird species on the basis of their distinctive palate (jaw) morphology. There are three extinct groups, the Lithornithiformes (tinamou like in appearance) the Dinornithiformes (moas) and the Aepyornithiformes (elephant birds).

The word *Paleognath* is derived from the ancient Greek for "old jaws" in reference to the skeletal anatomy of the palate, which is described as more primitive and reptilian than that in other birds. Paleognathous birds are the most primitive living birds, though there is some controversy about the precise relationship between them and the other birds. There are also scientific controversies about their evolution.

Keeper Tracks

Meet Megan Stegmeir from Blank Park Zoo!



I grew up in Minnesota where I enjoyed time outdoors in all seasons with my family. The North Shore area in Minnesota continues to be a favorite place of mine for hiking, kayaking and watching loons and other wildlife.

I have always been interested in animals and zoos, and found my passion to be birds pretty quickly after becoming a zookeeper in 2010. I started out in the Education Department at Blank Park Zoo but soon had the opportunity to join the Bird and Reptile team. I have an amazing flock of coworkers that share a passion for birds and a desire to learn and continuously improve our husbandry. I enjoy the variety of birds I work with, but am especially fond of our emu, cassowary, vultures, cranes and nakedneck chickens. Our emus are fun, fluffy, and range from lovable to ornery. Working with the cassowaries has taught me a lot of patience. Our king and cinereous vultures are mischievous and endlessly entertaining. Our cranes are always a challenge, but a welcome one. And the nakedneck chickens are the first thing I hatched and raised. They are a fun, personable family and you can't deny how cute naked-neck chicks are!





Be sure to stop by the Struthioniformes table at the AZA midyear meeting in Albuquerque where you can purchase some of Megan's cassowary foot paintings, courtesy of cassowary "Sydney"!

Rhea Enrichment

Dana Urbanski, Struthioniformes TAG Enrichment Coordinator



Photo: Hilary Colton, Smithsonian National Zoological Park

Rheas are native to South America and resemble ostrich in appearance but are not related. Rheas have three forward facing toes whereas ostrich only have two toes. Rheas are grassland bird preferring open lowland areas. Rheas may form flocks anywhere from 20 to 25 birds during the non- breeding season. Males can weigh up to 88 pounds and stand more than 5 feet tall. They have a large wing span (around 8 feet) and use their outspread their wings to steer while running which helps them outmaneuver predators. Rheas are omnivorous preferring to eat broad leafed plants and will continuously eat as they walk. Rheas also eat fruit, seeds and roots as well as insects, and occasional small reptiles and rodents. Males

may court between 2 to 12 females and prefer to breed near water. Males build the nest, incubate the eggs and care for the young.

In zoos, rheas are often kept in in mixed species exhibits with guanacos and various other South American species. Browse is a good enrichment idea for rheas. Offering various browse piles, scatter feeding or grass flats can provide longer lasting enrichment. Providing dust baths with either sand or dirt and different forms of substrate on exhibit or in holding can also be enriching. Many insti-

tutions freeze vegetables or produce into a "frozen block" and give that as an enrichment item especially during the warmer months. The use of puzzle feeders and/or boxes with holes or just simply hanging lettuce, leafy greens or grape bunches from exhibit fencing so the rheas have to work to get it is an easy way to provide enrichment for these birds.

Operant conditioning is also a great way to mentally stimulate these birds. By training these big birds to participate in various medical procedures such as blood draws, ultrasounds and radiographs voluntarily, caretakers can minimize handling. Some institutions have built crates for successful training or built areas that offer more protection for both animals and humans. To be able to give animals choices whether it is through enrichment or operant conditioning helps improve welfare for the animal.



Photo: Denise Ibarra, Abilene Zoo



Photo: Hilary Colton, Smithsonian National Zoological Park

AZA TAG News

- The 2nd International TAG Chair meeting was held in Omaha, NE March 17th and 18th. Representing the AZA Struthioniformes TAG were Chair Sara Hallager and Vice Chair Scott Tidmus. EAZA Ratite TAG Co-Chairs Joost Lammers and Jo Gregson were also in attendance. Sara spoke about ratite collaborations between AZA and EAZA
- The AZA Struthioniformes TAG meeting was held March 20th at AZA midyear. Speakers included Bill Houston [Niger ostrich], Courtney Stone [ratite mixed species exhibits], Joost Lammers [EAZA updates] and Sara Hallager [AZA updates]
- The AZA Struthioniformes TAG participated in the TAG Mart held at AZA midyear meeting. We'll be at the 2017 mid year conference in Albuquerque so be sure to stop by our booth!
- Interested in working on the ostrich, rhea, emu (ORE) Animal Care Manual? Contact Sara Hallager at <u>hallagers@si.edu</u>
- AZAs new sustainability database is now live! Check out information on our TAG program species (brown kiwi and southern cassowary) <u>https://ams.aza.org/eweb/DynamicPage.aspx?webcode=SSPReportsSearch</u> [note you need to be logged in to view reports]
- Species Fact Sheets can be found at <u>http://aviansag.org/Fact_Sheets/Ratites/Ratite_TAG.html</u>
- Quarterly Enrichment postings can be found at <u>http://aviansag.org/Newsletters/Struthioniformes_TAG_Newsletter.html</u>

Health and ratites

Dr. Amanda Guthrie, VA Zoo alerted the TAG to reports of EEE in WI and MI and reminded everyone to vaccinate your ratites. Even if you live in a part of the country that does not see EEE, remember that birds move around for breeding recommendations so it's a good idea to vaccinate. <u>http://www.waupacanow.com/2016/09/15/ eee-virus-in-waupaca-county/</u>

Learn How Scientists Turned Extinct Birds Into Life-Like, 3-D Animations

http://www.nzfauna.ac.nz/building-a-moa

and

http://www.audubon.org/magazine/may-june-2016/learnhow-scientists-turned-extinct-birds-life



A life-sized model of an extinct Coastal Moa, built in 2006 by the firm Izzat Design Limited, is on display at the National Museum of New Zealand.

Photo: TE PA-PA/CC BY-NC-ND

TAG Population Updates

Program Species

The **Brown Kiwi** studbook was published in August 2016. At the time of publication, there were 55 birds in 14 institutions including North America and Europe. The studbook is managed as a Red SSP by Kathy Brader, Smithsonian National Zoological Park.

The **Greater Rhea** breeding and transfer plan was held in Nov 2016. This was the first breeding and transfer plan for this species. At the time of analysis, the managed population consisted of 101 birds distributed among 31 AZA and 7 non-AZA facilities. Greater rheas are managed as a Yellow SSP by Kristen Clark, Smithsonian National Zoological Park.

The **Elegant Crested Tinamou** studbook was last published in 2015. At the time, the population was at 89 birds distributed in 22 facilities. Elegant crested tinamous are managed as a Yellow SSP by Kristen Clark, Smithsonian National Zoological Park.

The **Southern Cassowary** studbook was last published in 2015. The living population at that time was 218 birds in 113 facilities with 56 birds in North America, 52 birds in Australia and 109 birds in Europe. This is an International Studbook, Yellow SSP and is managed by Nicole LaGreco, San Diego Zoo.

Candidate Species

Andean Tinamou data is currently being compiled by Studbook Keeper Jim Lotz, San Diego Zoo Safari Park

Unmanaged species

Emu population update: species champion Monica Halpin, Zoo Atlanta reports the current population stands at 167 birds.

Ostrich: species champion Scott Tidmus, Disney's Animal Kingdom. The current population is at 331 birds at 84 facilities (ZIMS information current 20 Jan 2017)







AZA Struthioniformes TAG

Chair Sara Hallager, Smithsonian National Zoological Park

Vice Chair Scott Tidmus, Disney's Animal Kingdom

Secretary Nicole LaGreco, San Diego Zoo

James Ballance, Zoo Atlanta

Dominck Dorsa, San Francisco Zoo

Bruce Bohmke, Woodland Park Zoo Chad Comer, Blank Park Zoo

Mike Mace, San Diego Zoo Safari Park

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Kristi Newland, Lee Richardson Zoo

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Newsletter Editor, Monica Halpin, Zoo Atlanta

Program Leaders

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Species Champions

Monica Halpin, Emu, Zoo Atlanta Scott Tidmus, Ostrich, Disney's Animal Kingdom





Thanks for reading our annual newsletter! If you have an idea for next year or are interested in contributing you can contact TAG Chair Sara Hallager at hallagers@si.edu

or

TAG Keeper Representative and Newsletter Editor Monica Halpin at mhalpin@zooatlanta.org.



Ratite Race by K. Sheridan