

The Ratite Review

THE AZA
STRUTHIONIFORMES TAG
ANNUAL NEWSLETTER 2018



2017 Hatches

Exciting News from Uganda! By Sheri Horiszny

The Care for Karamoja Team is excited to share that we have successfully hatched an ostrich at Uganda Wildlife Education Centre (UWEC) in Uganda! This chick has hatched from the incubator and hatcher that you helped move from San Francisco (to Santa Barbara to Jacksonville) to Entebbe.

The UWEC vet and husbandry teams have worked through many obstacles to reach this success, including:

- Installing solar power and battery back-up systems to manage power outages and surges
- Building a new habitat for the ostriches as UWEC who had stopped laying
- Fine-tuning handling protocols and machine settings

This is made even more exciting by the fact that we have confirmed the subspecies of the Karamoja ostriches to be *Struthio camelus camelus*. This finding is important as the working assumption by wildlife officials in Uganda had previously been that these ostrich were the more common *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.

Kiwi Chick Hatches at Smithsonian Conservation Biology Institute

An endangered brown kiwi chick kicked her way out of her egg at the Smithsonian Conservation Biology Institute (SCBI) in Front Royal, Va., between Saturday, July 29, and Sunday, July 30. Keepers had been monitoring the egg closely during the past week after it pipped or showed signs that it would hatch soon. They tracked the egg's development closely by candling the egg, or shining a light on it to see the embryo's growth. Keepers candled the egg during a [Facebook Live](#) July 27, days before it hatched.

After SCBI's adult female kiwi Rua laid the egg, keepers placed it in an incubator with controlled temperature and humidity where it developed for 75 days. Brown kiwis are able to hunt for themselves from birth and do not depend on their parents. The chick stayed in the incubator during her first 24 hours, but was then moved to an isolette (a smaller enclosure specially designed for newly hatched chicks). Keepers moved her to the kiwi facility Aug. 3. She will eventually be paired with a male and join the Association of Zoos and Aquariums' Species Survival Plan for brown kiwi. Kiwis are monogamous and generally live in mated pairs for life.

Brown kiwis, flightless nocturnal birds, are native to New Zealand and are endangered due to non-native predators introduced by humans. They lay the second-largest eggs for body size of any bird—an average 20 percent of



the female's body weight. In 1975, the Smithsonian's National Zoo became the first organization to hatch a brown kiwi outside of New Zealand. SCBI has hatched six kiwi eggs since 2012.

SCBI plays a leading role in the Smithsonian's global efforts to save wildlife species from extinction and train future generations of conservationists. SCBI spearheads research programs at its headquarters in Front Royal, Va., the Smithsonian's National Zoo in Washington, D.C., and at field research stations and training sites worldwide. SCBI scientists tackle some of today's most complex conservation challenges by applying and sharing what they learn about animal behavior and reproduction, ecology, genetics, migration and conservation sustainability.



The Phoenix Zoo produced two female rhea chicks! Drew Foster, Phoenix Zoo

Blood samples were collected from eight eggs. Three were determined to be female and allowed to continue through incubation. Two hatched and were reconfirmed as females. Congratulations to Phoenix Zoo Staff and thank you to Drew Foster, Animal Curator, Phoenix Zoo for sharing the wonderful news!



Out and About with Ostrich

Update on Import of Ostrich Eggs From Morocco to Zoo Hannover in 2017

By Maren Frerking, EEP coordinator for North African Ostrich



The season started promising. There was sufficient rain and it wasn't too cold. Egg laying started "according to plan". However in January it became very cold in Morocco. Air temperatures were down to 2 °C. We went to Morocco the 19th of January. In Agadir we learned that the birds due to the cold already had abandoned their nests. The 23rd we collected the eggs, although the last egg laying had taken place the 12th of January already. We took about 30 eggs and candled them at a nearby ranger station. We excluded some eggs because the air cell was very big and they were obviously old.

From the eggs we took with us to Hannover of course we also knew that they were quite old and that we had to expect (if any) a very low hatching rate. As feared many embryos died at a very early stage. Two chicks died around day 35 of incubation and one directly before hatching. Five birds hatched. One chick was able to break the egg shell without help. It was a very slim chick. Four chicks were very weak, with very strong oedema and were helped out of the egg. One chick did not recover and died. The hatching took place between the 11th and the 13th of March. At the moment all chicks look fine and as the critical first 2 weeks have passed I'd say they have a chance.



Re-wilding the North African ostrich in Tunisia

Dr. Marie Petretto, Dr. Philip Riordan, Dr. Tim Woodfine | Marwell Wildlife

The reintroduction and conservation of the North African ostrich *Struthio camelus camelus* is considered an instrumental goal for the restoration of the region's aridlands. Within the broader framework of the Sahelo-Saharan ecosystem conservation, the Tunisia's Forestry Directorate (DGF, Agriculture Ministry) and Marwell Wildlife have established a close partnership in order to repopulate the depleted areas that once were inhabited by this large flightless bird.

During the last decade, Tunisia established a founder population of birds imported from breeding centres in Morocco and Saudi Arabia (respectively from Chadian and Sudanese lineages) with a goal of maximizing the genetic diversity of the Tunisian meta-population. Their offspring are now being released to progressively re-establish the species at seven national protected areas located within their former range. Having implementing management and logistical solutions to the many problems that emerged during the initial phase (see previous reports), in 2017 our emphasis has been put in developing the expertise to re-wild the animals that descend from generations kept in captivity. The reinforcement of appropriate foraging and predator response behaviours was made possible by the establishment of small groups in their natural habitat which were closely monitored and supported when possible. The benefit of human interventions was evaluated and the skills gained will allow further releases in more areas during 2018. During 2017 we have learned that 'hands-off' indirect actions were most effective in helping the released ostriches and their offspring to adequately express social behaviours and use the habitat resources. Explaining the importance of these approaches to enthusiastic local managers has greatly improved their ability to undertake successful reintroductions and further enhanced their dedication and commitment to the project.

In July 2017, Marwell Wildlife took our experience and learned empirical knowledge to Niger, where the Saharan Conservation Fund has been supporting a captive breeding programme for many years. A number of people involved in local conservation actions in Morocco, Sudan or Senegal have also join the network, creating a useful platform for knowledge and experience sharing. The intensive work in Tunisia continues, with the goal of having sustainable social groups in each of the targeted protected areas by 2022. This might require importation of additional founders from other source populations which is greatly facilitated by the overall the coordination of efforts between countries, which we hope will lead to creating a regional strategy for this importance species.



Juvenile ostrich and SHO in DNP



Ostrich grazing



Marie Petretto & Maimouna Ibrahim working together at Kelle', Niger



Female ostrich in arid steppe of DNP

Ostrich Recovery Project in Niger Progress Report August 2017

SCF is working hard with its partners 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 facility in Kellé, Niger, to begin returning small numbers of ostrich safely to the wild in 2018.

Laying, Training & Taxonomy

During the first part of 2017, recommendations from Niger's national strategy for North African Ostrich conservation were implemented and the first tangible results achieved. The first eggs from a breeding pair of ostriches at a farm in Mainé Soroa in eastern Niger were laid. For the past three years, no eggs had been laid at this establishment. These first eggs are the result of the diet change, better handling of the birds, and improved management of the site thanks to the support and advice provided by SCF's staff in Niger and the recruitment of a new ostrich keeper in Mainé. Recently, SCF partnered with Marwell Wildlife to improve the skills and savoir-faire of the Nigerien staff involved in ostrich breeding. A dozen young Nigerien professionals were trained by Dr. Marie Petretto. Following a workshop held in the United Kingdom last November, the status of the ostrich was discussed at the Sahelo-Saharan Interest Group meeting in St Louis (Senegal) and agreement reached to elaborate an Action Plan to conserve the remaining populations of North African Ostrich within their historical range. Beyond the conservation objectives, SCF and its partners are working to update the taxonomic status of this sub-species and to propose the North African ostrich be reclassified as a distinct species, like the Somali Ostrich. Finally, two Ministers from the Niger Government visited the breeding center at Kellé, recognizing the great initiative carried out by SCF and its partners to restore this iconic species.



Chicks from the last breeding season 2016-2017



The site manager and the Ministers of the Interior and Environment & the Zinder Governor



The female Nani with the new keeper Maoudé

Laying

The Kellé site manager, Maimounatou Ibrahim, visited the breeding center at Mainé Soroa three times this year

to provide advice and assistance to implement the recommendations of the national ostrich conservation strategy. First of all, a new keeper was recruited and together they have greatly improved the maintenance of the site by removing all the livestock present in this large enclosure, by fixing the fence, and by changing the diet based on the formulation provided by our partner, San Diego Global Zoo. During her visits, Maimounatou raised awareness with the local population based around the breeding center, highlighting the need to minimize the disturbance next to the enclosure, something which negatively impacts ostrich breeding behavior. As a result, for the first time in the last three years, the breeding pair laid 10 eggs in July, rather late in the breeding season, which can be interpreted as a direct result of the better management of the site over the previous six months. Hatching is expected for the first week of September and while there is no guarantee, there is great hope, since both parents have incubated the eggs steadily so far.

Training

One of the main priorities outlined in the national strategy for ostrich conservation was to strengthen the knowledge and the skills base of the Nigerien partners involved in ostrich breeding to guarantee the sustainability of the ostrich recovery program. As a result, SCF requested the support of Marwell Wildlife and Dr Marie Petretto to carry out a training course in Niger at the Kellé breeding center. It is the first time in Niger such an initiative, catalyzed by an international NGO, has been implemented and co-supported by the public and the private sectors, with the main goal of improving ostrich production for conservation and farming purposes. The training was organized in a series of theoretical and practical activities to improve basic knowledge on the ostrich's biology (physiology, anatomy), and aspects related to ostrich breeding (diet, reproduction, common diseases, veterinary cares, site management). The trainees had the opportunity to practice under real conditions (egg candling, bird handling, diet preparation, enclosure maintenance, etc.) and observe the social behavior of the birds in the pens, including display and reproduction. An evaluation was carried out by Marie to assess the improvement in skills and knowledge of the trainees, and each one has received a diploma with the appropriate mention based on the results of the evaluation.



The male Jori incubating its 10 eggs



The trainees during a theoretical session



Marie Petretto with the trainees at the breeding



Some members of the multi-talented team working in the future incubator container

The Solar Project

The solar project supported by Stephen Gold from the Wildlife Conservation Network (WCN) progresses steadily, with the modification of five shipping containers to harbor the solar panels and provide a multi-functional breeding unit on site. The amount of electricity needed to run the station is significant, with several air conditioners, an incubator, two hatchers, a fridge, a freezer, lighting and office equipment. As a result, three of the five containers have been designed by a multi-talented team to fulfill the requirements imposed by the need to run these modules in a very remote place, where the average temperature reaches over 100°F during the hot season. In addition, to keep a constant temperature and humidity as required to run an incubator and hatcher, the containers are being painted with a special heat-reflective paint. An expandable foam insulation is being sprayed into additional walls to further improve insulation. Many challenges were faced as well to provide water for the station, with a solar pumping system at the borehole, a supply pipe, storage tanks and an intermediary pump to carry the water to the camp through rough terrain and crossing to washes. These challenges have slightly delayed the shipment date of the containers but in all likelihood the solar infrastructures will be operational for the coming breeding season.

Taxonomy

The North African Ostrich *Struthio camelus camelus* is facing a similar fate to the Somali Ostrich *Struthio molybdophanes* with a rapid ongoing decline over the past 50 years due to hunting for feathers and food, egg collection and habitat loss. However, the ostrich as a whole is still listed as "Least Concern" by the IUCN Red List. These sub-species are lumped together as *Struthio camelus* with the far more common black and blue-necked ostriches. Though there are still gaps in the knowledge of the species genome map which could be filled by carrying out more analysis with additional samples, it seems pretty clear based on the genetic analysis published by Miller et al., 2011, that *S. c. camelus* (possibly with *S. c. syriacus* from the Middle East added in) is a distinct subspecies and in all probability, a distinct species. This taxonomic review is highly important in our opinion since it would help us raise more attention from the world conservation community and a larger public to the silent extinction of the North African ostrich, whose only viable population is located in Chad.

Miller, J. M., Hallager, S., Monfort, S., ... & Fleischer, R. C. (2011). Phylogeographic analysis of nuclear and mtDNA supports subspecies designations in the ostrich (*Struthio camelus*). *Conservation genetics*, 12(2), 423-431.



Simulation of the solar station in Kellé

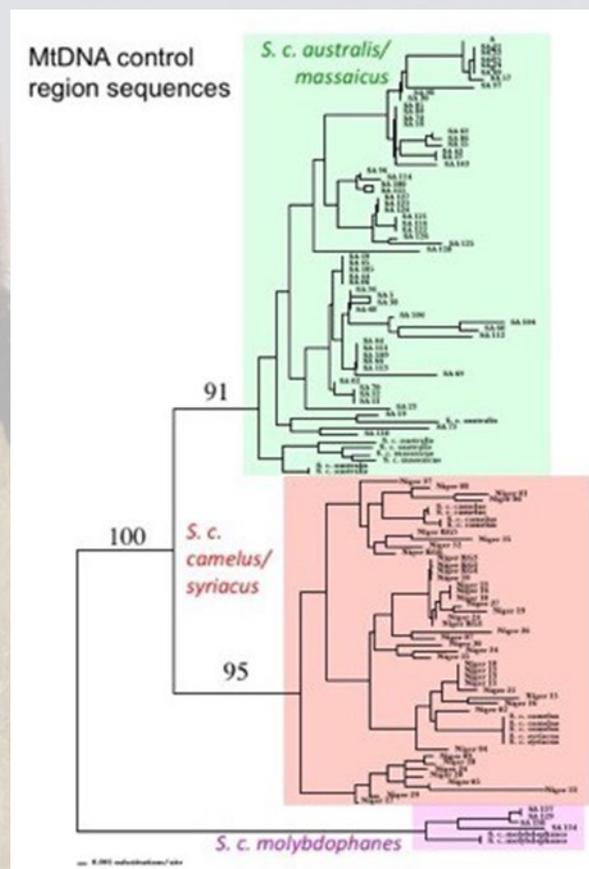


Figure from the article Miller et al., 2011

Main challenges for the rest of the year

Within the framework of Niger's national strategy, we are looking forward to consolidating our partnership with the other ostrich breeding sites in Niger. We need to purchase a year's supply of food for the birds and pay the salaries of the keepers at both Iférouane and Mainé Soroa.

With greater commitment from both private and public institutions, we need to redouble our efforts to build on the momentum of this collaborative agreement and deliver tangible "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:

- Secure the salary of two ostrich keepers for the breeding centers of Iférouane and Mainé Soroa for the next year; keepers who will contribute to the management and monitoring of a self-sustaining population of reintroduced ostrich à **US\$ 5,000** per year
- Secure funds to complete the shipping of solar infrastructure and containers to Niger à **US\$ 30,000** for 2017
- Ensure the Kellé breeding center is fully operational with skilled staff providing appropriate veterinary care, maintaining the infrastructure, and feeding the birds with the recommended diet à **US\$ 30,000** to run the center per year
- Support the organization of a regional workshop to draw up a conservation strategy in a close collaboration with the range States (Chad, Morocco, Niger & Tunisia) involved in North African ostrich conservation à **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 à **US\$ 15,000** for 2017

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

Acknowledgements

Since 2015, this project has been made possible through the generous support of the following people and institutions:

AZA's Struthioniformes TAG, Seaworld & Busch Gardens Conservation Fund, 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 Technologies, North Carolina Zoological Park, Omaha's Henry Doorly Zoo, Saint Louis Zoo, San Diego Zoo Global, Sara Hallager, Smithsonian's National Zoo, Toledo Zoo, Marwell Wildlife, Utah's Hogle Zoo, Weltvogelpark, Woodland Park Zoo, Zoo Atlanta, Zoo Hannover, Zoo Miami, Jimina ranch, OutBack Power Systems, Beronio Lumber, B and K Electrical, Jacksons Hardware, Pete Retondo AIA, Peter Amick Amick Construction, Michael Labate ESP Products, Stephen Attell AIA, George Bajada Bajada Electric and Stephen Gold - Wildlife Conservation Network.

Photograph credits: Stephen Gold, Maimounatou Ibrahim & Thomas Rabeil

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Running with Rheas

The 2017 Greater Rhea Breeding and Transfer Plan has been published.

The population size at the time of publication was 101 (33.59.9) birds in 31 AZA and non-AZA facilities.
Kudos to Kristen Clark, Smithsonian National Zoological Park for publishing this first plan!

Darwin's Rhea Conservation and Recovery at Patagonia National Park, Chile

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The Darwin's Rhea program is an on-going initiative developed in Patagonia National Park, located in southern Chile, with the aim to recover the population of the species in the area. Darwin's Rheas are listed as Endangered in the Aysén region due to the existence of two populations living in only one protected area (a recently designated formal Patagonia National Park of over 304.000 hectares) with a small population (< 30 adult individuals), and a very low density (< 0.6 birds/ km²).



Figure 2. Darwin's rhea wearing a Multi-Loc plastic collar

The advances of the program, launched in 2015, have been shared in the previous Ratite TAG Newsletter (2016 and 2017). The first group of chicks produced in 2016 are now over a year in age (Figure 1), and are almost ready for a move to a soft release pen of 20 ha. Selecting the best marking method system for individual monitoring has been a major obstacle. Some preliminary tests using a Multi-Loc system fitted in the neck have shown acceptable results (Figure 2), and will be combined with VHF radio transmitters for field monitoring after release.

During 2017, the second season of the breeding center produced chicks from the breeder facilities, and from artificially incubated eggs collected from the wild (Figure 3). This was a new challenge for the team that involved the authorization, commitment, and coordination of the Chilean Wildlife Service and a land owner which had a large and healthy rhea population (>300 individuals) in a private ranch located in the same region.

Figure 1. Darwin's rhea yearlings in acclimation pens



Figure 3. Egg collecting from a free-ranging Darwin's rhea nest



Figure 4. Darwin's rhea chicks artificially



Following the identification of a wild rhea nest by the land owner, team members were able to collect the eggs of the single nest. We did not know when incubation started, but according to the data available the male was lying down and incubating the eggs for over a week. 21 eggs were carefully collected and surrounded with wool in heated containers at 37°C. Containers were carefully transported in a truck by gravel roads for approx. 105 Km to the incubator site. Once eggs arrived, they were marked and admitted to the incubator programmed at 37.5°C and 45% RH. The eggs were systematically candled and embryo development controlled, resulting in the hatching of 18 chicks (13 one day before the remaining five), one dead chick and two non-fertile eggs. Once dried in the hatcher, chicks were transferred to an IR lamp and hot-water bag. After eight hours of hatching and drying, the chicks were placed in small pastures for an hour and leaves of white clover were offered as the primary food (Figure 4).



Figure 5. Translocation plane and border patrol police carrying Darwin's rhea chick transportation cages to truck

Figure 6. Darwin's rhea male with chicks in the breeding enclosures



Two plastic boxes were adapted for the transportation of 18 chicks (two and three days old) by plane for 50 minutes over 350 Km. 40 minutes of additional land transportation from the airstrip to the breeding center facility was provided by the border patrol police, who are active program collaborators (Figure 5).

Once in the center, water and food were provided for all chicks. Adult males, which were breeding their own chicks, successfully adopted groups of three to four artificially incubated chicks in individual breeding pens. In all cases, artificially incubated chicks were accepted by the males and interacted with the local chicks.

We currently have four breeding males and three adult females. Last winter three adult females died due to traumatic injuries from thunder storms, which are rare in this area of Patagonia. The center manages 22 yearlings and 26 chicks from this breeding season. The primary goal of this initiative is to implement active management of the species that could contribute to a population increase of the Darwin's Rheas in Patagonia National Park.

This program is possible due to the commitment of the Rhea Recovery Team, the park wardens Alejandra Saavedra and María Cayún, and a large number of interns and practitioners whom have provided invaluable work and dedication being crucial members to achieve the results to date.

Catching Up with Cassowary

The 2017 Southern Cassowary Breeding and Transfer Plan was published April 19th 2017 by student book keeper/SSP Coordinator Nicole LaGreco, San Diego Zoo.

The population at the time of the plan was 50 (25.22.3) birds in 23 AZA facilities.

Jacksonville Zoo Partners with the Australian Rainforest Foundation to Help Conserve Cassowaries

By Larkin Johansen

The Jacksonville Zoo and Gardens (JZG) has been a proud supporter of The Australian Rainforest Foundation—Operation Big Bird since October 2016. Operation Big Bird is a project organized by Kelvin Davies, CEO of The Australian Rainforest Foundation, which repurchases parcels of rainforest and reclaims them as cassowary habitat. Operation Big Bird’s mission is to reconnect the fragmented rainforest to create a safe corridor for this keystone species. Currently, the historical range of cassowaries has been fragmented into three pieces, isolating the cassowary populations and causing a decrease in genetic diversity and biodiversity within the ecosystem.

Cassowaries, commonly referred to as the “Gardeners of the Rainforest,” are a keystone species which means the health of the rainforest is directly impacted by the health of the cassowary population. Cassowaries are vital for seed dispersal in the rainforest. Over 150 rainforest plants rely on this bird for germination and dispersal, especially for the seeds of large-fruit species. The ecology and extensive distribution of the cassowary makes it an effective conservation flagship species whose protection will have significant benefits for many other species and ecosystems. Operation Big Bird is one of the most ambitious conservation plans in Australia's history, according to the Australian Rainforest Foundation. The plan requires the collaboration of governments, corporate and private sectors, scientists, and communities from around the world to cooperatively save the endangered Southern Cassowary. The plan is to create 250km (roughly 155 miles) of wildlife corridors along Australia's Wet Tropical Rainforest coast. Wildlife corridors connect the fragmented rainforest and enable species to move safely across the landscape to feed, breed, disperse, and colonize, enabling the conservation of biodiversity. The corridor will link the North Queensland city of Cairns to the southern coastal town of Cardwell. Research has shown that cassowaries typically transport 4% of the seeds they consume over an average maximum distance of 1.5km (1 mile), but have the potential for significantly longer distance dispersal to as much as 5.4km (3.5 miles). The ability to disperse seeds over long distances and their landscape-scale movement patterns, mean cassowaries play a significant role in moving seeds between populations and across the rainforest landscapes of the Wet Tropics. This role assumes even greater importance as rainforests become more fragmented and isolated as a result of human land use.



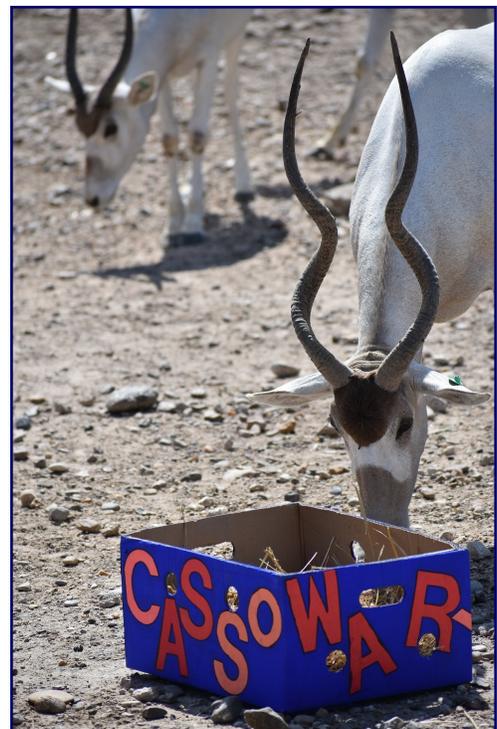
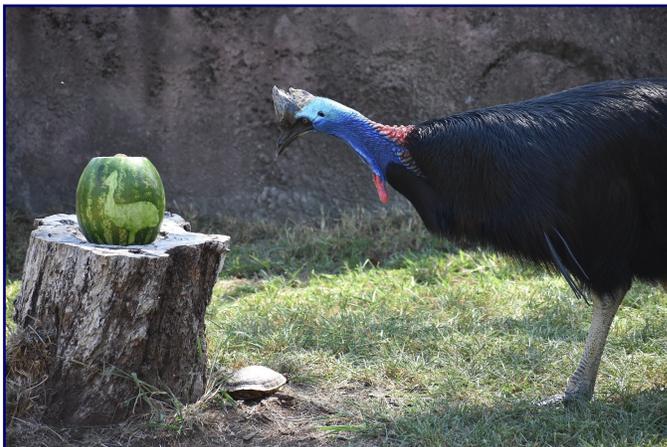
Every year on World Cassowary Day, Australia celebrates cassowaries through arts, crafts, music, education, and the planting of thousands of vital trees for cassowary habitat. The cassowary has been a long-celebrated figure within the culture and lore of the Aboriginal people. At The Jacksonville Zoo and Gardens, we highlight these conservation efforts on World Cassowary Day at our educational booth. We provide brochures on the natural history of cassowaries, the crucial role that only cassowaries fulfill, and opportunities for guests to get involved directly with cassowary conservation. Additionally, our guests get the chance to meet “Brisbee” our resident Southern Cassowary and take home a footprint painting made by him, listen to traditional didgeridoo music, and have an opportunity to donate to Operation Big Bird. Over the past two years the booth raised over \$300 USD specifically towards the planting of trees in the Daintree Rainforest, Australia.

Following the success of the booth, I contacted Kelvin Davies with The Australian Rainforest Foundation and explained my interest to formally involve The Jacksonville Zoo and Gardens with Operation Big Bird. After our conversations, I successfully put forward an Awards Application in October 2016 to the Jacksonville Zoo and Gardens' Conservation Awards, Research and Events Committee (C.A.R.E Committee) on behalf of the Southern Cassowary. The application requested \$7,500 USD to be used specifically towards reforestation through the Operation Big Bird project. The C.A.R.E Committee approved the proposal, which allowed JZG to purchase 1,000 trees to be planted and provided with 3 years of care in The Daintree Rainforest by The Australian Rainforest Foundation. The long-term goal of reforestation will create larger territories for the birds to find food, water, and mates to maintain a healthy, genetically diverse population. The corridor will also provide a place for safe travel away from introduced predators, such as feral dogs and pigs; and diminish the chance of encountering busy roads.

The Jacksonville Zoo and Gardens is committed to protecting the wild counterparts of our collection animals, such as the Southern Cassowary, within their natural habitats. By protecting this keystone species and their habitat, we ultimately protect countless other plant and animal species that rely on the survival of the cassowary. Thus, an umbrella effect is created and the Wet Tropics are able to thrive by maintaining high rainforest biodiversity. It is our goal to educate our guests and to inspire them to action. For, "in the end we will conserve only what we love; we will love only what we understand; and we will understand only what we are taught." (Baba Dioum, 1968). We are honored to work alongside The Australian Rainforest Foundation and make an impact through Operation Big Bird to Save the Cassowary.



Gladys Porter Zoo's World Cassowary Day fun Spreads beyond Cassowary!



San Francisco Zoo Curbs Undesirable Behavior with Training By Dominick Dorsa



In July of 2016 we were challenged with an adult male cassowary who was exhibiting undesirable and self-injurious behavior. The behavior issues had occurred at his previous facility and reoccurred at ours after the loss of his neighboring female cassowary.

The hospital staff, curatorial staff, and wellness staff teamed up to create an action plan to eliminate the undesirable behavior and improve his quality of life. As part of his plan we installed a sound system to play pink noise. With the loss of vocal communication with the second cassowary we believe the noise helped to comfort him.

The cassowary had a period of time where he was on medication and confined to his barn in order to heal from his injuries. During that time we trained him to a recall. He also learned a verbal bridge, and targeting. By establishing a recall and a positive training relationship with all of his keepers we were better able to manage him once he was given outdoor access again.

We added to his behavioral repertoire to include scale, A-B trainer across his exhibit, inside and outside cues for the barn, and an all done signal.

Currently his behavior and health are in a good balance of wellness. He is on exhibit with no reoccurrences of the self-injurious behavior. He interacts positively with his new neighbor and animal care staff.

By looking at how all aspects of his care (medicine, behavior, and environment) affect each other and developing an all-inclusive approach to his management we were able to prevent undesirable behavior and improve his quality of life.

Oklahoma Zoo Received Young Pair of Cassowary and Immediately Start Training

By Eddie Witte, Curator of Birds, Carnivores, and Small Mammals, Oklahoma Zoo

Oklahoma City received a young (5-6 months old) pair of Southern cassowary from the Cassowary Conservation Project in December 2017. The bird team has been working with them 2-3 times a day since they arrived to acclimate the birds to people, and to being touched and handled. They have also started target, scale, and crate training. We have been able to get daily weights allowing us to monitor weight gains, and to have a record of the birds as they grow into adults. The crate training is very important to us because our new exhibit opening this year will require the birds to pass through the training crate with a build in scale to go on and off exhibit. This is so we can safely work with the birds and train for behaviors like voluntary blood draws.



Photos by Holly Ray and Sandra Erickson



Two Species of Ratites Featured in Brevard Zoo's New Lands of Change: Australia and Beyond Exhibit, Ellen Dreyer, Animal Behavior and Wellness Coordinator, Brevard Zoo

On May 27th, Brevard Zoo opens Lands of Change: Australia and Beyond. The newly revamped Australasia area includes two walk-through aviaries, komodo dragon exhibit, wrinkled hornbill exhibit, theater, and more.

One of the main features is a walk-through kangaroo habitat where guests can feed kangaroos. The zoo's four emus will also be making their home in this exhibit which features a watering hole and opportunities for bathing, and lots of shade thanks to several large solar panel "trees." The solar trees will provide a source of renewable energy and help tell a narrative about climate change and how we can reduce our impact on the environment. This theme is woven throughout the Lands of Change area.



The other ratites that call Lands of Change home are two new cassowaries named Romeo and Juliet. The zoo's two cassowary exhibits have been updated for the pair. The smaller of the two yards has been expanded to give the birds more space. Both cassowary exhibits now connect to a brand-new barn. Guests will have great vantage points to view cassowary training sessions. The unrelated pair will hopefully be ready for breeding introductions by breeding season in 2018.

When Conditions are Perfect...



Apples, a 26 year old southern cassowary arrived at the San Antonio Zoo from the National Zoo in May of 2017, and she quickly adjusted to the Texas climate! After only ever laying a single egg while living at National, she laid a total of 12 eggs in a 2 month period! She is currently exhibited next to her future mate Wilmer in hopes that love will be in the air in the next few weeks.



Cecil's Corner

A New "Perspective" on Life By Kyle Loomis, Zoo Atlanta



One of the recurring questions we as keepers ask ourselves is how to make life more exciting for our animals. What enrichment can I offer to elicit natural behaviors? Does the animal need more room? These and many other questions help guide our choices. Other factors come into play in this decision-making process such as environmental elements. This was the case for trying to make cold weather more manageable for everyone's favorite cassowary, Cecil.

Cassowaries being from the tropical climates of the south-east Asian islands and Australia, cannot tolerate some of the lower temperatures we experience in the United States. Yes, even we down in the southeast get our fair share of cold weather (and snow some years too). This means that Cecil requires access to his stall with extra heat sources, especially overnight. There are even days he must remain indoors all day. You can imagine how boring this might be for him when he normally has a large yard to roam around. This is even more true when you consider he has not had windows in the stall to outside world.

This fall in anticipation of the approaching cold, keepers cut a gaping hole in the wall leading out to his exhibit. From that opening, we were able to clean it up and make a decent looking framed window for Cecil to use. Not bad for first time window installers, if I do say so myself. The window has mesh over it to keep Cecil from flying out...you know with those well adapted cassowary wings. The mesh keeps other critters at bay and leaves enough room for plexi to be installed over it. This keeps the heat trapped indoors and but still gives Cecil quite a view.

Since the installation, Cecil has been fascinated with through it from inside and out! Some days he won't even walk out his shift door and just stares at us through the window. The added bonus for keepers are during the warmer days when the plexi can be removed and allow fresh air to rush into the stall. I mean who doesn't want to be enclosed in a stall sealed with the smell of cassowary feces. Regardless of which aspect of the window is the best, this small change has made life better for Cecil and in some ways easier on the keeper staff. You might say Cecil even has a new perspective on life.



"All About That POOP!"

Because I'm all about that poop, about that poop, no trouble
I'm all about that poop, about that poop, no trouble.

Yeah, it's pretty clumpy, Cassowaries ain't no size two
but they can shake and ruffle their feathers like they're supposed to do
'Cause they got that boom boom that scare all those predators away
And all the right poop in all the right places... germinating seeds to plant those trees.

Yeah, the momma lays her egg and tells her mate don't worry about its size
She says "boys they like to incubate and raise the chicks to month nine"
You know Cassowaries won't be no stick-figure, like a flamingo
So, go ahead and incubate and leave me alone.

Because you know I'm all about that poop,
'Bout that poop, no trouble
I'm all about that poop, 'bout that poop, no trouble!



Time for Tinamou

The 2018 draft elegant crested tinamou population at the time of analyses (Jan 23, 2018) consists of 35 animals (22.13.0) at 12 AZA institutions. The Struthioniformes Taxon Advisory Group has designated this population as an SSP and set their target population size at 100 individuals in their 2015 Regional Collection Plan (RCP). The TAG is in need of new facilities to work with this species!

Please contact studbook keeper/SSP Coordinator Kristen Clark, National Zoological Park



THE
DALLAS
WORLD
AQUARIUM

Husbandry and Breeding Challenges of Three Species of Tinamous at the Dallas World Aquarium

By Carolina M. Arruda, Avian Manager

The Dallas World Aquarium (DWA) has three different species of tinamous in its collection. Elegant crested tinamous (*Eudromia elegans*) were first received in 2002, with a first hatching experience just one year later. Great tinamous (*Tinamus major*) were imported in 2007, with breeding in 2011. Little tinamous (*Crypturellus soui*) were imported in 2008 and started breeding at that same year. We are very fortunate to have had numerous successful hatchlings of all three species over these past few years.

Successful tinamou breeding can be tricky and we're still learning a lot each year. The Great tinamous are kept as a flock at DWA and seem to have a marked breeding season during the summer time, with hatchlings over the months of June through August. Although the season can possibly be related to the fact that these tinamous

are kept in outdoor aviaries and are subjected to weather changes, the grouping seems to be more related to the personality of the species and/or individuals.



Great tinamou flock



Little tinamou with chick

Little tinamous are kept inside and seem to breed year-round. They are kept in pairs. When we grouped them as a flock, the dominant breeding female would show a lot of aggression towards the other birds. Keeping them in pairs seems to be a much more reassuring situation.

Elegant crested tinamous are currently kept both in pairs and in a flock. From our experience the breeding success seems to be greater when a pair is kept by themselves, reducing the risks of broken or abandoned eggs, also breeding year-round when kept inside.

All species are kept on dirt floors, with small bushes and plenty of nesting ground. A source of warmth is provided during cold nights and the winter season. The birds receive a well-balanced diet, consisting of gamebird pellets, a mix of chopped vegetables (carrots, broccoli, cauliflower, peas, cabbage, corn, romaine and others) and soft fruits (papaya, blueberries, and grapes). Dark green leaves like spinach and dandelion are also offered occasionally. Insects, such as crickets and mealworms, and hard-boiled eggs are used as a source of protein and enrichment. A

calcium supplement is given to laying females.

The Great and Little tinamous seem to be shier and spook easily, while the Elegant crested tinamous appear to be more curious and outgoing. That can be related to the nature of the species and/or the fact that our Elegant crested

tinamous were all captive born, but we still notice the reserved personality with the captive born individuals of the other two species. They are not great flyers, and will jump aimlessly when approached, so hard objects and other barriers need to be considered during capture and handling. Elegant crested tinamous are more manageable when there is a need for handling and will usually just duck down during a capture approach.

The incubation and rearing of chicks can also be sensitive. After a few failed attempts of pulling the Great tinamou eggs to be artificially incubated at the time of laying, we learned that letting the males incubate the eggs and pulling babies to hand-rear individually or preferably as a flock at the time of hatching proved to be a lot more successful. The Little tinamou eggs seem to have greater chances of hatching when artificially incubated compared to the Great tinamou, but the chicks seem to be more sensitive and will take a lot of time and investment to thrive when raised alone. While delicate, we still had success when hand-raising chicks, individually or in small groups, and we also had a couple successful parent incubated and reared chicks. The Elegant crested tinamou eggs can be pulled to be artificially incubated at the time of laying or after a few days of parent incubation, both situations with good hatchability results, and then the chicks can also be hand-raised. Throughout the years, we were able to improve our neonatal care by better understanding the needs of the species, and were able to achieve significant survival rate of the hand-raised chicks. After the unfortunate loss of our female breeder we are currently working with the SSP to form new breeding pairs and keep improving the captive population of this wonderful species.



Elegant crested tinamou

Great tinamou trend: species is susceptible to hunting and/or trapping and is believed to be declining at a rate approaching 30% over 3 generations .

IUCN NT. BirdLife International. 2017. *Tinamus major* (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2017: e.T22678148A110915916. <http://dx.doi.org/10.2305/IUCN.UK.2017-1.RLTS.T22678148A110915916.en>. Downloaded on 20 February 2018.

Elegant crested tinamou trend: although still abundant in remote parts of its range, elegant crested tinamous have declined due to hunting pressure and a reduction in habitat. The current population trend is decreasing. IUCN LC

BirdLife International. 2016. *Eudromia elegans*. The IUCN Red List of Threatened Species 2016: e.T22678289A92765892. <http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22678289A92765892.en>. Downloaded on 20 February 2018.

Little tinamou trend: species is susceptible to hunting and/or trapping and is believed to be declining at a rate approaching 25% over 3 generations . IUCN LC

BirdLife International. 2016. *Crypturellus soui*. The IUCN Red List of Threatened Species 2016: e.T22678169A95208453. <http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22678169A95208453.en>. Downloaded on 20 February 2018.

Enough Tinamou at the Zoo? Increasing the representation of evolutionarily distinct Struthioniformes in *ex-situ* captive breeding programs

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As even the casual zoogoer knows, Ostriches and their relatives (the Struthioniformes) are special. As part of the earliest split in the Bird Tree of Life (see, e.g., Jetz et al. 2012), the group has undergone a lot of evolution separate from other groups. Interestingly, this has produced species with characteristics that make them highly suitable for exhibits in zoos. They are often very large (think Ostriches, Emu, Cassowaries and Rheas), and frequently odd-looking (think the fur-ball appearance of New Zealand's symbolic Kiwis). But this independent evolutionary history has another facet too – because Struthioniformes have fewer close relatives than species in most other Orders, the extinction of any one species would result in a greater overall loss to the Tree of Life compared to the average bird (Faith 1992; Mace et al. 2003). From this perspective, Struthioniformes represent a key priority for conservation, including *ex-situ* conservation.

Evolutionary approaches to identify conservation priorities are receiving increasing attention, including within zoo prioritization schemes. For example, taxonomic uniqueness is one of the selection criteria used to prioritize species for management under Species Survival Plans (Struthioniformes RCP, 2015). While there are many measures of taxonomic uniqueness, one (called Evolutionary Distinctiveness or "ED") has gained popularity (Redding 2003; Isaac et al. 2007). ED simply distributes the total evolutionary history of a group (in millions of years) among all member species, apportioning any common history equally among the members that share it. It is the metric currently used by the Zoological Society of London for its EDGE of Existence Program (www.edgeofexistence.org). As Table 1 makes clear, Struthioniformes possess exceptionally high levels of ED. The average species in the Order represents 23 million years of bird evolution, over three times the average bird. Collectively, the 62 species in the Order represent over 1 billion years of evolutionary history found nowhere else; every species ranks in the upper 20% for all birds, and the top 50 of them rank within the top 5%!

Conserving Struthioniformes therefore seems an important conservation priority, and *ex-situ* conservation networks can play an important role (Conde et al. 2011). Using a subset of data from a wider study examining the representation of the evolutionary history of all 10,284 recognized bird species (Biega et al. in prep), we examined the representation of at-risk and evolutionarily distinct Struthioniformes in global zoo holdings and produced a list of high-ED species not currently in zoos to aid in the prioritization of species for future captive breeding programs.

18 of the 62 Struthioniformes in our phylogeny (29%) are currently represented in ZIMS institutions. This is slightly higher than the percentage of all birds held in ZIMS institutions (22%); this makes sense, as we found that birds that ranked in the top 10% of ED scores are more likely to be found in a zoo overall (Biega et al. in prep). Zoos already hold several Struthioniformes possessing particularly high ED: common ostrich (*Struthio camelus*, ranked 25 among all birds), Elegant crested tinamou (*Eudromia elegans*, ranked 50th), and common emu (*Dromaius novaehollandiae*, ranked 127th among all birds) are each found in many ZIMS institutions. However, while zoos hold some high ED Struthioniformes, the fact remains that 71% of species in the Order are currently unrepresented in zoos, including 11 Vulnerable and Endangered species.

Given the constraints to establishing *ex-situ* populations generally, we encourage zoos to consider evolutionary history when prioritizing species for future captive breeding programs. In Table 2 we highlight Struthioniformes that are currently at risk (classified as Vulnerable or worse by the IUCN (2017)) and are not currently held in a ZIMS institution, ranked by their ED score. Naturally, some species on this list will be more suitable for captivity than others. For example, planners might consider species with other species in the same Family already kept *ex situ* as high priorities, given that they may benefit from the transfer of husbandry techniques developed for their close relatives already in zoos. For example, Taczanowski's Tinamou (*Nothoprocta taczanowskii*) may benefit from husbandry techniques being developed for SSP management candidate, Andean Tinamou (*Nothoprocta pentlandii*). It may also be possible to increase capacity by phasing out species not recommended for *ex-situ* management (e.g. Solitary Tinamou *Tinamous solitarius* and Great Tinamou *Tinamus major*).

Increasing the representation of at-risk high ED species in *ex situ* collections aligns with a zoo's role as a conservation centre and a commercial attraction. So, if you are interested in how evolutionarily distinctive your zoo's bird species are, the full list is now available [online](#) (Biega et al. in prep).

Table 1. Top 10 highest ED Struthioniformes. Threat status relates to the IUCN 2017 Redlist. Evolutionary distinctiveness (ED) score is a measure of taxonomic uniqueness, measured in millions of years. Species scored as 1 in the “In ZIMS” column are held in at least 1 ZIMS institution.

Rank by ED	Common name	Scientific name	Family	IUCN threat status	Avg. ED score (my)	In ZIMS?
1	Common Ostrich	<i>Struthio camelus</i>	Struthionidae	LC	41.6	1
2	Somali Ostrich*	<i>Struthio molybdophanes</i>	Struthionidae	VU	41.6	0
3	Puna Tinamou	<i>Tinamotis pentlandii</i>	Tinamidae	LC	41.2	0
4	Patagonian Tinamou	<i>Tinamotis ingoufi</i>	Tinamidae	LC	41.0	0
5	Elegant Crested Tinamou	<i>Eudromia elegans</i>	Tinamidae	LC	35.6	1
6	Quebracho Crested Tinamou	<i>Eudromia Formosa</i>	Tinamidae	LC	35.6	0
7	Highland Tinamou	<i>Nothocercus bonapartei</i>	Tinamidae	LC	29.3	0
8	Tawny-breasted Tinamou	<i>Nothocercus Julius</i>	Tinamidae	LC	29.2	0
9	Hooded Tinamou	<i>Nothocercus nigrocapillus</i>	Tinamidae	VU	29.1	0
10	Common Emu	<i>Dromaius novaehollandiae</i>	Casuariidae	LC	28.7	1

*3 *3 living individuals in zoos according to ZIMS on Jan 16, 2018.

Table 2. List of at-risk (VU or above) Struthioniformes represented in low numbers or not at all in ZIMS institutions. Threat status relates to the IUCN 2017 Redlist. Evolutionary distinctiveness (ED) score is a measure of taxonomic uniqueness, measured in millions of years.

Rank by ED (within Struthioniformes)	Common name	Scientific name	Family	IUCN Threat Status	Avg. ED score (my)
2	Somali Ostrich*	<i>Struthio molybdophanes</i>	Struthionidae	VU	41.6
9	Hooded Tinamou	<i>Nothocercus nigrocapillus</i>	Tinamidae	VU	29.1
11	Dwarf Tinamou	<i>Taoniscus nanus</i>	Tinamidae	VU	27.7
14	Grey Tinamou	<i>Tinamus tao</i>	Tinamidae	VU	25.4
15	Black Tinamou	<i>Tinamus osgoodi</i>	Tinamidae	VU	25.3
27	Lesser Nothura	<i>Nothura minor</i>	Tinamidae	VU	22.6
40	Choco Tinamou Taczanowski's	<i>Crypturellus kerriae</i>	Tinamidae	VU	21.1
52	Tinamou Great Spotted	<i>Nothoprocta taczanowskii</i>	Tinamidae	VU	19.0
58	Kiwi** Southern Brown	<i>Apteryx haastii</i>	Apterygidae	VU	15.5
60	Kiwi	<i>Apteryx australis</i>	Apterygidae	VU	13.5
61	Okarito Kiwi	<i>Apteryx rowi</i>	Apterygidae	EN	13.2

*3 living individuals in zoos according to ZIMS on Jan 16, 2018.

** 1 living individual according to ZIMS on Jan 16, 2018.

References:

- Avian Scientific Advisory Group. 2015. AZA Struthioniformes Regional Collection Plan 2015–2020, Third Edition.
- Biega et al. In prep. Guiding the prioritization of the most endangered and evolutionary distinct birds for new zoo conservation programs. Data available online at: <http://researchdata.sfu.ca/islandora/object/islandora:9106>
- Conde et al. 2011. An emerging role of zoos to conserve biodiversity. *Science* 331:1390–1391.
- Faith, D.P. (1992). Systematics and conservation: on predicting the feature diversity of subsets of taxa. *Cladistics* 8, 361–373.
- Faith D.P. 1992. Systematics and conservation: on predicting the feature diversity of subsets of taxa. *Cladistics* 8:361–373.
- Isaac et al. (2007). Mammals on the EDGE: Conservation priorities based on threat and phylogeny. *PLoS ONE* 3:e296
- Jetz et al. 2012. The global diversity of birds in space and time. *Nature* 491, 444–448.
- International Union for the Conservation of Nature. 2017. IUCN Red List of threatened species. Available from: <http://www.iucnredlist.org>
- Mace et al. (2003). Preserving the tree of life. *Science* 300, 1707–1709.
- Redding D.W. (2003). Incorporating genetic distinctness and reserve occupancy into a conservation prioritisation approach. [MSc. Dissertation]. Norwich: 19 University of East Anglia.

Keeping Up With Kiwi

Brown Kiwi 2018 Summary

Kathy Brader, Brown Kiwi Studbook Keeper for North America and Europe
Smithsonian National Zoological Park



Several exciting updates on the kiwi front. We have 56 birds (37.19) at 16 zoos.

North America: Columbus Zoo, World Conservation Society, San Diego Zoo, San Diego Zoo Safari Park, Zoo New England, Toledo, Smithsonian National Zoo, Smithsonian Conservation Biology Institute.

Europe: Frankfurt Zoo, Berlin Zoo, Parc des Oise, Walsrode, Paignton Zoo, Zlín-Lešná Zoo, Vogelpark Avifauna, and Osaka.

The SSP is growing and excited to welcome back the San Diego Zoo Safari Park and Zlin-Lesna Zoo.

The brown kiwi studbook welcomed Stefan Stadler (Frankfurt Zoo) as vice-chairperson for the Kiwi SSP. Stefan has been my 'go to person' to help me on the EU front over the years so now he will officially get the credit.

Important husbandry update regarding incubation

Emma Bean, kiwi manager at the Kiwi Encounter at Rainbow Springs, New Zealand, shared some information on incubation of newly laid kiwi eggs and how long an egg can be left in the nest without being incubated.

"I'd leave the egg where it is - it could be that he's waiting for the second egg to be laid before he initiates incubation. Eggs can stay viable for ~10-14 days without being incubated, however once incubation has commenced it needs to continue, so if he starts incubating and gets off you have 2 options. One is to lift it into artificial incubation, but alternatively as he's a first time breeder you may wish to effectively 'sacrifice' the egg and see if it helps him establish into a good incubating behavioural pattern. We've had a similar situation here and we opted for the latter as we didn't want to risk interfering and altering his future incubation technique. Assuming their weights are ok (female kiwi lose weight after laying) and there are no other health concerns, I'd stay hands off now – as you really don't want to handle her whilst she's potentially producing the second egg. And you don't want to put him off incubating either. Health can also be assessed by monitoring their consumption and using night vision cameras if you've got any concerns. The latter is also useful if you want to see if they are visiting the nest burrow or not (even though he's not sitting either one of them might be checking it) and to see if they're exhibiting breeding behaviour. So it's a really matter of watching and waiting like anxious parents! "

Emma Bean, Kiwi Husbandry Manager / Tumu

Rainbow Springs

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Update on kiwi feather program

We sent over the 7th box of kiwi feathers a couple of months ago. Any zoo that has some feathers can start sending them along to me. I am aiming to get a box together in September 2018 and avoid the holiday rush.

Berlin Zoo by Dr. Tobias Rahde (curator of birds)

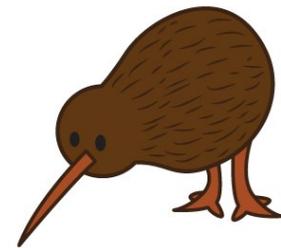
The Berlin Zoo keeps at the moment 5.4 of the North Island brown kiwi (*Apteryx mantelli*). Up to now we had the problem that these nice and charismatic birds were just kept in our breeding aviaries and were invisible for the visitors. This year the Berlin Zoo opened a small nocturnal section in the new bird house especially for the kiwis. We use special lamps during the night time which allow us to work with natural plants. At the moment we keep in this enclosure one male.



Ambassador Tim Groser and Kathy Brader



Berlin's Zoo's new kiwi enclosure



San Diego Zoo Safari Park by Mike Mace

The Safari park welcomed a young male from SCBI last summer and are looking forward to receiving a young female from Frankfurt zoo this winter or spring.

World Conservation Society by Ken Huth

WCS set up this enclosure for introducing kiwi and did successfully set up a new pair, unfortunately the female died shortly after laying an egg. With two boys looking for a date they will also be receiving a young female from Frankfurt this winter or spring.



WCS Breeding pen

Smithsonian National Zoo by Kathy Brader

At the Smithsonian National Zoo, most of you may know that our historic bird house is undergoing (or soon to be) a major renovation, so I am down to one kiwi at the park, our Ambassador kiwi "Pip". Pip is still performing his ambassador duty meeting new friends from the New Zealand Embassy, more Smithsonian Staff (from other museums) and other zoo staff. We will be moved out by late next summer and Pip will be heading out to SCBI to join our growing "herd" out there, joining his father and Toru (the first kiwi to hatch outside of New Zealand in 1975) who went to SCBI last summer.

We have finished with the fecal collection of all of our kiwi (SCBI and SNZP) to run cortisol hormone tests. The researchers are now beginning to run the fecal analysis, so I am hoping we can get something published next year. We are looking at both of our Ambassador kiwi, off display kiwi, breeding kiwi, on display kiwi, and finally looking at the moves of 2 kiwi from the park out to SCBI, Toru has never lived outside so I am really excited to see what happens as he begins his new life outside.

Smithsonian Conservation and Biology Institute by Wesley Bailey

2017 has been a good year for the Smithsonian Conservation Biology Institute. We've been able to renovate some older, unused enclosures and repurpose them for housing kiwi. This increases our capacity by an appreciable measure. We took part in several transfers; in all, two male 2016 hatches were transferred out and one female 2016 hatch was transferred in, with which we hope to have another breeding pair upon maturation. We also had two eggs laid this year; the first, the fifth male from our pair, was transferred to the Columbus Zoo and Aquarium and the second, the first female from our pair, hatched here at SCBI. Both eggs were sexed without complication. For the latter, incubation was completed entirely in an artificial incubator and we were able to confirm fertility on the ninth day of incubation. With successful hatches from our breeding pair and in receiving kiwi from the National Zoo while they undergo renovations we now have ten kiwi – double that of two years ago – and are looking forward to our future endeavors with the species.



Whetu, SCBI female kiwi chick (the public in the US and New Zealand voted for a name. Ambassador Tim Groser and his grandchildren made a video to help promote the contest).

Watch a kiwi hatching here!
<https://nationalzoo.si.edu/animals/news/watch-kiwi-hatching>

Frankfurt Zoo by Dr. Christine Geiger

FELICITAS moved into her 'husband' KELSEY's enclosure on October 30th where she laid her first egg of the season on December 11th, 2017. KELSEY is incubating the egg as reliably as every year. First candlings showed early embryonic development. FELICITAS is currently gaining weight, so we are awaiting her second egg before she will be moved back into the 'kiwi ladies department' until next season.



Left: Kelsey on her egg

Below: Kelsey and Felicitas

Beginning October 2nd, 2017, we started to form a new breeding pair from female MAHURU and male KAYTEE. KAYTEE had recently moved in from Berlin Zoo (on June 26th). They shared the same enclosures from October 17th, 2017, the first nights under close observation. After a few nights they were always found

in the morning sleeping side by side in the same nestbox. MAHURU laid her first egg while having a 'husband' this year on December 14th together with KAYTEE. (March 18th, 2017, she had her first egg ever but, then, without a male). Unfortunately, KAYTEE has not yet started incubating and, on day 13, we decided to replace the abandoned egg by an artificial egg and give the original egg to APTERYX (36 years) who is our most reliable 'adoptive incubator.' MAHURU is also gaining weight, and we still hope KAYTEE will start incubating eggs after she has laid a 2nd egg?!



Mahuru and Kayte

Pair-forming attempts with HARI x PUAWEI did look promising in the beginning, but have not been successful during November 2017: Young male HARI (2.5 years) knew exactly what he wanted and what was his job - but female PUAWEI (2.7 years) whom he had shared the enclosure with as kids was too shy and afraid of his straightforward mating(?) attempts, although no aggression was observed

from either side. So we decided to leave them for this year's breeding period and give them a try next year. Additionally, we were afraid of too much disturbance for the other breeding pairs while observing this possible new pair in the same building at night.

New Zealand female WHA moved to Berlin on May 19th, 2017, as several pair-forming attempts with all genetically and age-wise suitable Frankfurt males ended up unsuccessfully and with aggression (mostly from her side). To avoid transportation of some more males to Frankfurt we decided to give WHA to Berlin to try some of their suitable males and avoid additional kiwi travelling.

Zoo New England by Carol Brackett, Zookeeper at A Bird's World

Update on Aria's Training Program at Zoo New England's Franklin Park Zoo



Voluntary palpation while Aria stands on a scale and targets.

During Aria's first breeding season at Zoo New England's Franklin Park Zoo, between October of 2016 and March of 2017, five infertile eggs were laid. Regular voluntary weights and abdominal palpations through training were successful in tracking changes in Aria's condition. This allowed keepers to identify when an egg was developing as well as estimate the lay date. Previously, abdominal palpations were performed while Aria was eating from a bowl. In March of 2017, Aria's training progressed to incorporate a small plastic cone as a target. During sessions, Aria stands on a station platform and places her beak inside the plastic cone that is clipped to a plant or wall. The keeper uses one hand for palpations and the other hand for bridging and rewarding. This setup allows the keepers to have more control over the feeding and lengthens the time for palpations. The station platform is placed on a scale, allowing the keepers to

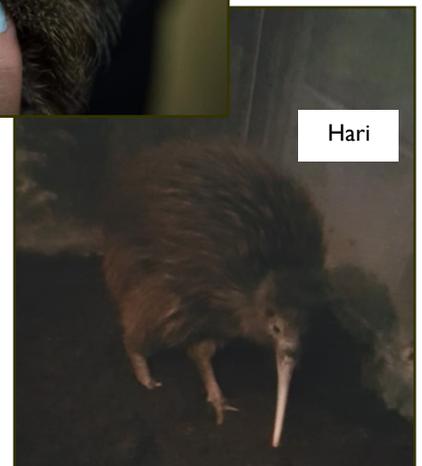


Aria targeting her beak inside the plastic cone.

simultaneously track her weight. The training program has been positive for Aria and successful for keepers. Therefore, regular tracking of weight and abdominal condition are continuing through Aria's second breeding season. Since October of 2017, keepers were able to successfully track the development of two eggs.

Columbus Zoo by Taylor Hann

In May of 2017 the Australia and the Islands team at the Columbus Zoo and Aquarium began preparing to welcome new Kiwi to the region. In June, a young male Kiwi, "Hari," and a male Kiwi egg came to the zoo from The Smithsonian Conservation Biology Institution. While the egg developed in the incubator, Hari settled into his new home and adjusted quickly to his adoring public. The egg we received hatched on June 22, 2017. The new chick was named "Haka." Haka hatched and has been growing and thriving in an area that is not viewable to the public. Today, Hari has grown comfortable in his habitat and spends his days probing, digging, and delighting guests with his occasional swift Kiwi run. He is calm, but can definitely be feisty and strong willed. Haka is now over 6 months old and still lives in an area not viewable by the public. While he does express himself with a kick now and then, Haka is sweet and loves chin scratches. He is currently learning about and enjoying all the fun things Kiwi love such as dried leaves and logs to shred. As both boys continue to learn and grow, we are looking forward to what 2018 will have in store for our Kiwi at the Columbus Zoo.



Toledo Zoo by Chuck Cerbini

Fecal Monitoring and Feather Loss in Kiwi Chicks

In 2017, the Toledo Zoo Bird Department successfully raised a North Island Brown Kiwi chick. The egg was produced by breeding birds at the Smithsonian Conservation Biology Institute (SCBI) in Front Royal, VA and transported to the Toledo Zoo by SCBI staff at day 68 of incubation.

As recommended by Kathy Brader, the SSP Coordinator and Studbook Keeper for the North Island Brown Kiwi, a weekly fecal monitoring program was initiated for the chick after self-feeding reliably commenced. The purpose of this practice was to identify the presence of coccidian parasites early enough to quickly implement treatment and prevent health issues for the bird. Kiwi chicks are reportedly sensitive to coccidiosis and death can occur with no clinical signs of illness.

Interestingly, it appeared that feather loss was associated with coccidian eggs in the bird's feces. At one and a half months old, the Kiwi chick began dropping feathers, which is atypical for young of this species. This continued daily until three days later when coccidia ova were found on a fecal sample.

After a 5-day ponazuril treatment, which the Kiwi chick took eagerly in waxworms, the substrate in the chick's brooder box was completely removed and replaced with fresh soil and peat after the disinfection. For the following week, daily fecals were submitted for evaluation after which the frequency of submissions was decreased back to once a week. The feather loss subsided after treatment and the bird's first negative fecal analysis results. A similar progression of events took place a month later, suggesting that the feather loss could be a clinical sign of coccidiosis. In both cases, feather loss ranged from five to fifteen body feathers molting overnight and more being lost throughout the day.

The weekly fecal monitoring regimen continued until the Kiwi was a year old. Regular substrate changes were also performed in addition to substrate removal after deworming events. Aside from coccidia, strongyloides were also found several times in fecal samples and were treated with ivermectin. Our experience with this particular Kiwi chick showed us that implementing a regular and frequent fecal monitoring schedule is an essential practice when managing these young birds.

Let's face it kiwi have very different lifestyle! My undying gratitude to each of you and your staff for your continued support for the kiwi program. I am so proud where we were not all that long ago to where we are today and it all thanks to each of you, so thank you!!!



Kirihimete the Brown Kiwi at one and a half months old exploring his brooder box at the Toledo Zoo's Avian Breeding Center.

Two kiwi species no longer endangered in new Red List

CNN: Conservation efforts in New Zealand to save the flightless kiwi bird have paid off, with two species -- the Northern brown and the rowi -- no longer at a high risk of extinction.

The latest update to the International Union for Conservation of Nature and Natural Resources' (IUCN) Red List of Threatened Species upgraded the status of the birds from "endangered" to "vulnerable" because of a steady increase in population.

The IUCN is a global body that evaluates the existential threat to various animals and plants. Their findings, published in Tokyo on Tuesday, assessed the status of 91,523 species, and found 866 to be extinct. However, the change in the status of the northern brown and rowi kiwis marks more than 25 years of successful conservation efforts by the New Zealand government and community groups.



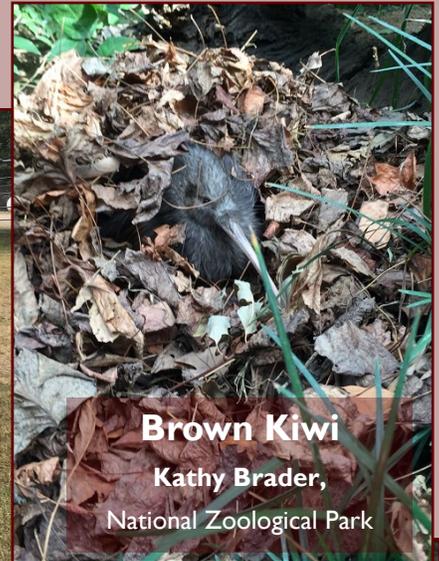
The best enrichment pictures of the year!
Thank you to all those that contributed to Dana's updates!



Greater Rhea
Deanna Whalen, Staten Island Zoo



Ostrich
Hollie Wells, Rolling Hills Zoo



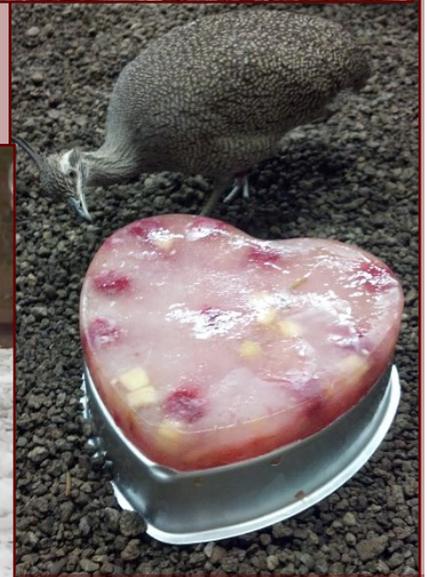
Brown Kiwi
Kathy Brader,
National Zoological Park



Southern Cassowary
Lauren Butler, Nashville Zoo



Emu
Deanna Romanello,
Staten Island Zoo



**Elegant Crested
Tinamou**
Jordana Todd,
National Zoological Park



Honorable mention:
Bald Eagle at North Carolina Aquarium with an Ostrich egg

Keeper Tracks with Michelle Ferguson



I'm originally from Falls Church, Virginia, and have always been interested in animal care. I have worked in a veterinarian's office until I graduated with a Bachelor's of Science in Biology from Radford University. I had various animal care internships with facilities including Smithsonian's National Zoo and Tampa's Lowry Park Zoo. I began my first keeper position in 2014 at Leesburg Animal Park, close to my hometown. I worked with all of the animals, which varied greatly! I was able to get a lot of experience working with birds and small mammals. Most of my ratite experience has come from working in the Lands of Change: Australia and Beyond area at the Brevard Zoo in Melbourne, Florida.

The ratites I currently care for are 1.1 Southern Cassowary and 2.2 Emu. Last year the Brevard Zoo went under construction and renovated the entire Australia area. This required us to move almost all of our animals in that section. A lot of training was done to successfully crate our Emu and Cassowary for relocation. Right before the zoo re-opened the new Lands of Change area to the public, we received a younger pair of Southern Cassowaries. Working with the new Cassowaries has been a great learning experience. I've learned that it takes much patience and consistency, especially when working with Cassowaries that have never been exposed to

training. Shift training our 0.1 Cassowary has been my greatest challenge to date. She has never been inside a barn before, but I've learned not to give up on this cautious bird! As I continue to work with these challenging ratites, I hope to soon expand their behaviors.



Odds & Ends

Researchers from Monash University's Biomedicine Discovery Institute have helped solve the mystery of how emus became flightless, identifying a gene involved in the development and evolution of bird wings. The research, published in *Nature Communications*, sheds light on how genes regulate limb development. They found that a gene is turned on during the development of wings in emu embryos, but not in chickens or other birds, leading to greatly reduced wings. When researchers isolated the emu gene and inserted it into chicken embryos, they developed tiny emu-like wings.

Full story at

<https://phys.org/news/2017-07-discovery-emus-grounded-flight.html>



A large flightless bird has been unearthed in China and Palaeontologists have looked to the cassowary to explain the structure of the skeletal fossil found. The *Corythoraptor jacobsi*, found in China is a new strain of oviraptor, which has a similar looking head crest to our Aussie cassowary.

The cassowary, a giant bird that stalks around the Daintree rainforest in Northern Queensland and Papua New Guinea, shows similar traits to its prehistoric ancestor. Their large flesh-tearing claws, naked blue heads and the casque crest on the top of the giant flightless bird's head are a dangerous reminder of the bird's aggressive demeanor.

It is the bony crest atop the cassowary's head which most intrigued palaeontologists. The newly uncovered dinosaur in China exhibits a similar structure. By comparing the dinosaur's crest to that of the cassowary, they will attempt to unravel the mystery surrounding the dinosaur's structure and gain valuable insight into the workings of its existence.



In the new Scientific Reports (<https://www.nature.com/articles/s41598-017-05016-6>), the researchers compared the fossil casque and a cassowary's casque. The results revealed a similar infrastructure of microtrabeculae webbing in both samples. The dinosaur's crest showed slightly larger holes in the honeycomb like structure. With such similarities, researchers were able to speculate as to what the dinosaur used its crest for.

There are many possible uses for the cassowary's crest, but the most popular theory is that it is sociosexual. The bony, keratin structure on top of the flightless bird's head helps resonate the low-frequency sounds it makes in courtship. The size, colour and general physical appearance of the crest also entice sexual partners.

This is the seventh oviraptor discovered in China to date. The find provides a particularly valuable look into the ecosystem of the Late Cretaceous period.

A successful TAG mart was held at the 2017 AZA mid-year meeting. Thanks to Katie Vyas, Carolyn Atherton, Kelly Vineyard, Nicole LaGreco, Mike Taylor, Scott Tidmus for helping to staff the table. Special thanks to Megan Stegmeir, Blank Park Zoo, for sending in amazing cassowary foot paintings and artwork! **Be sure to stop by the table in Jacksonville at the 2018 AZA midyear meeting and support the TAG!**



AZA Ungulate TAGs Mixed-Species Manual

First Edition Published: June 2017

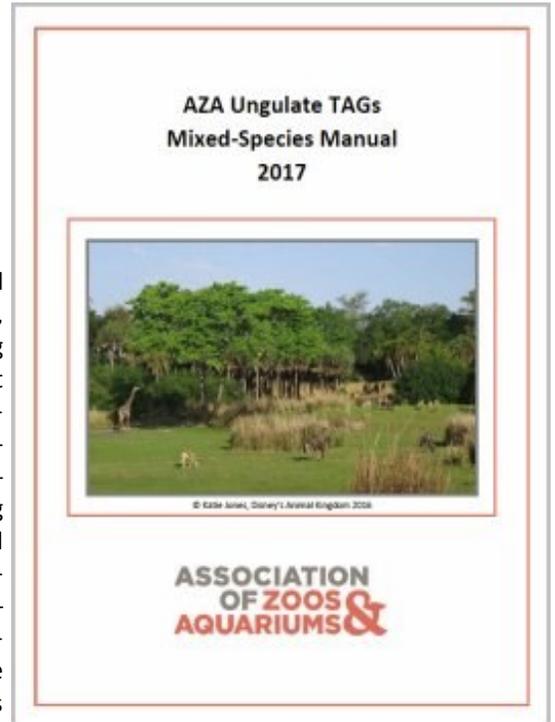
Citation: AZA Ungulate TAGs. 2017. Ungulate Taxon Advisory Groups Mixed-species Exhibit Manual.

Association of Zoos and Aquariums, Silver Springs, MD. pp 1031.

Authors and Significant Contributors: Chelsea J. Weibel, Andrew C. Alba, Brent Huffman, Gina M. Ferrie PhD

The eagerly awaited AZA Ungulate TAG Mixed Species Manual is out! Geared for hoofstock managers, it is also a very useful for those managing ostrich, emu and rhea in mixed species exhibits. It contains "information regarding best practices, combinations of species that have worked well, and mixes that have not been successful. Through the participation of 131 zoological institutions housing ungulates in mixed-species enclosures, we've created a reference that can be used for collection- and exhibit-planning. This manual contains information from over 650 mixed-species ungulate exhibits, including current successful exhibits, historical successful exhibits, and unsuccessful attempts at creating mixed species combinations. In addition to exhibits containing only ungulate species, we've also included information about non-ungulate species mixed with ungulates. Information was submitted by all levels of staff at participating institutions, who helped us to collect details on the animals, exhibit design, and management of current and historical exhibits, as well as changes over time of currently existing mixes."

<http://www.azaungulates.org/mixed-species/>



TAG News

- Quarterly Enrichment Postings can be found at http://aviansag.org/Newsletters/Struthioniformes_TAG_Newsletter.html
- Past newsletters can be found at http://aviansag.org/Newsletters/Ratite_TAG_Newsletter.html
- A comprehensive reference list can be found at http://aviansag.org/TAG/Ratites/Ratite_TAG.html
- Be sure to visit AZA's new Network page and sign up for the ratite listserv !
- Species Fact Sheets for ratites and tinamous can be found at http://aviansag.org/Fact_Sheets/Ratites/Ratite_TAG.html



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Nicole LaGreco, Southern Cassowary, San Diego Zoo



Thanks for reading!

If you have an idea for next year or are interested in writing a piece you can contact

Sara Hallager at hallagers@si.edu or

Monica Halpin at mhalpin@zooatlanta.org.

It's never too

early to turn in your submission!