

The Ratite Review

THE AZA STRUTHIONIFORMES TAG ANNUAL NEWSLETTER



The Ratite Review 2020

Welcome to *The Ratite Review*!

The vision of the Struthioniformes Taxon Advisory Group is to engender appreciation of ratites and finamous by raising awareness of conservation threats and helping zoo visitors and the zoo community better understand actions they can take to help conserve these species in the wild.



**ASSOCIATION
OF ZOOS &
AQUARIUMS**



www.facebook.com/RatiteTAG

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Cover Photo: North African Ostrich by Reinhold Tscherswitschke/Alamy

Newsletter Editor: Kirby Pitchford

Ratite TAG Personnel

Struthioniformes TAG Officers

Chair: Sara Hallager, Smithsonian National Zoological Park

Vice Chair: Scott Tidmus, Disney's Animal Kingdom

Secretary: Nicole LaGreco, San Diego Zoo

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Gwen E. Myers, DVM, Zoo Miami (Kiwi)

Enrichment Coordinator & WCD Liaison

Larkin Johansen, Jacksonville Zoo and Gardens

Zookeeper Representative & Newsletter Editor

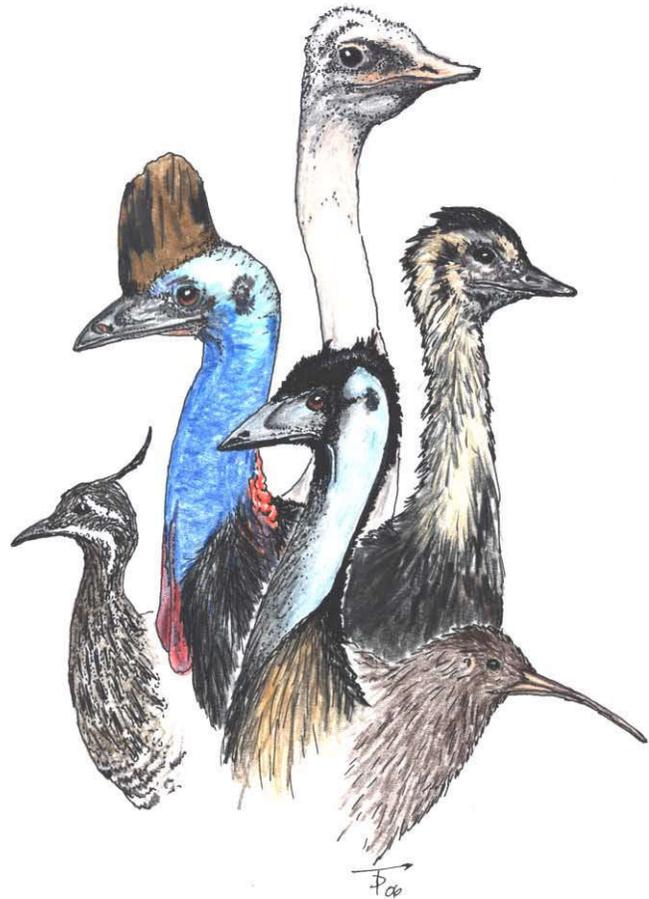
Kirby Pitchford, National Aquarium

SPMAG Liason

John Andrews, AZA Population Management Center

APMC Liaison

Colleen Lynch, Riverbanks Zoo and Gardens



SSP Program Leaders

Brown Kiwi: Kathy Brader, National Zoo

Elegant-crested Tinamou: Kristen Clark, National Zoo

Greater Rhea: Heather Anderson, National Zoo

Southern Cassowary: Nicole LaGreco, San Diego Zoo

Species Champions

Emu: Monica Halpin, Zoo Atlanta

Ostrich: Scott Tidmus, Disney's Animal Kingdom

Announcements

Record-breaking TAGmart!

The TAG participated in the 2019 TAGmart at the AZA midyear conference in Phoenix, AZ. Thank you to everyone who supported the TAG through the purchase of our one-of-a-kind ratite items. This year we raised **\$1,150**, a new record!

If you have any items to donate for next year, please contact Sara at hallagerS@si.edu

'Like' Us on Facebook!

The Ratite TAG Facebook page has been operating for over a year and has about 1,500 followers and has reached over 10,000 people!

If you haven't yet, find us at www.facebook.com/RatiteTAG



Are you opening a **new exhibit**?

Do you want to show us your advancements in **husbandry** or **training**?

Feature your contribution to **field conservation**?

Highlight your **successful hatches**?

It's never too early to submit your article for next year's edition of *The Ratite Review*!

Please email your article and pictures to kpitchfo@aum.edu and you could be featured in next year's newsletter.



Support the TAG, buy a bag!

We are thrilled to announce our recent partnership with Wendy Barnes Design! Do you love ostriches and cassowaries as much as we do? You can support their conservation by going to www.wendybarnesdesign.com and purchasing any ostrich or cassowary product. 10% of sales on these products will go towards the Struthioniformes Taxon Advisory Group.



New Enrichment Coordinator

The TAG would like to welcome Larkin Johansen at Jacksonville Zoo and Gardens in her new role as the enrichment coordinator! Larkin has served as the World Cassowary Day Liaison for many years. Email her pictures and stories of your ratite enrichment at johansen@jacksonvillezoo.org.

Left and below: Larkin spreads awareness on World Cassowary Day by hosting a booth and talking to the media.



The role of enrichment coordinator was previously filled for many years by Dana Urbanski at North Carolina Zoo, and we appreciate her many years of dedicated work compiling our quarterly enrichment features.

Thank you, Dana!



Inaugural World Ostrich Day

The TAG recently celebrated the inaugural World Ostrich Day! This date was chosen by New Zealand zookeeper Jade Tinkler, who created the event, to represent the only bird with two toes. This event was an overall success with several zoos around the world posting stories, photos, videos, and fun facts about their ostriches. Thank you to all who participated by hosting your own keeper chats and bringing attention to ostriches both in zoos and in the wild. We hope to grow this event in the coming years, with even more zoos participating in the future!



Mark your calendars for next year, February 2nd is World Ostrich Day!

Want to get involved with the Struthioniformes TAG?

Email Sara at hallagers@si.edu to learn how you can assist the TAG!

Program Updates



North Island Brown Kiwi, *Apteryx mantelli*

International Studbook

39.19.0 at 17 global institutions

SSP Coordinator: Kathy Brader, braderK@si.edu

Yellow SSP

Red SSP

Elegant-crested Tinamou, *Eudromia elegans*

Regional Studbook

25.11.0 at 13 U.S. institutions

SSP Coordinator: Kristen Clark, clarkK@si.edu



Greater Rhea, *Rhea americana*

Regional Studbook

24.49.3 at 29 U.S. institutions

SSP Coordinator: Heather Anderson, andersonH@si.edu

Yellow SSP

Yellow SSP

Southern Cassowary, *Casuarius casuarius*

International Studbook

28.25.1 at 30 U.S. institutions

SSP Coordinator: Nicole LaGreco, NLaGreco@sandiegozoo.org



Photos credits: brown kiwi, Columbus Zoo; elegant-crested tinamou, Carolina Aruda; greater rhea and southern cassowary, Scott Kayser

2020

Keeper Tracks!

Ratite Keepers of the Year!

Jessi Freeman & Thea Etchells at Denver Zoo!

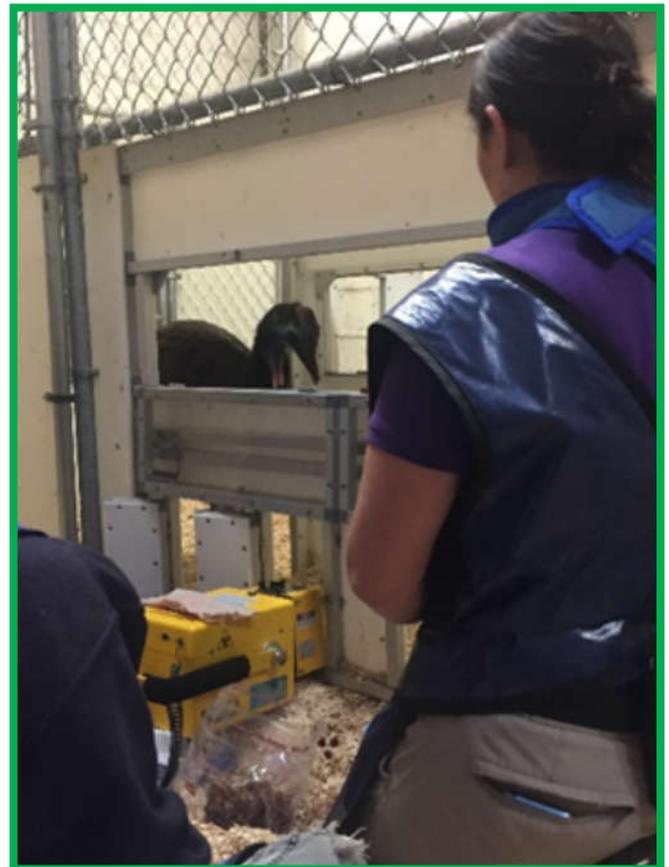
“Jessi Freeman and Thea Etchells have been rock stars in 2019 when it comes to cassowary training and care. Despite facing the challenge of closing our large, indoor bird-dedicated building last year, they focused positive energy on training our I.I double-wattled cassowaries for voluntary medical procedures. These voluntary behaviors included blood draw, crating, desensitization to tactile stimuli, radiographs and injection (via hand and pole dart). I’m so amazed and proud of the progress they have made in just one year. Their efforts have resulted in an improved management strategy and greater wellness of our cassowaries.”

- Katie Vyas, Assistant Curator



Ratite Keepers of the Year Jessi Freeman and Thea Etchells in action!

For more on their cassowary husbandry training program, see page 12.



Jessi Freeman cueing Neville into his crate with radiograph equipment.

New Hatches!



Emu Chicks at Trevor Zoo

Promethius laid her first egg of the season on January 10th. The green eggs are about 5 inches long and weigh over a pound. Two chicks hatched on April 21st and 22nd. The Trevor Zoo is AZA's only accredited zoo or aquarium located at a high school.



Photos courtesy of Trevor Zoo staff



Zoo Miami's Kiwi Chick



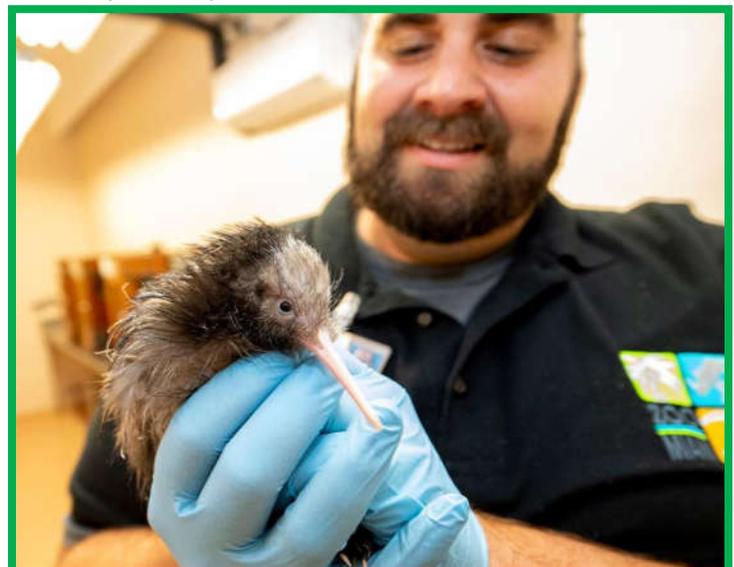
This past year Zoo Miami sent staff up to get two kiwi eggs from The Smithsonian Conservation Biology Institute in Front Royal, VA. Kiwi eggs take 70-80 days on average to incubate and the SCBI team did an amazing job getting both eggs to a point in incubation where transport was safe and possible. The eggs were transported on March 17th in a portable incubator by car to Zoo Miami. Only one of the chicks ended up hatching out on April 9th on its 72nd day of incubation. The chick was sexed as a male via DNA from egg membrane. He is being hand-raised in the Breeding Center in his own specially built brooder pen. He has grown very fast and is extremely friendly, calm, and curious. We know we are lucky!



On Monday, November 4th, Zoo Miami welcomed Her Excellency, Rosemary Banks, New Zealand Ambassador to the United States. She traveled from Washington, D.C., along with a special delegation from New Zealand to participate in an historic naming ceremony for the first kiwi ever to hatch in the state of Florida. Accompanying Ambassador Banks was Mr. Chris McKenzie and Mr. Paora Haitana, both iwi leaders of the indigenous Maori people, who traveled from New Zealand to perform the official naming ceremony, as well as Nancy Gilbert, New Zealand Honorary Consul to the State of Florida. The kiwi was named "Paora," by the New Zealand delegation in honor of the iwi leader who is deeply committed to conservation, particularly with *Whio* (Blue duck) on the Manganui-o-te-Ao river.

Currently Paora is doing really well and is an over-achiever on the weight charts. After some initial concerns with his low body weight shortly after hatching, he has made up for any lost ground and is now tipping the scales in the other direction. His most recent veterinary exam deemed him in good health, though over-conditioned, so his Nutritionist is keeping a close eye on his diet. He is now a popular attraction where he engages with VIP guests and anyone who books a behind the scenes tour.

Above: The chick with Dr. Gwen Myers, Chief Veterinarian and Brown Kiwi vet advisor. **Below:** The chick being held by keeper Matt McHale. Photos by Ron Magill. **Bottom Left:** Zoo Miami staff with the chick.

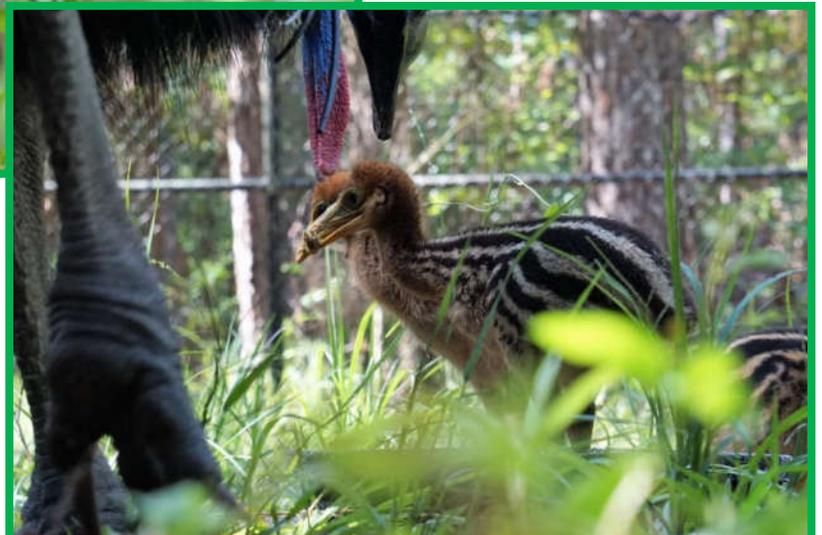


White Oak's Cassowary Chicks



This summer, White Oak Conservation Center in Yulee, Florida welcomed three cassowary chicks! They were announced at 4 weeks old on July 11th.

Photos courtesy of White Oak

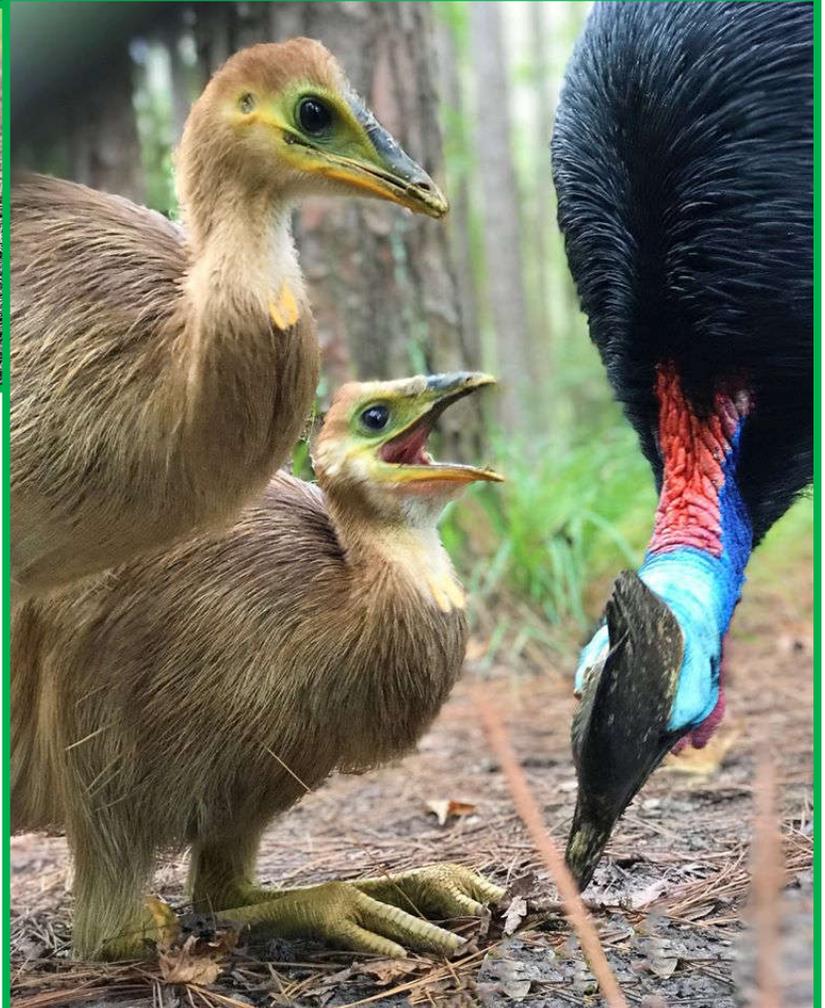


White Oak's Cassowary Chicks

Here they are again
at 7 weeks...



... and again at 21 weeks!



Photos courtesy of White Oak Conservation Center

Husbandry and Training

Voluntary Radiographs of a Double-wattled Cassowary

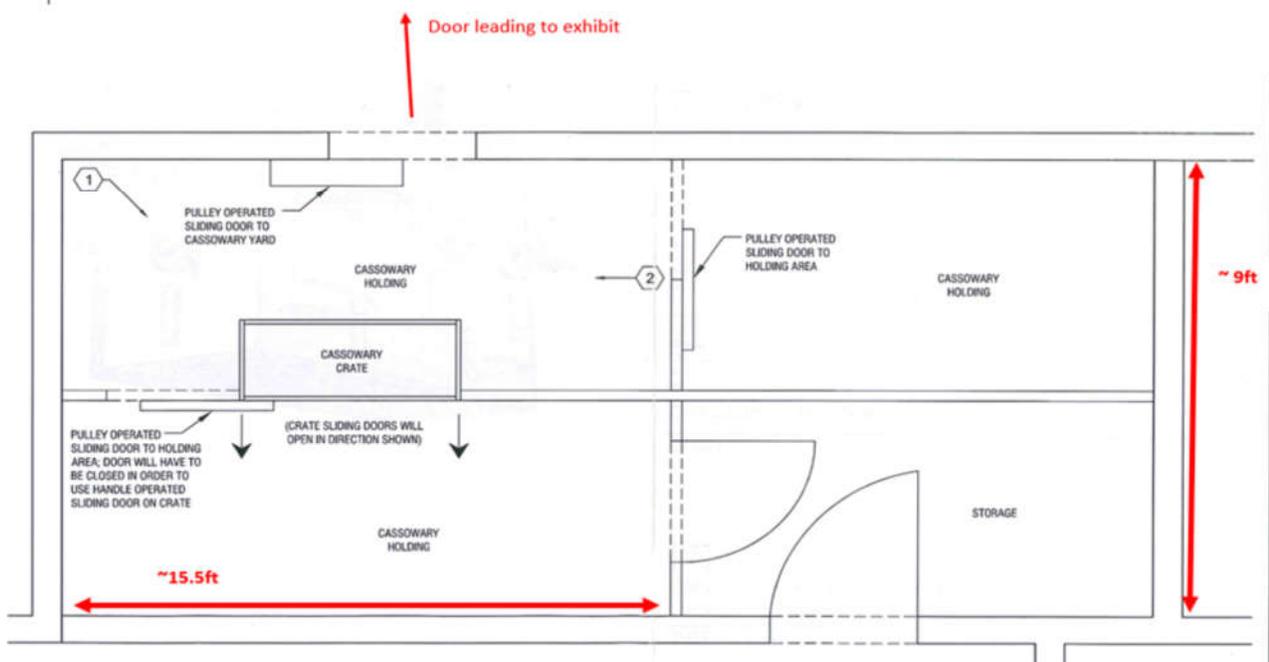
By Jessica Freeman and Thea Etchells, Denver Zoo



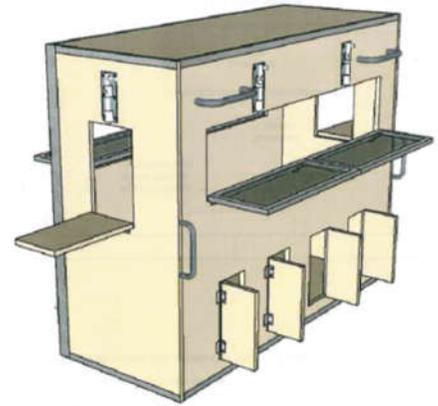
'Neville,' 1.0 double-wattled cassowary

Denver Zoo is home to 1.1 double-wattled cassowary; Neville (2 years old) and Salem (24 years old). After the loss of our previous male, Murry in 2017, we received 1.0 Neville several months later to be a future mate for Salem. With Neville arriving at just a little over a year old, we took advantage of his age by starting to train several behaviors that would allow us to build a positive caretaker relationship and better manage his overall care. These behaviors included tactile training and voluntary blood draw. Once out of quarantine, we worked towards getting Neville comfortable with his new stall and eventually out into the outdoor yards. We have 3 separate indoor stalls, one being a joining stall that leads to the outdoor yards and the two other stalls that are Salem and Neville's primary stalls. (See layout in picture below.) In this joining stall, is a crate we designed and installed in 2017. This crate was specifically designed for training and future voluntary medical procedures. The first step in the training process was to get Neville used to going in and out of the crate. With Neville being at a young age it did not take long to get him going in and out the crate. Neville had already developed a relationship with his keepers while he was in quarantine so convincing him to go into the crate with a few grapes took about a day.

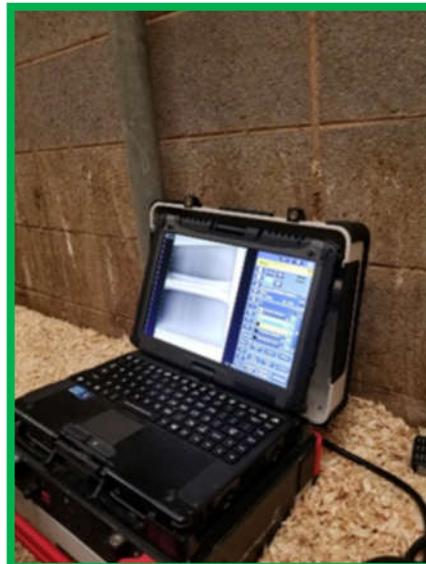
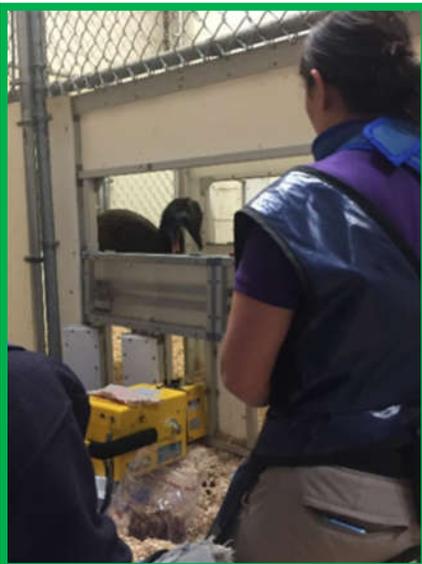
Neville was observed one morning with a significant limp, swelling around the base of his ankle and had minimal weight bearing on his right foot. He was placed on Meloxicam for 5 days with no results. Tramadol was added to help with pain and he was placed on stall rest for a couple of days. After 12 days of medication Neville was still exhibiting signs of pain and limping. Our vets asked if it would be possible to get a voluntary radiograph. While the crate was designed for voluntary medical procedures, we had not anticipated using this crate for radiographs.



Training for voluntary radiograph's could have taken some time especially with a cassowary. Cassowaries are notorious for being afraid of new things. Because this was a medical case, we had to work quickly to get Neville used to all the machines and new people. As part of the desensitization process we used a box which was designed to simulate the radiograph machine and a radiograph plate that was not being used by the vet staff. When we initially put the plate into the crate Neville would not go inside the crate when cued. We found that when we removed the black cover the plate was white, which is also the same color as the crate. The white plate blended into the crate and Neville either didn't notice plate or accepted this better versus the black cover. This change helped progress the training process. Grapes were placed on top of the plate in order to establish a positive association. The radio was played in the background to drown out the "beep" noise of the radiograph machine. We typically played the radio for him on most days for enrichment so this was something he was already used to. During our training sessions we also asked extra people to sit with us so he was not nervous of extra people. While taking radiographs we had to wear lead aprons, so we decided that during training we would put on trash bags so that we looked different. After our first attempt of an actual radiograph we realized that he was not standing high enough to get his foot in the picture so we added a flattened cardboard box and lots of shavings in the bottom of the crate to help lift him up higher. This of course made it feel funny to step on. Neville is a highly food-motivated cassowary. His favorites are grapes and blueberries which made it much easier to convince him that it was ok to go into the crate with all these changes. On our first attempt we were unsuccessful. We needed Neville's foot to be in the perfect spot aligned with the plate and the machine. After a couple of tries, on different days, we finally were able to get a clear picture of his foot.



The radiograph was successful in that it demonstrated no obvious signs of fractures or breaks. This helped us work collaboratively with the vets to confirm that it was likely soft tissue damage and to continue anti-inflammatory medications and rest. As far as we know, Denver Zoo is the only institution that has been able to get a voluntary radiograph on a cassowary. This training allowed us to avoid a stressful and dangerous restraint which could have aggravated the injury or result in further injury of Neville and/or staff. Neville has recovered from his injury and his keepers continue to progress with his training.



Previous page: Layout of cassowary holding, **Top right:** sketch of Denver Zoo's cassowary crate, **Top left:** radiograph equipment set up in the crate, **Above:** Success! The first voluntary radiograph on a cassowary, **Far left:** Jessica Freeman cueing Neville into his crate, **Left:** equipment showing a voluntary radiograph.



Rehabbing an Emu; It Takes a Village

By Paula Kolvig, M.A., Assistant Curator

Moody Gardens

On Jan 22, 2019 Moody Gardens received a call from Animal Control officers that 2 emus (*Dromaius novaehollandiae*) were running loose on Galveston Island. Emus are a prohibited species within the city limits and animal control officers were looking for housing and care assistance for the duration of the pending legal case. Depending on the circumstances, Moody Gardens will frequently assist with local exotic animal control confiscations. Galveston Island Humane Society is the housing agent for confiscated animals through local animal control. However, they do not have large enough yards or enclosures to house a bird(s) of emu size. Animal control officers transported 2 emus to Moody Gardens' property after a few hours of chasing, corralling and capturing the birds.

Arrival:

At the point of intake, both birds presented with various physical injuries, one being more severe than the other. The emus had been 'hog-tied' for transport and positioned on their sides. While the drive from the capture location was not too far, both birds appeared extremely stressed, wounded and a bit lethargic.



Background

Incoming information we received was sparse
 Owner had transported the birds to the island in the back of a pick-up in wire cages on the day prior to their capture
 Owners yard fencing not appropriate height or secure enough, birds likely escaped more than once over the span of the day
 Sometime early morning of Jan 22nd, birds escaped and calls were made to animal control
 Rumors- one of birds falling out of back of truck during transport by owner, and of one bird being hit by a car on the morning of the capture. Some of their injuries appeared consistent with the possibility of both of these rumors

Moody Gardens

No historical facility experience with ratites
 Staff with minimal ratite experience
 Due to the makeup of the collection, we did not have appropriate food for the birds *Houston Zoo provided a bag of ratite pellets on short notice

Emus

Emu #1 Hubert 1.0

Arrived with severe physical injuries.- Leg abrasions, feather and wing damage, scrapes and cuts primarily on legs and body

This bird could not stand unassisted and would fall when staff attempted to stand the bird.

Lethargic

Hay was laid down under the shelter and heat lamps installed Hubert was set up under shelter for night with access to food and water

Hubert was never observed standing, or moving from the initial spot by the heat lamps

Found dead on morning check of Jan 24th Necropsy showed signs of major hemorrhage/trauma and possible exertional rhabdomyolysis, capture myopathy

Emu #2 Dominique 0.1

Arrived with leg abrasions, cuts and scrapes, and some underwing bruising wounds

Presented with more energy than Hubert

Could not stand unassisted for more than 1 minute at a time, could not walk unassisted

Dominique's long road to recovery:

After the initial triage and the 1st full week of fluids, pain medication and antibiotics on board, we began the process of trying to feed and get Dominique to stand and walk unassisted. Showing no interest in eating and some hesitation to our presence, getting weights and fluids in her proved to be challenging in the beginning.



Feeding:

Day 1-5 we started with tube fed gruel, protein powder, fluids with her medications along with supplements

During this time staff noted that it appeared that she was curious about the food and would peck at it, but seemed unable to ingest it.

Day 5- 15 tube feeding continued with various foods in the gruel mixture along with vitamins, fluids and medications.

We continued to offer food of various types, presented in various locations/times and ways. She was also offered water in smaller bowls as well as a large tub. She continued to show no interest in feeding. The slight interest we noted in for the first few days was no longer observed at this point. Her behavior otherwise appeared to be improving slightly.

Day 20 appetite stimulant regimen started, and tube feeding continued.

After nearly 40 days with us, Dominique started to eat unassisted! She was mainly interested in the fresh grass and flowers/weeds that were coming up in the yard. She resisted all the slightly inappropriate food items (we were trying anything and everything- especially things like cheese balls and popcorn....which the seagulls found quite tasty!) During this time, we took a step back from gavage feeding to determine if she would be able to feed on her own. We continued to monitor her weight and body condition on a regular basis. Although success came slow, we finally got to a point where she was consistently eating!

time at Moody Gardens. Due to her injuries, weighing her in the beginning meant staff had to pick her up, carry her to the scale and place her in a seated position. This slowly evolved to keepers assisting her to walk onto a platform over the scale load bars for the weight. As time went on and her appetite increased along with her ability to walk unassisted, keepers began to corral her to have her acclimate to walking on the ramp to the scale unassisted. By early March we were able to weigh her voluntarily. The ramp that was used for the scale also served as the ramp for the transport trailer, so it was a win in our eyes since she was accustomed to walking the ramp.

Final steps:

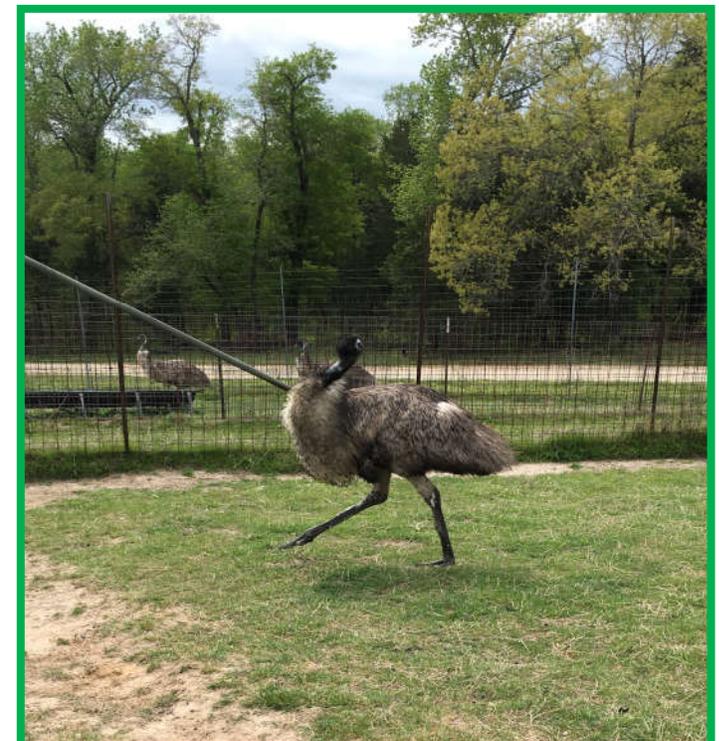
By day 55 it was determined that Dominique was healthy enough for transport to a permanent home. Cleveland Amory Black Beauty Ranch in Texas would be that home where she would join 2 other emus on acres of open land. From this point until her departure, keepers kept up with her weighing, and ensuring that she would load up into a trailer without issues. On April 3rd- a full 71 days after arrival at Moody Gardens, Dominique was transported to Black Beauty Ranch. One keeper and the animal control supervisor made the trip and were there to assist with the off-load and transfer.

Without the assistance of AZA Ratite TAG members, and others in the industry, her recovery would not have been possible. The village it took was a team of keepers with no previous emu care experience, 3 vet techs, 3 veterinarians and 71 days of complete dedication for Dominique to recover.

Many thanks goes out to not only our staff at Moody Gardens, but also Galveston Island Animal Control officers, Hannah Bailey at Houston Zoo for providing food on short notice, Sara Hallager, Carolyn Atherton and Scott Tidmus from the Ratite TAG for their wonderful patience and guidance with so many emu questions! And of course, thank you to Cleveland Armory Black Beauty Ranch for providing a wonderful permanent home to Dominique.

Standing/Walking:

Due to the physical injuries as well as suspected capture myopathy, Dominique was unable to stand or walk unassisted for very long. During the rehab process keepers made attempts to assist her with walking by using sheets a make-shift sling. However, these attempts were unsuccessful. Various medications to combat swelling and pain were given via injection and added to gruel mix. As time went on, with



our attempts to walk her, she started to have some sustained walking. By day 16, Dominique was noted to be in various spots and had walked to an elevated feed tray to inspect it. At this point, walking was still labored and she tended to stumble after short walks due to knuckling of her feet. Her legs and wounds were noticeably improved by Day 23. Daily walking and standing assistance continued until day 29. At this point, she was walking mostly normal. Her stumbling had decreased as well.

Weighing:

Keepers were consistent with weighing Dominique during her

Training Greater Rheas at Phoenix Zoo

Brittnye Shelley, Keeper I

We've been busy over the past several weeks with our Greater rhea flock, and have been initiating husbandry training to continue to improve their living situation. We have a rather aggressive male rhea who is extremely difficult for keepers to work around when on exhibit with him. Keepers have trained him to shift into a squeeze hallway and remain there for the duration of time his keepers are on exhibit. He caught on very quickly with the training and the shifting behavior has been successful among several different keepers, making servicing their exhibit much quicker and safer!

Our female rhea group presented us with the challenge of figuring out a way to tell them apart without using bands. We had historically used zip ties to differentiate between each of the girls, but as we all know they fall off all too quickly and getting them to stay still long enough to put a new set on without restraining them is a nightmare. We switched over to using cattle markers (All Weather HC Paintstick) on their legs instead and have had great success with that! We've been using the same squeeze hallway that we shift our male into and basically just get one girl in at a time and super quickly give each leg a few marks while standing behind them. They are still a little uneasy about the process as it's relatively new, but keepers have developed a training plan to condition them to be more comfortable with the whole thing and we're hoping within the next year to have them shift into the hallway one at a time and calmly allow keepers to mark their legs!



Above: Brittnye demonstrating the use of cattle markers to color the rhea's leg for individual identification. **Left:** Brittnye training the male rhea to shift into a holding area for easier cleaning and better keeper safety.

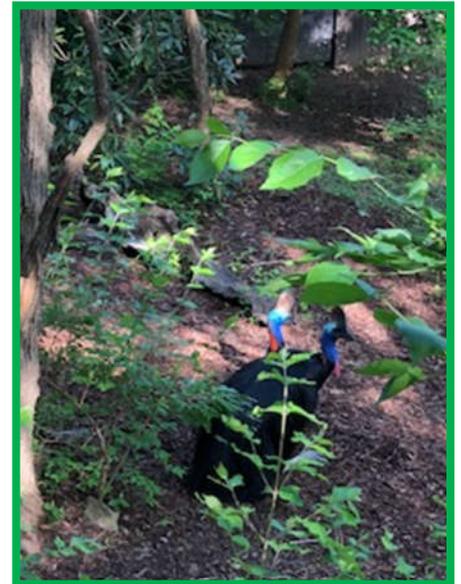
Cassowary Breeding Activities at Nashville Zoo

By Lauren Butler, Bird Keeper II



Nashville Zoo has had some successes with training as well as breeding for 2019. The training chute systems have Plexiglas panels that open to allow keepers to feed through as well as further the training to blood draws and AI in the future. Our older male, Sy, has been the most successful with chute training as well as pole syringe training for vaccinating. In the past, it has taken almost two hours to vaccinate our three Cassowaries but this year it took less than an hour mostly because of our youngest male being too stubborn yet suspicious of the vaccination pole. It takes much patience to work these birds, which you all can sympathize.

Nashville Zoo is looking forward to breeding season number 5 for Sy and Marge as well as the first season for Wren and Marge in the coming months. This past season, Sy's behaviors have become more territorial around his female and he has initiated more contact while attempting to copulate. Because Sy has been known to crush the eggs, we have been tracking when Marge will lay her eggs and will separate the birds overnight so that the keeper can then pull the eggs. We have not yet had fertile eggs for this pair but their bond has strengthened overtime. We are crossing our fingers for this upcoming season!



The youngest Cassowary, Wren, has battled a plucking problem when molting. Keepers have been able to catch the behavior quickly and keep the problem area maintained by enriching him three to four times a day as well as offering multiple feeding and training sessions which distract him from plucking further. This tactic has been very successful in aiding his feather growth, allowing him to look just as handsome as he once was.



All photos courtesy of Nashville Zoo bird department staff.



Emu Cataract Surgery & Recovery at Blank Park Zoo

By Brittany Chase, Bird and Reptile Keeper



Drizella, our 35-year-old emu that resides at Blank Park Zoo, had an existing cataract in her right eye. On July 1, 2019, her eye suddenly appeared much more cloudy than usual. Dr. June Olds, Chief Veterinarian, and Dr. Andrew Gall, Associate Veterinarian, examined the eye, finding that the cataract had caused a lens luxation. Surgery was recommended because the luxated lens was likely causing pain. Emergency surgery was scheduled for the following morning with Dr. Gil Ben-Shlomo and the

ophthalmology team from Iowa State University College of Veterinary Medicine.

On July 2, Drizella was anesthetized, intubated, and taken to the Vet clinic to begin surgery. Dr. Gil Ben-Shlomo removed the cataract by phacoemulsification. Overall, the procedure went very well. Drizella was taken back to the barn to begin anesthesia recovery in the holding stall. Her recovery was slow and at times, quite tense as she had trouble breathing on her own. After finally waking up, she became somewhat distressed, pacing in the stall and open mouth breathing. We attempted to use Haloperidol powder sprinkled over her pellets to help calm her down the first few days after surgery, but she didn't show interest in food or water during that time. She also had to be separated from her companion, Buzz, an 8-year-old male emu during the entire recovery process which didn't help her stress level. She often followed Buzz around closely due to her poor eyesight, perhaps using him as a guide sometimes.

The following day, Drizella was restrained so the vets could recheck the eye. Our maintenance team had hung up padded gym mats over the cement walls in her stall to provide a cushioned space for recovery, reduce the chance of trauma to the eye, as well as to provide padding for the numerous restraints we had to do to assess the healing process. She was prescribed Moxifloxacin and Prednisolone eye drops, as well as oral Meloxicam. Both kinds of eye drops needed to be given three times a day. This was a challenge for the keepers, as Drizella tolerated keeper presence but not taction or very close interaction, so attempting to drip drops an inch from her painful eyeball was difficult. It was crucial for her to receive the eye drops so her eye could heal properly and we were trying to avoid any more manual restraint than necessary because restraints were causing added stress and risk of trauma. For a 35 year old emu, she still put up a good fight. The more we disturbed her, the more stressed she reacted whenever we were present. She was still not showing any interest in food at this time either. If we wanted her on the right track to a full recovery, we had to be as hands-off as

possible, only restraining when the vets needed to recheck the eye.

Vet Dr. Gall had the idea to use a needle and syringe to project the eye drops onto her eye while standing at a greater distance away from Drizella, usually around a corner or behind the shift door with the lights off. Once the keepers got their aim down, this seemed to be the least stressful way to get the drops in her eye. A lot of time was spent over several weeks quietly lying in wait for the right angle to squirt drops in, but it got easier as time went. We also offered Meloxicam tablets in grapes (usually a favorite food to the emus) but she still had not shown interest in any treats or food items. We were still restraining her every few days so the vets could administer antibiotic and pain relief injections.

Five days after the surgery, Drizella was given access to the outside holding while Buzz had the outside yard so they could see each other. We hoped that by providing visual access, Drizella would feel more relaxed and possibly start eating. Unfortunately, she was still pacing and not eating. The next day, she was given access to the outside yard with Buzz in hopes of getting her back to as normal as possible would be best for her recovery. We scattered grapes, romaine, and pieces of apple around the yard. She still was not interested. On the plus side, she seemed more relaxed being back with Buzz.

Almost two weeks after the surgery, Drizella started squinting her right eye more and holding it closed. The nictitating membrane also looked a little swollen. On July 17, Dr. Ben-Schlomo came back to examine the eye. An ulcer had developed on the cornea, which was likely causing the squinting and discomfort, another challenge that was slowing her healing process.



On July 23, Drizella was restrained for the vets to debride the ulcer. Her eye was numbed, disinfected, numbed a second time, stained, debrided, then a topical antibiotic and canine serum were applied to aid in the healing of the cornea. Luckily is was a relatively quick procedure. She was started on the serum drops, along with NeoPolyGram drops, three times a day. Of course, we still wanted to avoid restraining her more than necessary, so we continued using the “squirt method” of applying the drops while calmly standing near her in the stall with the lights off. When she was outside with Buzz in broad daylight (when we needed to give her her afternoon drops), we tried to make our presence a calming one. We’d take a moment to just stand near her and give her a chance to calm down with our presence (sometimes for several minutes if she was getting suspicious) or use Buzz as a buffer in order to get closer to her since he is a more people-friendly emu. The challenge with this was that we needed to wait three minutes between each type of drops, so we essentially had to reset after applying the first drops. But making sure her eye was healing was important and all her keepers did an amazing job of being patient and diligent.



We wanted to get Drizella back to her normal routine as soon as possible. On July 26, we put her and Buzz on exhibit for the first time since the surgery. She was still receiving the two sets of eye drops three times a day, so we started with half days on exhibit. Initially, she was at least seen picking at the grass, seeming to forage, but it was unclear if she was actually eating much of it. We tracked her behavior closely, noting daily her eye appearance, if she was squinting, if she was foraging or showing interest in food, her fecal output, how she was using the exhibit space, and her overall activity level, etc.

Keepers assiduously tried every trick and recommendation to get her to eat. While we knew emus could naturally go extended periods without eating, we weren’t sure how long that was, and vets and keepers alike were more concerned with Drizella as she is an elderly emu with an already somewhat frail body condition. Keepers offered a variety of foods presented in a variety of ways. Different types of browse, romaine, apples, pears, grapes, cracked corn, watermelon... Our emus seem particularly picky, only liking a select few treats. She would sometimes show interest and pick at but not eat anything. After getting some advice and input from a couple of other institutions, concerns were slightly eased but persisted. From July 1 to July 29, she lost 7kg, going from 45kg to 38kg.

On July 30, she was restrained to have her eye examined, stained, and to apply Terramycin ointment and serum drops. The eye looked to be almost healed, although the sutures were not yet dissolved and were likely causing inflammation and irritation. This was probably the reason why Drizella was holding her eye closed again. Luckily, though, we only had to continue the eye drops for one more week. The end was in sight.

The next few days, Drizella still held her eye closed intermittently. She took small bites of grass, or eat a couple of leaves off of browse here and there, and would sometimes show interest in the various foods offered but still not eat any of it. It wasn’t until August 5 that she was seen eating about 4-5 leaves of romaine after being shifted off exhibit. This was the most we saw her eat for over a month. On August 7, she weighed 37 kg.

On August 9, Drizella was restrained to have her eye reexamined. The ulcer appeared healed. In the days following, she was seen eating every day - romaine, pellets, and browse. She was holding her eyelids open normally, and began having normal fecal output. We were relieved she was getting back to herself, even though she dropped another kilogram. It only took an anxious one and a half months to get there. It was a combined effort from every individual on the vet team and the bird team, with a major assist from Dr. Ben-Shlomo and his team to get her up and kicking again.

Drizella has since returned to normal, gaining some weight and condition back, with better vision in her eye than before. She’s regained some trust in keepers, and is back to enjoying grapes, romaine, and walking around exhibit with Buzz, sometimes even seen leading the way.



North Island Brown Kiwi SSP Update

**Kathy Brader, Kiwi SSP Coordinator
Smithsonian National Zoological Park**

This past year we published an updated Kiwi Studbook and a Breeding and Transfer Plan! This is was the first time all the data was used from ZIMS. The SSP hopes to have several more pairs of kiwi set up in the next few years with new transfers. Several zoo's reared kiwi from eggs that were transferred from the Smithsonian conservation Biology Institute, which enable new folks to get experience rearing kiwi. Its wonderful to see all the new zoos coming on board. We are currently at 57 birds worldwide and the SSP has met the sustainability threshold to qualify from 'red' to 'yellow' designation. We are now in 17 institutions worldwide and hope to welcome 1 or 2 new zoos this coming year.



This past year the SSP got 100% of our EAZA institutions approved as AZA Sustainability Partners! I can not say thank enough for our partners for their diligence for filling out all the paperwork, the photos and for letters of recommendation from several directors that made this possible! I did do some happy dances.

We are putting together our 9th delivery of Kiwi feathers for donation to the Maori weavers. This year we are trying to make this easier for European zoos by delivering to one of the New Zealand Embassies in Europe. My personal thanks to all the keepers and volunteers who pick up all those feathers, I so appreciate your dedication!



Dr. Gwen Myers from the Miami Zoo has agreed to continue as the Kiwi Vet Advisor. Dr. Myers has also agreed to write the Veterinary section for the Kiwi ACM! You can contact Dr. Myers at Gwen.Myers@miamidade.gov.

Wesley Bailey from SCBI has been working with me to help get the manual finished. I'm hoping to get it to reviewers in about a years' time, thank you Wesley!

If you think your zoo would like to participate in the kiwi program, we would be happy to grant your kiwi wish. Please contact Kathy Brader (braderk@si.edu) or Stefan Stadler (stefan.stadler@stadt-frankfurt.de) for more information.

Notes from Kiwi Keepers



Kiwi Update from Wildlife Conservation Society

by Kevin Hils

Our young female arrived from Germany in late 2018. When she cleared Quarantine, she was housed directly across from our one of our 2 males separated by a fence. We were told to hold her back because she was so young for any introductions. During the Spring in 2020, they will move to our outside holding facility that we showed under construction and preparation on the Animal Planet show, "THE ZOO". The area is a much larger space than our winter holding area. It is better to do the introduction of our young female in a large space with lots of hides and shrubbery. We hope to have similar success that we had with our last female when we got egg production but no hatches. We also have plans for a Capital Improvement Project to the area to improve the electrical power so that we can keep the Kiwi outside in the winter similar to the facilities at the Smithsonian in DC. We are hopeful for a great year in Bronx in 2020!



North Island Brown Kiwi resting in a log, photo courtesy of Columbus Zoo and Aquarium

Kiwi Introductions, Columbus Zoo

by Taylor Hann

In 2019, our young kiwi at the Columbus Zoo and Aquarium, Hari and Haka, had an exciting year of progress and growth. In July, we introduced the two brothers in our kiwi habitat. The younger (and smaller) kiwi of the two, Haka, quickly established himself as the kiwi in charge and that has not changed. They both seem to enjoy spending time together and can often be found tucked next to each other in a hollow log in the kiwi habitat.

Kiwi Breeding and Research, Smithsonian Conservation Biology Institute

by Wesley Bailey

2019 was a successful year for the kiwi program at the Smithsonian Conservation Biology Institute. Our older, original kiwi enclosures finished their renovations and we were able to return kiwi to the facility. With the renovation and repurposing of unused enclosures in 2017, this brings our capacity to new heights.

We hatched out two chicks earlier in the year, one of which hatched with a deficient left leg. However, through quick action and the use of laser therapy the matter was resolved in two weeks and she is now without issue. Both chicks will be transferred out in early 2020. SCBI also provided eggs for three other facilities to hatch and rear, two of which were sexed without complication. Between those transferred and the two hatched here, 2.3 individuals were added to the program. SCBI additionally hosted staff from three separate facilities to discuss and train in kiwi husbandry before receiving kiwi themselves. We're involved in several ongoing research projects with kiwi and have several more planned; we hope to contribute more substantially to the knowledge base for the species.

With the two hatches in early 2019 we now have thirteen kiwi – just over half of our dedicated capacity – and are looking forward to continuing to work with the program.

Wanted: DNA Sexed Male for Lovely San Diegan Lady, San Diego Zoo

By Lauren Yang

Single 'gorgeous' DNA Sexed Northern Brown Kiwi female seeking eventual partnership with handsome male of same species. Currently enjoying the lovely southern Californian sunshine at the San Diego Zoo, but willing to relocate for further propagation of the species. Hatched in early June of 2019, this feisty lady enjoyed a longer than usual stay in ovo in her incubator for SDZ, checking into the Avian Propagation Center at 30 days into parental incubation. She brings joy to her keepers and terror to fern fronds and earthworms. Enjoys a good decaying log and snooting for bugs into the wee hours of the morning. Willing to share her worms with the right male 'snoot.' Will provide the future offspring vesicle if male is willing to exclusively handle sitting duties.

Kiwi Introductions, San Diego Zoo Safari Park

By Eleanor Lovell

Background:

- San Diego Zoo Safari Park received a single male Northern Brown Kiwi ("Kaha") in June of 2017 and introduced him to his new enclosure at the off-display Bird Breeding Center. He's a May 2016 hatch and is housed in a heavily planted pen measuring 20'x16'x10'.

A little more than a year later we received a female Northern Brown Kiwi ("Roa") in October of 2018 into a duplicate pen adjacent to the male's but separated by a single layer of wire. She is just a few months older than him, having hatched in February 2016.

Introductions:

- They were initially introduced to each other February 16, 2019 and February 17, 2019 but did not appear very receptive towards one another and were separated again. For the next few months they were moved in and out of each others' pens with access to the others' burrows without placing the 2 of them together.

- A second round of introductions began November 6, 2019 and there were improvements in the way they interacted with one another. They were together, supervised via video monitors, Nov 6/7 and 7/8, again Nov 15/16 and 16/17 and then Nov 20/21 and 21/22.

During the initial intros in February the male was heard calling but there was no response from the female. During the 2nd, most recent intros the female often called with the male responding. No copulations were observed and, due to their tendency to fight with one another inside the burrows they have not been put back together or left unsupervised as of this time.

Zoo Zlin, Czech Republic

by Vaclav Straub

Gerry has had the issue with his left eye during the spring time. His eye was swollen and red and he started to be apathetic with lower food intake. After consultation with Kathy Brader, Christina Geiger and our vet, we found out that it could be a tick allergy (there were some ticks on the Gerry's orbital skin). We treated him by eye ointment (Floaxal) and antibiotics (Enrofloxacin). The problem was overcome after 3 months and since summer he is doing very well.



Gerry at Zoo Zlin, Czech Republic. Photo courtesy of Zoo Zlin.

Kiwi Update from Frankfurt Zoo

By Dr. Christine Geiger

Breeding season started in October 2019. 0.1 FELICITAS had been moved into her "husband" (KELSEY) enclosure on 21st October. She laid her first egg of the season 48 days later on 8th December, 2019, and the 2nd egg on 1st January, 2020. FELICITAS was moved back to the "females department" on 2nd January, 2020.

On that same day (21st) in October, our new breeding pair - KAYTEE x MAHURU – was re-united. MAHURU laid her first egg of the season on 10th December, 2019 (after 50 days). As KAYTEE had shown himself to be a less reliable brooder last season, we decided to change eggs around between the males. MAHURU's first egg was, thus, given to experienced KELSEY for incubation immediately on day 1, and FELICITAS' 1st egg was moved in exchange to KAYTEE. Unfortunately, he did not seem to be convinced of his job and did not start sitting tight on this egg. After the arrival of MAHURU's 2nd egg on 3rd January, 2020, this egg was also given to KELSEY, and FELICITAS' 2nd egg from two days before was given to (reliable in the past) 1.0 APTERYX for incubation. MAHURU was moved out a couple of days after laying her 2nd egg.

Despite the fact that our youngest female, PUAWEI, did not show any signs of being in breeding mood, she was, nevertheless, moved to HARI on 12th November, 2019. Forty-five days later she laid her first egg ever! J and a 2nd egg on 20th January, 2020! She is doing fine and we did not observe her having any problems with egg deposition. After two days of recovery she will also be moved back to the females area to stop her producing more eggs.

So far we have not been able to confirm fertility in any of the eggs laid. FELICITAS' 1st egg has been removed at day 36 as KAYTEE had stopped incubating at around 1st January. This egg had already been smelly when it was checked and has not been fertile. Also, this egg was very small in comparison to the eggs FELICITAS has been producing over the years.

A sad story is the loss of two kiwis in the course of the last two months.

First, young TAPU (from KELSEY x FELICITAS) died on 19th December, 2019, quite obviously from predation by a stone marten (*Martes foina*) in a newly constructed outdoor enclosure that is now being adapted to a much smaller mesh size (up to that point, we had only been aware of house cats in this area and they have been kept out successfully).

The 2nd loss – and this is much worse – was the death of 1.0 KAYTEE on 13th January, 2020. He was found dead in the outside section of his enclosure without any signs of fighting or similar in the middle of his usual path ("runway"). He was not found hiding anywhere under a bush or other structure - he looked as if he had just dropped dead. Today (20th Jan) we received some preliminary Post Mortem results showing no abnormalities and a very good body condition. We will have to wait for histology and/or infectiology results.

Left to right: Hari incubating his first ever egg, view of Hari in the nestbox, Hari headed 'back to work.'



North Island Brown Kiwi at Pinola Conservancy

By Jacob Kraemer, Director



March of 2018 was a month of significant achievement for the staff of Pinola Conservancy as we became officially certified as a related facility with the Association of Zoos and Aquariums; an achievement that we are immensely proud of. With this newly minted certification came another opportunity for achievement as Kathy Brader wasted no time (same day) in asking me if we would be interested in potentially working with the North Island Brown Kiwi program. Being asked to participate in such an important program was not something I was expecting that day but was enthusiastic, and quick, to say yes.

In July of that same year, a potential opportunity presented itself for us to acquire a young male kiwi, named Rongo, from The Frankfurt Zoo in Germany. After working out the logistics, we were able to confirm his pending arrival to Pinola via an import facilitated by the Wildlife Conservation Society; with USDA quarantine beginning in September. During this period, we wasted no time in our preparations. A brand new exhibit was built to the required standards near our cassowary enclosure. I was able to visit the Frankfurt Zoo and meet with Rongo's primary caregiver, Dr. Christina Geiger, who proceeded to give me a crash course in kiwi management and husbandry! When Rongo arrived at Pinola on October 19, we were nervous but as ready as we could possibly be!

As any of you who work with kiwi already know, they are wonderful and endearing animals but present a unique set of circumstances and care guidelines to you and your staff. They were completely unlike anything else we were working with at our facility at the time. Luckily, our vet tech, Jessica Cockrell, instantly fell in love with Rongo and became his primary caregiver and he has since become an adopted son of hers. Jessica has been brilliant in her care of Rongo; keeping him happy and healthy and overcoming a few (very tough) obstacles he had presented to us in the early stages. She has become our resident ratite expert and is doing an amazing job! This past year, she made the drive from Shreveport up to SCBI to receive a fertile egg; a male, named Toro, who subsequently hatched here on May 21, was hand-reared without any issues, and is now a feisty teenager! Both kiwi were housed indoors through the hot and humid Louisiana summer but are now currently living adjacently in their outdoor enclosures enjoying Louisiana's night life



Top: Kiwi habitat, **Above:** Rongo, **Left:** Toro on hatch day



Our eventual goal is to be an active participant in the breeding program and we are hopeful to receive another egg, a female, this season. This has been a rewarding experience for the entire staff at Pinola. As the director, it has been a joy watching one of my staff find their true love in aviculture and then achieving success in it. We are honored to be working with such a culturally important species and hope for continued success, and more kiwi, in the years to follow.

World Cassowary Day 2019

Larkin Johansen
Enrichment Coordinator
& World Cassowary Day Liaison



Close your eyes and follow the sounds of the digeridoo to transport yourself to the 'Land Down Undah!'

...And that's just what our guests did this year for World Cassowary Day!

On September 26th zoos around the country celebrated World Cassowary Day by putting together educational booths and sharing information with their guests about our favorite living dinosaurs.

This year, Jacksonville Zoo and Gardens promoted plant awareness to build habitat locally as well as sponsor reforestation in the Daintree Rainforest. As proud supporters of Rainforest Trust Australia and their fantastic work creating habitat corridors to reconnect cassowary populations, we came up with "Buy a Tree, Plant a Tree". Guests had the opportunity to purchase a native holly tree for their own backyard, and their purchase sponsored the planting of a tree to expand cassowary habitat. Thus, building habitat for our native wildlife here while building habitat for cassowaries there. Upon their purchase guests received a button, "Plants are not optional" and were able to scoop their own "zoo poo" compost to fertilize their new plant(s).

Cassowaries play a critical role in the rainforest and have garnered the nickname "Gardeners of the Rainforest," from their unique ability of seed dispersal. From ingesting the fruit of the parent plant and then dropping the seed up to 3km away in a pile of scat, which acts as a natural fertilizer.

Unfortunately, as a result of expanding rural residential development on surrounding freehold land, cassowaries are subjected to significant threat from habitat loss, increasing traffic, and domestic predators. Rainforest Trust Australia manages the Benella Rainforest Reserve, a 32-acre reserve providing a safe predator-free zone with high quality foraging grounds through their habitat enrichment program. The habitat enrichment program supplements existing restoration plantings with known preferred food species which are grown in their local provenance nursery. The nursery, as of 2018, was producing around 15,000 rainforest trees per annum and providing quality seedlings for numerous restoration sites throughout the Daintree lowlands. Rainforest seeds and seedlings that germinate under parent trees are collected, propagated, pampered, and planted by RTA's Daintree Conservation Officer, Golly Watson and volunteers. Over the last two years 6,160 trees have been planted with another 4,440 trees planted during the 2018-19 wet season.

Flora species within the Daintree include the richest assemblages of ancient flowering plant families on the planet with twelve of the nineteen known ancient plant families occurring there. A number of these ancient flowering plant species have been planted in the north-eastern corner of the property, further enhancing the biodiversity of the site.

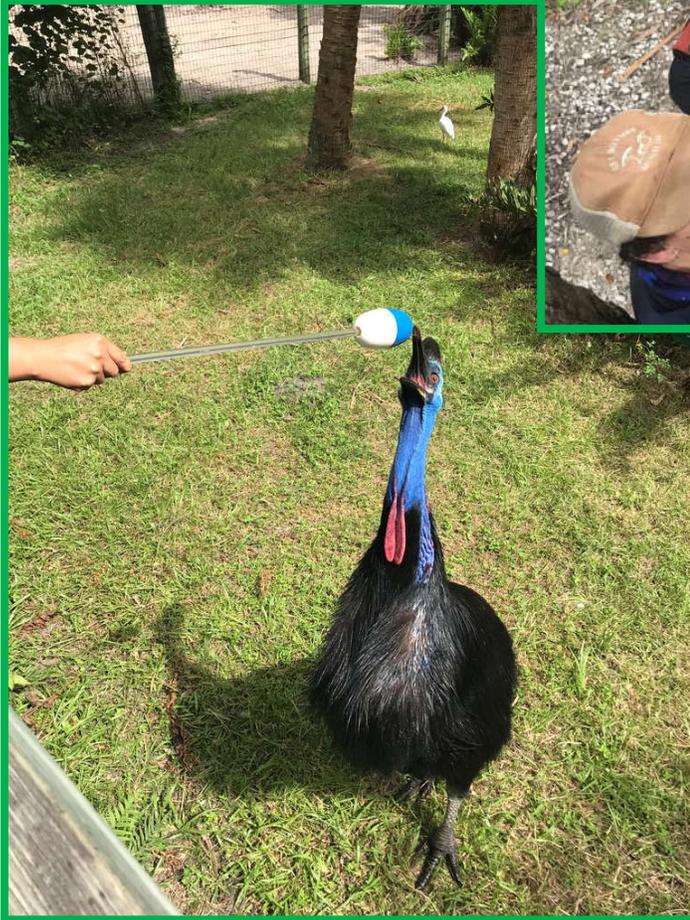


Brevard Zoo staff celebrating World Cassowary Day 2019 and proving that cassowaries bring people together!

World Cassowary Day at Brevard Zoo

Right: Brevard Zoo Staff celebrate World Cassowary Day 2019 with a cassowary hand stamp (close-up view on previous page.)

Below: A keeper and cassowary participating in a training demonstration.



Below: Guests of all ages can have fun learning about cassowaries via biofacts, infographics, and coloring sheets.

Bottom Left: Special enrichment is a perk of being the star of WCD!



Cecil's Corner

By Monica Halpin, Lead Keeper

Cecil's Corner is back to celebrate a major milestone in the life of everyone's (ok, Zoo Atlanta's) favorite cassowary! Cecil turned the BIG 4-0 in August! And, of course, we threw him a party fit for a king!

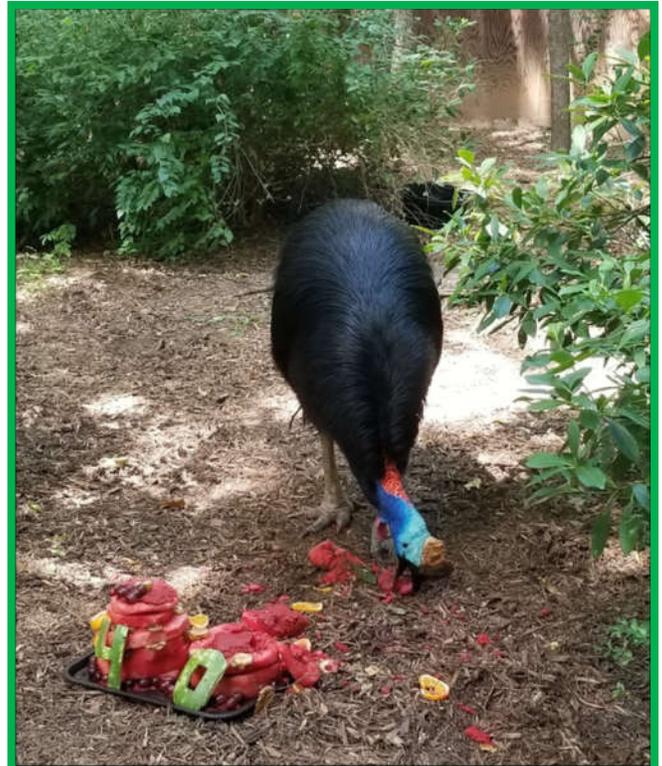


There was designer fruitcake



A giant card for everyone to sign

**Happy 40th
Hatchday,
Cecil!!**



And fun for all, but especially for Cecil!

Field Conservation

North African Ostrich Recovery Project: Setting Up New Facilities

Sahara Conservation Fund



In partnership with the Wildlife Conservation Network (WCN), Kellé, Niger, created by SCF a few years ago. SCF's ambitious goal to reintroduce the species into the wild. The recent installation of a solar-powered hatchery and incubation unit is now allowing the organization to get closer to this goal.



The containers have been successfully brought from the United States to Niger. The first is dedicated to the incubator, the second to the hatchery, the third is an office and a fourth one of all houses of the electrical equipment. A 2-week mission has been made to improve these facilities. In addition to SCF staff and members of WCN, the team is working on a system of operations.

The 110 solar panels on the containers, including 5 air conditioners – which are absolutely crucial to ensure optimal performance of the infrastructure.

Adequate humidity level is also mandatory to ensure successful incubation. That's why pipes were used to connect the containers to a water drilling site located about 1 km away.

A satellite system will also be set up by the US-based engineers.

These facilities are expected to increase the ostrich birth rate, but also improve the working conditions on site. A good news for everyone!



Sharing Experience of Adult Ostrich Translocation

The endemic North African ostrich returned to one more protected area in Tunisia

Dr. Marie Petretto | Marwell Wildlife, UK

Mr. Ezzedine Taghouti, Mrs. Hela Guedara | Direction Générale des Forêts, Tunisia

As part of continuing efforts to restore the Tunisian aridlands and return declining endemic wildlife, Tunisia's Forestry Directorate (DGF, Ministry of Agriculture) and Marwell Wildlife (www.marwell.org.uk/conservation) have cooperated in 2019 to release a flock of North African ostrich *Struthio camelus camelus* in Bou Hedma National Park.

Established in 1980, Bou Hedma National Park (N34° 27" – 34° 32"; E9° 23" – 9° 41") is one of the oldest protected areas of Tunisia. The site has been exceptionally well preserved and represents a rare example of the Maghreb's biological diversity as it was a century ago. This remnant pre-Saharan steppe was naturally selected to be the first reintroduction site for scimitar-horned oryx *Oryx damah* nearly three decades ago and it is recognized as a Key Biodiversity Area (KBA) for conservation (Birdlife World Bird Database).



Figure 1 : Released ostriches in Bou Hedma landscape. Photo by Brendan Walsh, Dublin Zoo

We previously reported the establishment since 2016 of small breeding flocks of ostrich in Dghoumes (near Tozeur) and Sidi Toui (near Ben Guerdane) national parks, with a source population established in Orbata National Reserve (Gafsa). This year, we are sharing our experience on three translocation operations that were carried out in spring 2019 to release adults and sub-adults into Bou Hedma. (Figure 1)

This translocation was the result of a long preparation phase that emphasizes the benefit of integrated reintroduction initiatives. Because the last wild ostriches had disappeared from North Africa by the end of the 19th Century, this species receded from the collective consciousness: the park staff and the neighboring communities did not know how to share their environment with these large, potentially aggressive, territorial birds. The Tunisian authorities decided to undertake a trial ostrich reintroduction in the 1990s, using common ostriches, in order to evaluate the habitat suitability for the species requirement as well as familiarize the park staff with ratite behavior and husbandry. During the subsequent nearly 25 years, common ostriches populated the site, yielding much information about their ability to inhabit the Mediterranean semi-arid ecosystem, comprised of seasonal watercourses and acacia steppe, without any active management. And even more importantly, this information has been retained in the ecological knowledge of local people, as demonstrated during workshops we held recently with the park staff as a prerequisite of the current reintroductions (Figure 2).

Moving untamed adult ostriches is a challenge and the decision to proceed has to be made taking into account risks and benefits. Very little is published on such operations, and most data available are from farmed animals. A number of important lessons have been learnt during the process and we are happy to share these to help and plan further translocation operations for reintroduction purposes.



Figure 2 : training workshop held with the park staff of Bou Hedma National Park, as part of the North-African ostrich reintroduction

Animal selection and preparatory work

In 2016, the DGF has decided to enact its North African Ostrich conservation strategy and removed the common ostrich flock from Bou Hedma. The reintroduction of the endangered sub-species has been planned, taking into account the harsh climatic conditions and the predation pressure as major threats for the released captive-bred birds. Our on-going monitoring in Dghoumes and Sidi Toui national parks taught us that young ostriches are unlikely to survive to these unpredictable events, particularly if they are in small numbers.

We also learnt that hand-reared ostrich chicks released at adulthood often do not display all expected natural behaviors, particularly regarding foraging, nesting and parental cares.

Building on these observations, it was decided that the best option would be translocating a group of adult-sized animals (adults and sub-adults). The founders were selected from Orbata, a National Reserve located 100km away in the natural range of the species, where a captive population is maintained. There, ostriches are grazing on natural pasture and receive food supplementation daily; predators are excluded from their environment allowing a highest chick survival than in natural conditions (Figure 3, next page). The selected animals displayed a high vigilance and could not be approached, what was chosen as a good defense indicator.

In anticipation of the animal transfer, a large acclimation pen was built in Bou Hedma where the translocated birds would remain before their full release. Acclimation is an important phase that allows to progressively expose animals to novel environmental factors: the behavioral changes would be observed in conjunction with habitat conditions.



Figure 3 : Source population of North-African ostrich gathering along the feeding trail in Orbata National reserve

Source population and Capture

Despite being fed daily, the captive ostriches in Orbata were not tame and were not habituated to being approached by humans: this rearing strategy aims at maximizing the chances of producing behaviorally and physically sound offspring. They are however habituated to the feeding process where a tractor drops the food supplementation in feeders along a trail. A capture boma (50 x 30 meters, 2m-high wire-fence) was built around a part of this trail incorporating six feeding points, and the birds were closed in when they came to eat. We recorded greater cautiousness from the oldest individuals that did not enter the boma during our capture attempts. We anticipate that establishing permanent infrastructure with greater habituation should help further routine operations.

Once in the boma, chemical immobilization was attempted using Xylazine (estimated dosage 1mg/kg) alone or in combination with Ketamin, being the only drugs available. Xylazine is also used with farmed ostriches for the induction phase allowing operators to handle the animals. However, here the birds did not become recumbent, either due to the inability to properly inject in the muscle, low dosage or animal stress.

For the following attempts, physical restraint using mobile nets helped to hold the animals: the method was efficient but stressful and potentially harmful in the current setting. Neck injuries and myopathy were recorded. We concluded this technique could be recommended to restrain the animals in conjunction with soft blind fencing, in a space where they are not able to speed-up.

The animals became very calm and handleable once held securely and a blindfold was put on. They were walked into individual crates and transported to their destination on a lorry: travel duration was about 1.75hours, for a total operation time from capture start to release in the acclimation pen of approximately 3 hours.



Figure 4 : North African ostrich translocation from Orbata National Reserve (Gafsa) to Bou Hedma National Park (Sidi Bouzid), in May 2019, Tunisia

We recommend to release the animals from the crate as soon as possible as repeated scratching on the wooden wall can cause severe skin abrasion. Acepromazine (0.25 mg/kg) was used as tranquilizer on some individuals but did not prove to have any benefit; in particular, one tranquilized individual showed difficulty to keep its balance in the crate and had more skin lesions than the other birds (Figure 5). While it could be an individual reaction, we decided not to tranquilize anymore and monitored good welfare conditions.

Acclimation

At the destination site, we had anticipated several challenges to be faced by the translocated animals. The new habitat features comprising low thorny trees, rocky terrain and wadi depressions have been considered as highly risky for animals that never had to move in such environment. Therefore, the animals were first kept in a large pen comprising acacias but little number of rocks for acclimation (Figure 6); external disturbance was reduced at maximum to avoid scaring the animals before they learn the how to avoid injuries. Despite precautions taken, a severe neck bleeding and a broken leg were recorded in the first weeks after translocation.

Release

The year was particularly dry: the total local rainfall was less than 50mm since January 2019 (www.infoclimat.fr) and the pasture was lacking. During drought, foraging becomes a challenge for wild herbivores and the predation pressure tends to increase. Because of their inexperience, the animals were kept in the vegetated pen until the end of the summer until a more diverse forage was available across the park assisting their dispersal.



Figure 5 : Skin abrasions on an adult female North African ostrich caused by waddling in the transport crate after chemical tranquilization with acepromazine



Figure 6 : translocated flock of North-African ostriches in acclimation pen (Bou Hedma National Park, Tunisia)

As done in the other Tunisian protected areas, a soft-release strategy was implemented: 30 meters of the acclimation pen fencing was removed and an empty feeder moved outside (Figure 7). The animals were initially reluctant to exit the pen. After a month of without success, the two youngest sub-adults died, and the post-mortem revealed severe hydrocachexia. It was not possible to monitor if all animals had equally access to supplementary food during acclimation, and it is suspected that the smallest individuals have been denied resources by the older dominant adults. Since the pen was opened, no further food was supplied. Following the sudden death of the two birds, it was decided to drive the remaining ostriches out of the pen. Since then, two social groups have formed, apparently age-based, promising the formation of breeding pairs in the coming months.

This operation highlights several practicalities that should be considered in the planning of wild ostrich translocations. The preliminary results of the North African ostrich reintroduction in Tunisia support the fact that rewilding these birds in aridland requires close attention to be paid to behavioral parameters. The life experience of an individual is determinant on its ability to adapt to its environment and moving flocks facilitates acclimation.



Figure 7 : Soft release preparation in Bou Hedma National Park (Tunisia); the wire fence is opened to let the translocated North African ostriches disperse within the wider protected area.

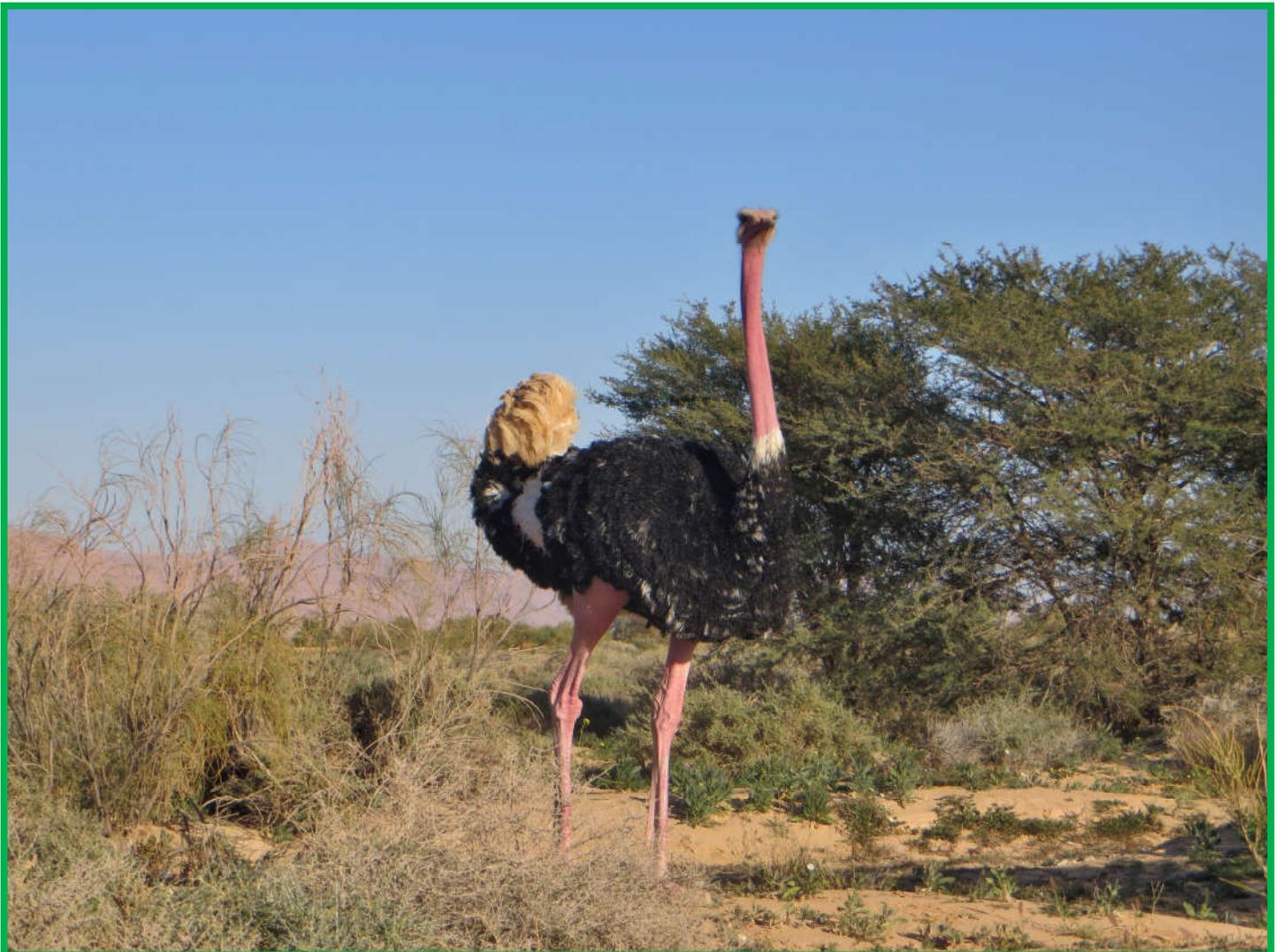
Tunisia is committed to catalyze a regional effort to deliver toward its return in their natural habitat as part of the International Sahelo-Saharan Conservation initiatives. Find out more about the Outcomes & outputs of the Tunisian reintroduction program in previous *Ratite Review* of the AZA Struthioniformes TAG and in Marwell's last technical report (https://www.marwell.org.uk/media/other/ostrich_tunisia_report_may2018.pdf).

With one more Tunisian protected area repopulated today, we aim to secure further healthy semi-wild populations of this endangered sub-species across its former range. In 2020, we will put particular effort to support capacity building in Orbata National Reserve. This key-site within the species national management plan was built in the early 1970s and needs to be improved to consolidate its position as source population.

Marwell Wildlife's 2020 fundraising campaign will target specific key-deliverables regarding the infrastructure of this reserve that are inevitably becoming obsolete and unsuitable for the best standards of wildlife reintroduction. Training and more expertise need to be brought in the local teams.

Specifically, we are seeking \$20,000 to rebuild or undertake basic repairs to animal enclosures and provide isolation areas for animal management. Facilities for veterinary procedures are urgently needed, which we estimate to cost \$15,000 to reach a minimum standard. Continuing recruitment and training of personnel, especially from local communities, requires constant investment, for which we will be seeking \$7,000 annually. Water drilling and solar panels will be necessary to improve the pasture and increase the carrying capacity of the site. Your generous financial or in-kind support for this work will be greatly appreciated.

Figure 8 : a semi-wild North African ostrich (*Struthio camelus camelus*) in its natural habitat in Dghoumes National Park (Tozeur, Tunisia)



Ostriches In North-Eastern Ennedi, Chad

By Yves Gauthier

We have been travelling in Northern Chad since 2012 to list rock art sites as well as monuments and ancient human settlements. This led us to visit areas with little or no passage at all, except by nomads or traffickers, and to observe the flora and fauna. Until now, we had never heard of ostriches in Chad except those in Zakuma National Park, much further south.

Dragesco-Jaffé mentions ostriches in Ennedi but they disappeared a long time ago, the species being eradicated by intensive hunting in northwestern Lake Chad (1993: 149) and elsewhere. This author then places the Northern limit of the species distribution range at 20 ° for Niger and the extreme east of Chad and 23 ° for North-Eastern Sudan (ibidem: 146).



Fig. 1 and 2: two ostrich tracks © Yves Gauthier



Fig. 3: In red: large ostrich / In pink: small ostrich / In blue: hare droppings / In black: stripped hyena / In green: fox © Yves Gauthier

To our knowledge, there has been no mention of the presence of this animal, in Ennedi, for at least a decade.

It was therefore quite unexpected, on February 7, 2018, to discover fresh tracks of ostriches in the NE of this massif, north of the 23rd parallel and so close from the Sudanese border. Based on the strong winds, these tracks had been left the same day in the morning. The photos show the tracks of a large and a small ostrich (Fig 1-2).

Our local guide, Idris Barkai, has been seeing ostriches (adults and young) in this area since his early ages (for about 30 years). According to Idris, these animals commonly visit this area in the morning looking for food and then head further East. We did not try to spot them to find out more, but, of course, it would be interesting to know about the size and composition of this ostrich herd.

This is therefore a small relict population, certainly the last representative of the species still living in Northern Chad. Unfortunately, like their conspecifics in Niger and Kanem, these ostriches are about to extinct. The local people have indeed confirmed that the animal is still hunted for its meat.

At a time when the rate of extinction is accelerating, for Saharan species as for many others, and in a context of ongoing attempts to reintroduce ostriches or addax in Niger and Chad, it seems crucial to me to have studies being carried out, measures taken rapidly, and to preserve the genetic heritage of this small population.

“I like **BIG BIRDS** and I can not lie.”
- **MC Hammer**, probably



Photo credits: **Brown kiwi** - Jessie Cohen; **Greater rhea** - Meghan Murphy; **Emu** - Angela Blommer; **Southern cassowary** - Mike Taylor; **Ostrich** - Colleen Baird