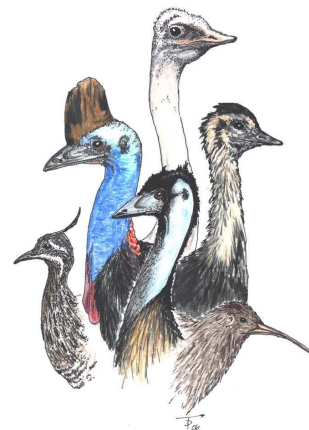


# The Ratite Review



THE RATITE TAG'S ANNUAL NEWSLETTER 2010

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Welcome to the first newsletter of the AZA Ratite TAG! The Ratite Review covers all the happenings of the ratite TAG within the past year. The newsletter is edited by the Ratite TAG Keeper Representative, Monica Halpin, Zoo Atlanta. Ideas for submissions can be sent to Monica any time during the year at mhalpin@zooatlanta.org. Thank you to everyone who submitted for this year's newsletter. Happy reading!

Sara Hallager, Chair, AZA Ratite TAG

## Regional Collection Plan Published!

The 2010 AZA Ratite TAG Regional Collection Plan was recently published. It can be downloaded at [www.aza.org](http://www.aza.org) or you can request a copy from Sara Hallager, hallagers@si.edu. This version of the RCP includes a TAG Action Plan, an Education Plan as well as an Action Plan for every species. It is a great resource for managing your ratites.

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# 2010 Ratite Hatchings



Photo courtesy of Sara Hallager

One female greater rhea chick hatched at National Zoo



Photos courtesy of Kathleen Brader

Two female Kiwi chicks at National Zoo

## Out and About With Ostrich

### New DNA Evidence for Ostrich

Phylogeographic analysis of nuclear and mtDNA supports subspecies designations in the ostrich  
(*Struthio camelus*)

Joshua M. Miller • Sara Hallager • Steven L. Monfort • John Newby • Kelley Bishop • Scott A. Tidmus • Peter Black • Bill Houston • Conrad A. Matthee • Robert C. Fleischer

#### Conservation Genetics

We investigated the phylogeography and subspecies classification of the ostrich (*Struthio camelus*) by assessing patterns of variation in mitochondrial DNA control region (mtDNA-CR) sequence and across fourteen nuclear microsatellite loci. The current consensus taxonomy of *S. camelus* names five subspecies based on morphology, geographic range, mtDNA restriction fragment length polymorphism and mtDNA-CR sequence analysis: *S. c. camelus*, *S. c. syriacus*, *S. c. molybdephanes*, *S. c. massaicus* and *S. c. australis*. We expanded a previous mtDNA dataset from 18 individual mtDNA-CR sequences to 123 sequences, including sequences from all five subspecies. Importantly, these additional sequences included 43 novel sequences of the red-necked ostrich, *S. c. camelus*, obtained from birds from Niger. Phylogeographic reconstruction of these supported clades containing *S. c. camelus/syriacus*, *S. c. molybdephanes*, and *S. c.*

*massaicus/australis*, respectively.

The 14 microsatellite loci assessed for 119 individuals of four subspecies (all but *S. c. syriacus*) showed considerable variation, with an average of 13.4 ( $\pm 2.0$ ) alleles per locus and a mean observed heterozygosity of 55.7 ( $\pm 5.3$ )%. These data revealed high levels of variation within most subspecies, and a structure analysis revealed strong separation between each of the four subspecies. The level of divergence across both marker types suggests the consideration of separate species status for *S. c. molybdephanes*, and perhaps also for *S. c. camelus/syriacus*. Both the mtDNA-CR and microsatellite analyses also suggest that there has been no recent hybridization between the subspecies. These findings are of importance for management of the highly endangered red-necked subspecies (*S. c. camelus*) and may warrant its placement onto the IUCN red list of threatened animals.



### American Ostrich Association

The goal of the American Ostrich Association [AOA] <http://www.ostriches.org/> "is to establish the standards for the highest quality American Ostrich products to ensure the long term viability of the industry." Although primarily focused on the production of birds for human consumption, AOA has been of tremendous assistance to the Ratite TAG by providing husbandry advice to the Ostrich Recovery Project in Niger. AOA has provided advice on incubation, chick rearing and diet. They have also helped several zoos locate birds for their collections. They are an extremely valuable resource to the TAG and their ostrich expertise is unmatched. Thank you AOA!

## Red-necked Ostrich Conservation Project by Scott Tidmus, Disney's Animal Kingdom



One of the projects that the Ratite TAG is working on is the breeding and re-introduction of red-necked Ostrich (*Struthio camelus camelus*), into the North African country of Niger. This desert population of ostrich was once a staple species in the desert and termit regions of Niger and over the past two decades has been eliminated from the wild due to human conflict and civil unrest. The Ratite TAG began working on this project in 2008 in partnership with the Sahara Conservation Fund (SCF) to evaluate and assess the current captive population of ostrich in Niger. Many individuals have worked to keep the species alive in a captive environment with a hope of one day seeing them back in the wild. It is this captive population that the TAG is working with and partnering to accomplish the goal of re-introduction.

In May of this year I was fortunate enough to travel to Niger and work on the construction of a new breeding center near the small village of Kellé. For those not familiar with the geography of Niger, Kellé is a small village in the east central region and is home to one of the most valuable collection of red-necked ostrich for our project. It is also a community that has land set aside for a breeding center as well as a release location. So for our project it is the hub of conservation for red-necked ostrich. The community of Kellé is a supportive group and they are very interested in these birds and look forward to seeing them running free in the surrounding habitat in the years to come.

Once arriving in Niger, after a few weeks delay due to the volcano activity that shut down Europe, I spent a few days in the capital city of Niamey reviewing the work that is happening in this area. This is where we have set up an incubator as well as working with the local collection of birds to assist us in developing a breeding population. Niamey is important as it has the most consistent electricity service in the country.

I was pleased to find that we had several ostrich chicks already on the ground. During my time in Niamey I also worked with the keepers there to adjust the incubator and make it more efficient and make sure the temperature settings were adequate for our purposes.



Four chicks on the ground in Niamey

Departing Niamey, I then traveled two days to Kellé and met with the field worker who is organizing the ostrich work there. Dylan Burress is a Peace Corp volunteer that has been assigned to work with SCF in Kellé. Dylan is from Virginia and has been instrumental in getting the diets adjusted based on local food stuffs as well as setting up for the construction of the breeding center.

We spent the next few days working with a surveyor to lay out the pens. This was a very large undertaking as we needed to make the pens level and square. We then began installation of the fence, which was done with material donated by Larry Johnson of Safari Enterprises in Texas. We hired a crew of workers from the community and without their hard work we would not have been able to do the work as well or as quickly. We were able to accomplish the construction of the first set of pens within the first two weeks, with a few doors being installed.



Hanging pen doors



Kelle Chief and Work Crew

The trip was amazing as we had four chicks on the ground at a site near Niamey; and the group in Kellé was showing signs of breeding, with one egg on the ground at the time we were there. The weather was the biggest factor with day time temperatures reaching 140F. This meant that we worked from 6:00 AM until around 1:00 PM with a break for lunch and rest followed by finishing the day from 4:00 to 6:00 PM.

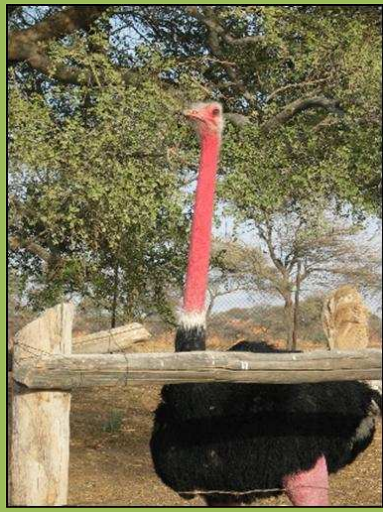
With the completion of this first pen section the birds are now at home in their new center and we look forward to a successful breeding season this coming fall-winter-spring. The project will continue to grow and the Ratite TAG will continue to work with all of our partners in Niger to be successful.





## SAVING THE BIGGEST BIRD ON THE PLANET:

### The Adopt-an-Ostrich Program in Niger



**THE biggest bird on the planet** is on the verge of going under in the silent tide of extinction that has been rolling across the Sahara. Once quite common across the Sahelo-Saharan zone, the Saharan race of the red-necked ostrich (*Struthio camelus camelus*), largest representative of its species, has been extirpated across 95% of its range. Within Niger, the bird has been deemed functionally extinct, with only a single male still rumored to exist in a remote valley within the Āir Mountains to the north.

**Zoos are uniquely positioned to do something about this crisis.** Fortunately, there are still roughly 100 pure-bred *S. c. camelus* in small privately-held captive flocks scattered across Niger. Niger is an exceptionally poor country, but with some modest assistance the Nigeriens caring for ostrich can substantially improve the chances of these birds breeding successfully and rearing young. Given how productive ostrich can be, there is every reason to believe that with the right material and technical support, Niger can

breed desert ostrich and return them to the wild in relatively short order.

**The AZA Ratite Taxon Advisory Group** has been championing the recovery of the Saharan race of the red-necked ostrich *Struthio camelus camelus* in Niger since 2007 in partnership with Sahara Conservation Fund (SCF). Through SCF, we are part of a public-private partnership with the Republic of Niger and a consortium of private local breeders (CERNK) that was launched in an effort to breed some of these birds with an eye towards producing chicks for eventual reintroduction. Significant improvements to the ostrich breeding pens in Kellé, Niger were completed in 2010. We are now focusing on substantially improving the diet and promoting natural incubation until such time as we can develop the capacity in Niger to manage artificial incubation and chick-rearing operations.



**Let your Zoo's ostrich become an ambassador!** This is a great opportunity for all of us to make a connection between our zoo ostrich and the conservation of the largest bird on the planet. The AZA Ratite TAG has developed its **Adopt-an-Ostrich Program** to support the acquisition, care and feeding of pure-bred Saharan ostrich in Niger; to help maintain the ostrich facilities; and to improve capacity for ostrich management. With your help, we can get Saharan ostrich back on the road to recovery in Niger.

**\$500 will cover the care of one ostrich in Niger for a year.** Our goal is 100% participation by all zoos holding ostrich, at whatever level each can contribute. We can provide each contributing Zoo with photos and background information to

help them promote their ostrich conservation efforts to the public. Please consider making a pledge today and add your Zoo's voice to the growing chorus speaking for the conservation of the Sahara's Wildlife. A pledge form has been provided for your convenience. Thanks in advance for your support!





## PLEDGE FORM

FROM:		
To:	Sahara Conservation Fund	
DATE:		
PURPOSE:	Support for the AZA Ratite TAG/SCF Adopt-an-Ostrich program in Niger	

- ☐ (insert institution name here) wishes to adopt an ostrich for one year for the sum of \$500  
 OR  
☐ (insert institution name here) would like to pledge the amount of \$\_\_\_\_\_

Please make check payable to <b>Sahara Conservation Fund</b> and mail to:	<b>Sahara Conservation Fund</b> c/o Karen Sausman, Treasurer 60-450 Hop Patch Springs Mountain Center, CA 92561 USA
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Or wire funds to: Wells Fargo Bank 27630 Ynez Rd Temecula, CA 92591 USA	
SCF Bank Account No.:	2681061277
SWIFT Code:	WFB1US6S
US Interior Transfer Prefix:	121000248

Thank you again for your support.

Sincerely,

Karen Sausman, Treasurer  
Sahara Conservation Fund

Thank you for your support. The Sahara Conservation Fund is a not-for-profit organization exempt from federal income tax under the provisions of Section 501(c)(3) of the Internal Revenue Code. Contributions to the Sahara Conservation Fund are tax-deductible in accordance with the law.



# Time for Training!

## Ostrich Training at North Carolina Zoological Park by Dana Urbanski

The North Carolina Zoological Park houses three nine year old female ostrich in the Forest Edge exhibit. The ostrich are accustomed to coming into designated holding stalls every morning to eat grain. The ostrich remain in holding for approximately 30 to 45 minutes. Training is done after the ostrich have eaten and training sessions are 5 to 10 minutes long per individual.

A formal training program for these ostrich began in August 2005. The first training project was to "hood" the ostrich. "Hooding" became a priority so that annual physical exams could be done without using baffle boards and physical restraint. Within a year the ostrich were acclimated enough that the hood became unnecessary. Over the last five years the ostrich have been trained on several other medical husbandry behaviors.

Scale training – the ostrich walk through the stalls onto a platform scale and monthly weights are taken on each ostrich.



Physical exam training – keepers can hold out a wing while vet staff draw blood from the wing vein, vaccines can be given as well. In addition, the ostrich have been desensitized to a radiograph plate being placed near the head, neck and leg.



Leg and foot desensitization – the ostrich have become accustomed to being touched from their upper thigh all the way down to their feet. A foot target was added so that the ostrich would lift their foot onto a platform.

Currently the ostrich are being trained on two new behaviors "eye" and "mouth". The ostrich allow a pen light to be shown in their eye while a keeper's hand is placed behind the head or on the neck. The goal is to have the ostrich hold its head still to allow an actual eye exam. The goal for the second behavior is to have the ostrich open their mouth and eventually hold it open for an exam. Both behaviors use verbal commands and hand signals and the ostrich are rewarded with apple pieces.

Training has proved to be a very useful tool with the daily management of the ostrich. They can be "targeted" past new objects and leg bands can be changed without restraint. Injuries can be treated safely and reliably. Shifting and separating the three ostrich has become routine. Training has greatly increased the tractability of these large birds.

Dana Urbanski is also the new ratite enrichment coordinator for the TAG. She can be reached at [dana.urbanski@nczoo.org](mailto:dana.urbanski@nczoo.org). She will be working towards developing enrichment guidelines for ratites so watch for exciting ideas coming your way to help enrich your ratite! If you have enrichment practices already in place for ratites at your zoo, please send them to Dana.

# Running with Rheas

New Rhea Exhibit Opens at Santa Ana Zoo submitted by Ethan Fisher



**Santa Ana Zoo opened a new exhibit called the Tierra de las Pampas Grasslands, where they are exhibiting 3.2 Rheas along with 1.3 Guanacos. The Rheas were sexed while still in their eggs and hatched by Lion Country Safari in Florida. A week after hatching the rheas were transferred to Santa Ana where they were hand reared. The exhibit opened in April, but the grasses are no longer as lush as they once were due to the grazing Guanacos!**



*Speaking of egg sexing...*

## DNA Sexing Rhea Eggs by Sara Hallager

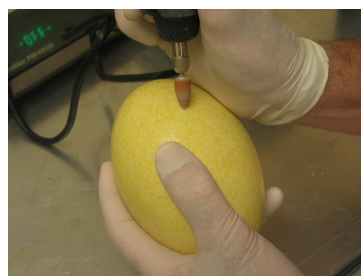
For the past several years, keepers at the National Zoo have been DNA sexing greater rhea eggs. This has proven to be a valuable tool in the overall management of greater rheas and has implications for ostrich management as well. Because no zoo can afford to have surplus male rheas (or ostrich), breeding of these species has virtually stopped in AZA facilities. To acquire new birds of either sex, zoos typically turn to private breeders or farms. While this is a good source of new genetic material into the captive AZA population, these birds can have undesirable traits [e.g. white color morph in greater rhea] and their genetic lineage is unknown. The ability to DNA sex embryos in the egg offers zoos the opportunity to breed desired sexes which zoos want. The process works best in rhea and ostrich eggs because these eggs are easily candled due to their light pigmentation (Fig 1). Towards the latter half of



Figure 1

incubation, a small hole is dremeled over a main vein, which is visible by candling (Fig 2). A small amount of blood is taken from the vein, and the hole is sealed using two part quick set (15 minutes) epoxy. The eggs are marked and returned to the male for incubation and to await the sexing results. When the results are in a few days later, the desired eggs are left under the male and the non-desired eggs are humanely euthanized. Since keepers at National Zoo started DNA sexing greater rhea eggs, DNA results have been 100% accurate as verified by weights and sizes once birds are several months old.

Figure 2





## Greater rhea (*Rhea americana*) behavior watch at the National Zoo by Sara Hallager

### Conservation status

The greater rhea (*Rhea americana*) is one of two species of rhea native to South America. *Rhea americana* has a large range in north-east and south-east Brazil, east Bolivia, Paraguay, Uruguay and north-east and east Argentina. It is comprised of five subspecies and is listed by IUCN as near threatened. Threats to greater rheas include illegal hunting of birds and eggs and habitat loss. The species is extensively farmed both in South America and North America and recently, captive bred birds have been proposed as candidates for reintroduction in South America (Navarro 2008). In recent years, the large-scale conversion of central South American grasslands for agriculture and cattle-ranching has been considerably reduced and fragmented available habitat, particularly in the pampas and cerrado strongholds.

### Justification for behavior watch

A greater understanding of greater rhea behavior is a necessary first step towards development and implementation of effective captive management practices. Few detailed descriptions of rhea behavior have been published, yet such manuscripts provide a valuable basis for quantitative study of behavior. Comparison of rhea behavior with that of other ratite species can highlight traits potentially shared by all or by specific groups of ratites, using the currently available behavioral information on all ratite species. Gaining a better understanding of greater rhea behavior in captivity, is a necessary first step towards improving the husbandry and management of captive populations and designing future conservation efforts that take into account all aspects of rhea life history and behavior.

Although large ratites (ostrich, emu, rhea, cassowary) are popular animals with zoo visitors and have been kept in captivity for hundreds of years, limited research has been conducted on their behavior and daily and seasonal time budget. Bruning (1974) and Raikow (1968, 1969) studied the greater rhea in captivity and although their observations are considered the basis for understanding rhea behavior, their work occurred nearly 40 years ago and a complete ethogram was never produced. Sales et al. (2000) did observations on captive rheas in the late 90's but his observations were limited to only 54 hours. The general purpose of the greater rhea behavior watch at the National Zoo is to develop an ethogram for adult males, adult females and chicks, obtain a diurnal time budget and determine the relationship between adult females and chicks. This is a multi-year behavioral study.



Although large ratites (ostrich, emu, rhea, cassowary) are popular animals with zoo visitors and have been kept in captivity for hundreds of years, limited research has been conducted on their behavior and daily and seasonal time budget. Bruning (1974) and Raikow (1968, 1969) studied the greater rhea in captivity and although their observations are considered the basis for understanding rhea behavior, their work occurred nearly 40 years ago and a complete ethogram was never produced. Sales et al. (2000) did observations on captive rheas in the late 90's but his observations were limited to only 54 hours. The general purpose of the greater rhea behavior watch at the National Zoo is to develop an ethogram for adult males, adult females and chicks, obtain a diurnal time budget and determine the relationship between adult females and chicks. This is a multi-year behavioral study.

The specific objectives of the greater rhea behavior watch are:

- Develop an ethogram (activity budget) for adults
- Develop an ethogram for nesting males
- Develop an ethogram for chicks
- Determine how activities vary with the time of day and season
- Determine social interactions between males, females and chicks
- Determine how social interactions change on a seasonal basis
- Determine the effect of crowd level on members of the flock



### References:

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Raikow, R. 1968. Maintenance behavior of the common rhea. *Wilson Bulletin* 80: 312-319.

Raikow, R. 1969. Sexual and agonistic behavior of the common rhea. *Wilson Bulletin* 81: 196-

Sales, J., Deeming, D., van Deventer, P., Martella, M. and Navarro, J. 2000. Diurnal time-activity budget of adult great rheas (*Rhea Americana*) in a farming environment. *Archiv fur Gefugelskunde* 64(5): 207-210.

## Notes on Aggression in a Multi-male Group of Greater Rhea *Rhea americana*

By Lisa Smith, Director of Animal Programs Great Plains Zoo

The Greater Rhea (*Rhea americana*) is a fascinating bird. Found in the Pampas environments of South America, it exhibits a remarkable variety of social structures throughout the year. They are gregarious in the non-breeding season living in large mixed-sex flocks until the breeding season begins and smaller groups begin to take shape. Rheas are both polygynous and polyandrous; they use communal nests, and only the males provide parental care<sup>1</sup>. In other words, the male has a small harem of females that he defends and breeds with, the females lay their eggs in a communal nest, the male takes on all nesting responsibilities (incubation, brooding, rearing) and the females move on to breed with other males. What makes this system even more interesting is that while the females take no part in the parental duties and males are sometimes aggressive to other males while defending their harems, there have been quite a few cases where males cooperatively nested and raised chicks together<sup>2</sup>.

The Great Plains Zoo began 2010 with two groups of Greater Rheas. The breeding group consisted of 2.3 (two related 2-year old males, a 2-year old unrelated female, and two 14-year old unrelated females) and a non-breeding group of three related 2-year old females (sisters to the breeding males). The exhibit the breeding animals were housed in measures approximately 65'L x 45'W. There is a 20'x10' barn and another 10'x10' shelter as well as a large tree, brush piles, and varied substrates.



From May 2009 until February 2010 the breeding group had lived peaceably together with an alpaca that shared the exhibit but as the end of February approached a significant change in the attitudes and dispositions of the males began

to take place. First, their attention turned on the keepers. Initially the males simply began showing more interest in them: coming closer than usual, following, etc. Eventually this "curiosity" turned into aggression. The males started escalating to bluff charges, pecking/biting, and eventually to jumping/kicking at the keepers. The escalation of aggression required staff to institute both a new shifting regime and a two-person rule if they had to enter the enclosure for feeding/cleaning. Next, the males began to cooperatively pick on and harass a lone alpaca that shared their exhibit requiring the alpaca to be moved permanently to another enclosure. As the aggression levels increased toward the keepers and the alpaca, so did the rhea's attention toward their female companions. Initially, most of the noticeable chasing and aggression appeared to be happening when keepers were in or near the exhibit. Observations, from a distance with observers hidden from view of the rheas revealed more normal behaviors (feeding, moving around the enclosure, a few courtship behaviors such as wing shaking, etc.).

In early March, keepers observed an interesting breeding attempt in the early morning. The young female in the group was being bred by both males. Initially one male was on her and then the second male stepped in. With both males on top of her, it was impossible to say if either male was successful. The bout lasted several minutes. This was the only breeding attempt witnessed by keepers during the entire breeding season.

A few weeks later, one of the males was observed sitting on an egg in the barn. He had gathered the egg into a shallow depression the straw bedding. Despite eggs being laid throughout February, March, and the beginning of April, this male only sat on this one egg and only for one day. The other male did not show any interest in any of the eggs. Eggs were found by keepers scattered throughout the enclosure and the barn.

Unfortunately, the following weeks proved to be problematic for the group. First, the young female sustained a severe



wing injury. The injury happened overnight and required her to be removed from the group for recovery. Soon after, both of the remaining females began to have leg problems. By mid-April, both of the remaining females were also removed from the enclosure. Two of the females recovered and were reintegrated with the other female group. Unfortunately one of the older females died of unrelated causes soon after being removed from the breeding enclosure. The ages of the older females and the number of females may have given the breeding group a disadvantage; perhaps having a greater number of younger females available would have divided the males' attentions more and possibly led to fewer injuries.

It is especially interesting that despite the aggression toward cage mates and keepers, the males showed no aggression toward each other while the females were present. After the females were removed the males had several bouts of chasing and fighting with each other, but no injuries were observed.

The males' attitudes toward keepers also began to improve once the females were separated and after about a month the aggression did eventually cease.

Going into the 2011 breeding season, we have removed one male from the group and integrated all of our females with the remaining male. Our intention is to see if the lone male exhibits the same level of antagonistic behaviors toward the females and the keepers as he did in the multi-male group as well as to see if he will show any interest in the eggs or in nesting without the presence of the other animal.

I'd like to Thank the staff at the Great Plains Zoo for all their hard work and patience as we worked through a difficult season and for their dedication to making this program work.

1. Simoy, M. V. and Canziani, G. A. (2005), A Stage-Structured Model with Two Time-steps for Analyzing the Population Dynamics of *Rhea americana* under variable Environmental Conditions. *Natural Resource Modeling*, 18: 215–233.

2. (1997), Cooperative breeding between males in the Greater Rhea *Rhea americana*. *Ibis*, 139: 568–571.



# Catching Up With Cassowary

## Cassowary DNA Research

### Introduction

The southern (or double-wattled) cassowary (*Casuarius casuarius*) is one of three species of cassowary. The southern cassowary *Casuarius casuarius* has a large scattered range that spreads from Queensland Australia to New Guinea, Seram and the Aru islands. The IUCN lists the Southern cassowary as vulnerable estimating about 1500 - 2000 birds surviving in Queensland. The population in Indonesia is largely unstudied but it is assumed birds are under equal pressure from hunting and deforestation. Unnatural threats to cassowary survival include car strikes, habitat loss and predation by dogs and feral pigs. Often called the rainforest gardener, cassowaries are important to the health and continued growth and renewal of the oldest rainforest in the world, the Daintree Rainforest in Queensland, Australia which is part of a larger World Heritage Area, the Wet Tropics. The diet of the cassowary includes fleshy fruits of up to 238 plant species, including seven exotics. By consuming fruits that are able to germinate only after passing through their digestive tract, cassowaries play a critical role in the growth and renewal of the rainforest. Because they can disperse large rainforest seeds over long distances cassowaries play a significant role in moving seeds across the rainforest landscape of the Wet Tropics. Their role as seed dispersers assumes even greater importance as rainforest becomes more fragmented and isolated as a result of human land uses. Both the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* and the State of Queensland's *Nature Conservation (Wildlife) Regulation 1994* list the southern cassowary as an endangered species. It is listed on the IUCN Red List of Threatened Species listed as Vulnerable.

The southern cassowary has been in decline in Australia since at least the mid 1940's. Cassowaries in the Wet Tropics were historically distributed between Cooktown in the north, south to Townsville and west including the entire rainforest portion of the Atherton Tableland. Present distribution remains similar but is much patchier as a result of habitat loss and fragmentation. Core habitat remains in

the rainforest and associated habitats of the coastal lowlands. In 1988 the Wet Tropics population was estimated at between 2500 -4000 adults, but by 2001 the estimate had dropped to less than 1500. There are three cassowary hot spots in the Wet Tropics: the Daintree area, the Kuranda and Atherton Tableland area and the Mission Beach area. All three areas are marked by habitat loss and fragmentation as well as roads that cut through cassowary home ranges. In addition, chicks are often preyed upon by dogs and struck by motor vehicles. In the Mission Beach area habitat loss is so extensive that the birds are forced into unnaturally small home ranges. Here cassowaries must seek food from plantation sources and this closeness to human settlements brings them into frequent contact with dogs.



### AZA Project

The AZA Ratite TAG and the AZA cassowary studbook keeper/PMP coordinator are initiating a project "An Investigation into the Geographic Origins and Mean Kinship of the Southern Cassowary in North America". The North American cassowary population has a high degree of unknown lineage and living birds are believed descended from just a few lines. The proposed project will use microsatellite analysis to determine the geographic origin (Australia, Indonesia, New Guinea) of the North American cassowary population. This is concurrent to exploring imports of birds from Australia. Prior to

importing birds, assurance is needed that the US population is of Australian descent. A better understanding of the mean kinship of the living population is also needed to allow for better genetic planning.

Analysis of samples will be performed in the laboratory of Dr. Rob Fleischer at the Center for Conservation and Evolutionary Genetics, Smithsonian National Zoological Park, PO BOX 37012 MRC 5503, Washington, DC 20013-7012. Samples will be sent as blood (vials or smears), freshly plucked or newly molted feathers or fecals. In order for this project to be successful, 100% cooperation from all AZA zoos holding southern cassowaries will be required. We anticipate sample collection through the summer with analysis starting in the fall and results coming in towards the end of 2010

This is a critical project for the Ratite TAG. This project is endorsed by the Australian Rainforest Foundation (ARF). ARF is keen to establish a secure population of genetically healthy southern cassowaries in the US in the event of catastrophic devastation of birds in Australia. The EAZA ratite TAG is working on a similar project.

### EAZA Project

Many of the wild birds show a great diversity of skin colour and body weight. Within EAZA collections we can see very obvious variations in the birds kept and bred. During the 19<sup>th</sup> century Sir Walter Rothschild noted 3 species and 17 subspecies of southern cassowary. There are over 200 cassowary skins at the Tring Natural History Museum showing examples of his findings. If we are to assist these birds with a captive management program we need a better understanding of their origins and relationships to each other. This can be found using DNA extracted out of feathers from the living birds in EAZA collections and from bird skins at the Tring museum. The birds' origins will be traced using microsatellite analysis.

There are only 114 birds in EAZA and probably as few as 200 in zoos world wide.



To make this project more viable we have formed part of a world wide collaborative with EAZA collections, the Wildgenes unit at RZSS, the AZA Ratite TAG, the Smithsonian genetics department and the ARF.

### Australian Project

Despite long-term concern, current cassowary management is conducted without recourse to information on cassowary population sizes or trends because of the lack of any reliable method for estimating population sizes, and, a lack of a rigorous monitoring program for monitoring population trends. As a consequence the management of a key threatened species is currently conducted without the benefit of a reliable estimate of population size and no means of determining population trends or management effectiveness. This is an

untenable situation if responsibilities for the management of threatened species are taken seriously under the EPBC Act. Furthermore, without estimates of i) cassowary population density and patterns of habitat use, and ii) an understanding of population processes, it is impossible to identify priority habitats and areas for protection or to predict population responses to management or threats.

To respond to this need our research team and collaborators have developed and are refining the field and laboratory methodologies to enable cassowary population censusing and monitoring. Whereas traditional approaches rely on encounter rates of cassowary sign (primarily dung) to derive a population estimate, in our method DNA is extracted from the encountered dung samples and genetic fingerprinting

allows discrimination between the dung of different individuals. The identification of individuals, rather than just dung, immediately opens up the full range of analytical approaches normally applied to population estimation (e.g. capture-mark-recapture, distance sampling etc), including with one-off sampling. As a consequence it becomes possible to i) assess population size with quantifiable error, ii) over time to estimate population trends, and iii) to identify patterns of habitat use and critical habitat. Furthermore, when used as a capture-mark-recapture method, it becomes the underpinning for detailed population ecology research allowing for the estimation of population parameters for predicting population responses to management and threats. In addition, we are examining patterns of divergence across the range of all three cassowary species.

### Contact information

US/AZA Geneticist: Dr. Rob Fleischer, Center for Conservation and Evolutionary Genetics, Smithsonian National Zoological Park, [fleischerr@si.edu](mailto:fleischerr@si.edu)

EAZA Geneticist: Dr Ross McEwing Royal Zoological Society of Scotland Wildgenes Laboratory [rmcewing@rzss.org.uk](mailto:rmcewing@rzss.org.uk)

The Natural History Museum at Tring, Hertfordshire, HP23 6AP. [www.nhm.ac.uk/tring](http://www.nhm.ac.uk/tring)

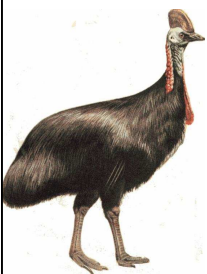
Sara Hallager, AZA Ratite TAG Chair, Smithsonian's National Zoo [hallagers@si.edu](mailto:hallagers@si.edu)

Nicole LaGreco, AZA cassowary studbook keeper, San Diego Zoo [nlagreco@sandiegozoo.org](mailto:nlagreco@sandiegozoo.org)

Jo Gregson, EAZA Ratite TAG Vice Chair, Paignton Zoo, [jo.gregson@paigntonzoo.org.uk](mailto:jo.gregson@paigntonzoo.org.uk)

David Westcott Principal Research Scientist, Tropical Landscapes Program Sustainable Ecosystems [David.Westcott@csiro.au](mailto:David.Westcott@csiro.au)

### Help us Understand Them: Cassowary Ethotrak



In 2009, a cassowary workshop was held at White Oak Conservation Center, Yulee, Florida. Twenty six participants from thirteen US zoos, one European Zoo and ARF participated in the 2-day workshop that focused on further uniting conservation minded zoo professionals. Several areas of research, husbandry and potential collaborations were explored and an action plan was generated. A primary focus of the workshop was the establishment of a multi-institutional study to systematically and quantitatively observe captive cassowary behavior.

Increased knowledge of captive cassowary behavior can help improve breeding success of captive birds and aid future conservation efforts. Due to space limitation and the species' solitary nature, few institutions house more than two cassowaries at any time. Therefore, it is difficult for any one institution to conduct a study that could be considered representative of the species. A greater understanding of captive cassowary behavior requires cooperation across institutions. A software program (developed by the Chicago Zoological Society) called Colonel Stanley R. McNeil's EthoTrak Observation System, facilitates that effort. EthoTrak gathers behavioral information on a particular study animal using a Palm®-based program to collect behavioral data. Observers are trained on data collection and use an ethogram to collect data. Data are synched between the Palm® and the computer and then compiled into one central database. Information can then be compared across and between institutions to generate a variety of information on captive birds. Gaining a better understanding of cassowary behavior is a necessary first step towards improving the husbandry and management of captive cassowaries and designing future conservation efforts. During a recent trip to Queensland, several AZA Ratite TAG members coordinated training classes led by Jason Watters (Chicago Zoological Society) for EthoTrak at two zoos. What started as a US based study has now expanded to include cassowaries in several zoos in the United Kingdom, Netherlands and soon, Australia making this the first international use of EthoTrak.

Current participating AZA zoos include: Birmingham Zoo, Smithsonian's National Zoo, Brevard Zoo and Nashville Zoo. More zoos are desperately needed to increase the sample size. Data collection is very easy and takes no more than 15 mins per day/bird. For more information, please contact Sara Hallager at [hallagers@si.edu](mailto:hallagers@si.edu).

# Enrichment

## Finding their Own Enrichment

Most people love to enrich the animals in their care, but sometimes it's the things they find on their own that are the most entertaining for us! Take Zoo Atlanta's Cassowary Cecil, for example. A keeper came in one morning to find him entertaining himself with a deceased furry rodent. Whether he killed it himself or it was already gone is unclear but we were able to shoot some video of the 20 or so minutes he played with it. We saw him:



Poke it



Stare at it



Stomp it



Drag it



Become confused by it

And finally...



Fling it

Before dropping it to go out on exhibit. They must be all the rage this year as a cassowary at the National zoo did the same thing!

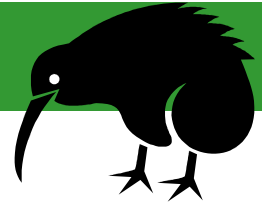
## Seasonal decreased food consumption in

### Australian ratites



Both the emu and the cassowary regularly enter a period of decreased food consumption during the North American winter and early spring. During this period, either sex may exhibit a noticeable decrease in food consumption. Weight loss is minimal and the birds are otherwise perfectly fine. This is normal for both emu and cassowary and corresponds to the onset of the breeding season. This phenomenon has also been reported in captive emu and cassowary in Australia (Biggs, per comm.).

# Keeping Up With Kiwi



## Brown Kiwi On The Move! By Kathleen Brader



Keeper Geoff Reynolds, His Honorable Ambassador Roy Ferguson, and Mr. John Mataira, releasing one of the new Kiwi at SCBI.

Kiwi have rarely been kept in zoos for several reasons; as a nocturnal species they make a more

difficult bird to display, they are hard to come by as breeding kiwi is a challenge, New Zealand rarely send out native species. The kiwi are the most recognized and cherished animals in New Zealand and of particular cultural significance for the Maori. They are a taonga (treasure).

The first kiwi to the United States came to the Philadelphia Zoo in 1897 and only lived a few months. This was followed over the years at other zoos in the world, and most of those birds lived from a few months to a year or two. The first kiwi breeding happened in Otorohanga kiwi house in 1945, but even in New Zealand kiwi were only kept in small numbers. The Smithsonian National Zoo became the first zoo outside of New Zealand to hatch a kiwi in 1975. That bird, Toru, is still on exhibit at the bird house. The first kiwi egg to be successfully artificially incubated was at Otorohanga in 1977.

Unfortunately the kiwi, like so many flightless birds, has suffered greatly since people first came to New Zealand and introduced mammals; the only mammals that existed prior were three small species of bats. The primary predators for adults are dogs and ferrets, and for the chicks, stoats and cats the biggest threats. In areas where pest control is not carried out, kiwi (under 1000grams) 70-90% of the youngsters are taken out, with only 5% making it to two years. Kiwi are among the slowest growing birds taking 2-5 years to mature. In the early 1990's kiwi recovery plans were stepped up in New Zealand for all the species. With the advent of DNA analysis the kiwi population has been divided into 5 species with a further division of several of these species into 8 races. The Department of Conservation (DoC) manages each of these as a separate species for conservation purposes. The only species kept in overseas zoos are the Brown Kiwi (formally known as the North Island Brown Kiwi) and are considered as a "mixed" province by the New Zealand officials, as the birds sent out prior to the 1990's were collected from different parts of the North Island. The first studbook for kiwi was for the Brown Kiwi, and was started in Wellington in

1987. It included all kiwi kept including the birds overseas. In 2005 the decision was made to separate the overseas population to be managed apart allowing us to move forward with managed plans for both N. America and Europe (there are two kiwi kept in Osaka). The first Studbook for the N.Am/EU population was published in 2007 and the second was published in November. At that time there were only 4 successful pairs of kiwi breeding in our population, all in Frankfurt and Berlin. In 2006 SNZP hatched out our 2<sup>nd</sup> chick and with the new studbook and SSP plans in place the future of kiwi in overseas zoos has taken on a new life.

I have made two trips to New Zealand to work and meet with different people involved with kiwi, both in-situ and ex-situ. I have traveled to all three major islands of New Zealand and seen 4 different species in the wild. I was lucky enough to go out to Whangarei with DoC ranger Pete Graham and his kiwi dog, Manu, to look for kiwi, by using both transmitters on the birds and Manu to locate two birds. Kiwi dogs go thru months of training to locate birds, and even then they are not allowed to go into the field without specialized muzzles to prevent even accidental injury to the kiwi. In the past few years there has been an explosion of regular people there to help the kiwi. To read more of the work going on there I would recommend reading Neville Peat's book: Kiwi The People's Bird and the latest Doc's Kiwi Recovery Plan 2010-2018 (<http://www.doc.govt.nz/upload/documents/science-and-technical/tsrp60entire.pdf>).

In the fall of 2008 I attended a Kiwi Incubation Workshop held at the Kiwi Encounter in Rotorua with Warren Lynch, the bird manager at the Smithsonian Conservation Biology Institute (formally known as CRC). During this trip Warren and I made further contacts in the kiwi community not only for our own education but also in the slim hope of obtaining kiwi for the overseas population. The overseas population has a skewed ratio of more males than females and an aging population. The last time kiwi were sent overseas was in 1990 and since then New Zealand had virtually closed its borders to sending out kiwi. With the new relationships we have built there and in the overseas community to forge an alliance we were successfully able to bring in 5 kiwi this past spring; two pairs and a single female. These birds hatched from eggs taken in Operation Nest Egg from the area in the Northland, which is on land managed by the Ngati Hine Iwi tribe. These par-



Mr. John Mataira performing a blessing during Maori welcoming ceremony at SCBI.

**" BOTH SDZSP AND SCBI HELD SEPARATE CEREMONIES WITH THE NEW ZELAND AMBASSADOR... WHO PERFORMED THE MAORI WELCOMING CEREMONY."**



ticular birds hatched at the Auckland Zoo and are all very young. The import of these birds required both the support of the Ngati Hine Iwi, various DoC departments, the Kiwi Captive Management Advisory Committee, up to the Prime Minister level. We also had developed a relationship with the New Zealand Embassy in Washington DC which was extremely supportive of the plan to import more kiwi. When the word finally came after several years of discussion that the various departments had approved to release birds to the Brown Kiwi SSP last fall, we still had to get the approval of Maori. This has to do with the Treaty of Waitangi, which actively protects the iwi and hapu interests in indigenous biodiversity. Once we had that the plan moved forward though we were asked not to discuss this with anyone that was not actively involved in the transfer. The announcement was not made until I was in New Zealand this past April (even my fellow co-workers in my unit were not told where I was) to pick up and accompany the birds to the USDA quarantine station in San Diego. The story was major news in New Zealand with TV, Radio and written press (including Maori TV), converging at the Auckland Zoo where all the birds were being held. On the day of the actual shipment we had the Iwi Chief, Waihoroi Shortland and Kevin Prime from the Ngati Hine to come and bless the birds in a Maori ceremony. Part of the agreement is that when these birds die they must go back to Ngati Hine iwi for burial; this is the first time that this has ever been required. It was an extremely moving ceremony. Air New Zealand donated all five cargo spaces for the kiwi and two seats for me and Auckland Zoo Native Species keeper Michelle Whybrow, who came back with me to ensure the kiwi settled into quarantine. We were allowed access daily into the USDA station and we cannot thank the staff there enough for their kindness and willingness to work ensuring the birds had the best care. In particular the single female was of high concern as she had gone off food for several months after being moved back to Auckland Zoo from the South Island where she had been sent previously (in fact the decision to let her come was not made till I was already in Auckland). The great news was she was the first one to eat after the move; the rest of the birds took another day or two to settle down. Due to the regulations of international quarantine, after we landed in Los Angeles we were not allowed to handle the birds or transport them, so we were met at the cargo area by a bonded agent who we followed down to San Diego station (the funny thing was that it took us over an hour to locate the cargo area as it had been moved to a new site the day before and no one told us). We were met at the station by Mr. Michael

Mace, Curator of Birds for the San Diego Zoo Safari Park and Animal Care Manager Andrea Cabibi. They had worked closely with the quarantine staff to set up the birds in advance of their arrival. After five days we departed and Mike and his staff were on hand to assist during the quarantine period as well as supply food. After 30 days I returned with Geoff Reynolds from SCBI to pick up the two pairs of kiwi; one pair will stay at SCBI and the second pair continued on to Frankfurt.

To welcome the birds to their new homes both the SDZSP and SCBI held separate ceremonies with the New Zealand Ambassador, his Excellency Roy Ferguson and John Mataira who performed the Maori welcoming ceremony.

The single female went to SDSP to pair with their single male. She has already laid two eggs (her first), the first egg after just 4 days of being together with the male. The pair that is staying at SCBI has laid their first egg (their first) and though these eggs all have been infertile, we are all excited that the birds have settled down so quickly (for kiwi) and it bodes well for the future. The Smithsonian has made a commitment to further research for the kiwi and has announced that they will be opening the Kiwi Science Center at SCBI with up to six pairs.

Part of the agreement to support the overseas kiwi program is a commitment from us to assist in different ways back in New Zealand, which includes research, education and conservation. The different agencies have also stated that from time to time our ex-situ population will need additional birds for genetic diversity and as long as we continue to work together as a team they will help us with birds. The whole future for the overseas kiwi program is in the best shape it has ever been in and with more zoos now coming forward wanting kiwi in their collections it's a very exciting time.



Mr John Mataira, Mr Mike Mace and the Honorable Ambassador Roy Ferguson releasing the new female at SD-WAP.



The new pair of kiwi taken on a trip camera at SCBI. The female is in front.

Turn the page for an update about these amazing birds!

## Kiwi Update—Kathy Brader

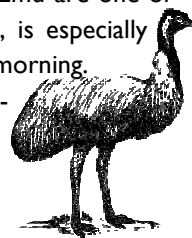
The new pair of kiwi at SCBI have laid a total of three eggs over the past few months. Unfortunately, the young male has not quite figured out he actually has to sit on the egg and not use it as head cushion. The nice thing is that the male at the Rock Creek facility loves to incubate and has accepted all three eggs from SCBI. The first two eggs proved to be infertile, not surprising from a young pair but the third egg is fertile. It is early (as of Jan 16<sup>th</sup> its only 31 days into incubation) but at least the pair has proved to be compatible and very much at home.

Another exciting piece of news that was just reported this past week (Jan 13<sup>th</sup>) is that the Columbus Zoo has their first fertile kiwi egg. This is a new pairing. Their female Gruen has been with two other males with no fertility. With the new male, Koru (who is also on the small size for adult male, barely making 1.4KG) their very first egg is fertile. They pulled the egg to the incubator when the 2<sup>nd</sup> egg appeared but Koru couldn't cover both eggs (though he was trying pretty hard per Matt DeVoe, kiwi keeper at Columbus). To say that their staff is excited is an understatement (me too) and Congratulations to all of the Columbus Kiwi team for working so hard to get to this point.

## Keeper Tracks— Meet Alix Dunlap from Lowry Park



I have lived all my life in the Tampa area. I grew up on a farm, and have always felt a special affinity for animals of all shapes and sizes. I graduated from University of South Florida in 2007 with a bachelorette degree in biology. I always loved visiting Lowry Park Zoo growing up. I volunteered for a year in 2007, and was awarded the 2007 Herpetology and Aquatics volunteer of the year award. I then started work as a vet assistant at a busy animal hospital in Lutz, Florida. I especially enjoyed assisting with orthopedic surgery but I've always wanted to work with animals on a more continuous one on one basis, and was hired at Tampa's Lowry Park zoo in early 2009. Now I work with birds and I can't imagine doing anything else that would bring me as much enjoyment and satisfaction. I have the pleasure of helping to care for a number and variety of different birds, but I have to say the Emu are one of my favorite animals to work with. The male, One-Eye, is especially friendly and is almost always waiting to greet me every morning. He loves grapes, being hosed down on hot days, and having his curly feathered head scratched. He's one of the first and last things to make me smile each day.



## Odds and Ends About the TAG and Our Feathered Friends

### AZA and EAZA

The AZA Ratite TAG works closely with the EAZA Ratite TAG. Officers of the EAZA Ratite TAG include:

Joost Lammers, Vogelpark Avifauna

Jo Gregson, Paignton Zoo

Simon Jenson, Weltvogelpark

The two TAGs share similar goals of working towards improving the care and management of ratites and promoting the conservation of highly threatened ratites. One noticeable difference is where AZA is focusing on the greater rhea, EAZA focuses on the lesser or Darwin rhea. By working together, both TAGs are ensuring both species of rhea are managed in zoos. The EAZA Ratite TAG has just published its first Regional Collection Plan: "EAZA Regional Collection Plan for *Palaeognaths* EAZA Ratite Taxon Advisory Group".





### Upcoming Events:

- The AZA Cassowary Animal Care Manual is near completion. IRs should watch for it in the coming year and provide comments.
- The 2nd Edition of the International Cassowary Husbandry Manual is under production in Australia. It is being edited by James Biggs of Cairns Tropical Zoo.
- The AZA Ratite TAG will have a 2 hour meeting at the AZA mid year meeting in Chattanooga.

### Ratite Websites of Interest:



<http://www.saharaconservation.org/>

Cassowary Conservation in Australia

<http://www.arf.net.au/>

Kiwi Conservation in New Zealand

<http://www.doc.govt.nz/conservation/native-animals/birds/land-birds/kiwi/kiwi/>

American Emu Association: Guidelines for Sexing Emu

<http://aea-emu.org/node/109>

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### **Keychains! \$10**



**Ostrich**

and

**Coming soon... Emu!**



**Cassowary**



**Ratite TAG Pins! \$5**



Thanks for reading our first annual newsletter! If you have an idea for next year or are interested in writing a piece you can contact Sara Hallager at [hallagers@si.edu](mailto:hallagers@si.edu) or Monica Halpin at [mhalpin@zooatlanta.org](mailto:mhalpin@zooatlanta.org). It's never too early to turn in your submission!