GLOBAL RE-INTRODUCTION PERSPECTIVES

Re-introduction case-studies from around the globe

Edited by

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Cover photo: Clockwise starting from top-left:

- Formosan salmon stream, Taiwan
- Students in Madagascar with tree seedlings
- Virgin Islands boa

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Conservation status of re-introduced red-necked ostrich in Mahazat as-Sayd, Saudi Arabia

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Introduction

The Arabian ostrich (***Struthio camelus camelus***) has been completely lost from the Arabian avifauna. The ostrich had remained in counterpoint with its human predators for probably thousands of years as it could compete on equal terms against hunters armed only with lances and mounted on horses. The ostrich became extinct in the late 1930s, after only a short period when it's hunters gained advantage through modern firearms and becoming vehicle-mounted (Jennings, 1986). The sad story of the ostrich's fate in Arabia is a sobering pointer to the destructive potential of man, especially when enthused by the chance of reward or the excitement of the chase. The ostrich (***Struthio camelus***), was historically distributed across Africa, Arabia, and parts the Middle East. The form that occurred in Arabia, generally accepted as a distinct subspecies (***S. c. syriacus***) and known as the Arabian ostrich (Jennings, 1986), became extinct in the wild during the mid-20th century, due to over-hunting and commercial exploitation (Jennings, 1986). Arabian ostriches became extinct in captivity at about the same time. Most of these ostrich populations have been listed in Appendix I of CITES and are protected by law throughout their range. Ostriches were often captured whilst young and raised in captivity, there are records of imported captive birds at Taif as early as 1917 and an escaped chick was caught near Jeddah in 1978. Since the 1970s, ostrich farms and private collections containing ostrich of various subspecies have been reported from all corners of Arabia and escapes have occurred, there is even a report of a road kill in Kuwait in 2005. Since 1997 there have been attempts to re-introduce the ostrich, of the nominate subspecies, back into the wild in Arabia. In the Mahazat as Sayd reserve in central Saudi Arabia ostrich have been released into a semi wild environment in a large fenced enclosure.

Arabian ostrich (*Struthio camelus camelus*) in Saudi Arabia © O. Couppey

Restoration of the ostrich is one of the aims of the Kingdom of Saudi Arabia's (KSA) National Commission for Wildlife Conservation and Development (NCWCD), which has initiated a conservation program to captive breed and re-introduce ostriches into Mahazat as-Sayd Protected Area and proposed to re-introduce in Al-Khunfah Protected Area. The extant ***S. c. camelus***, a red-necked form that occurs in northeastern Africa and is considered the most closely related, and possibly the same subspecies as the extinct Arabian form, has been chosen for the re-introduction, in accordance with existing international guidelines on re-introductions. The re-introduction program was started in 1988 - 1989 by obtaining red-necked ostrich from Sudan from a private collection and in 1990 couple of birds were translocated to Mahazat as-Sayd protected area in 200 ha fenced enclosure, and in 1994, seven ostriches were released into the wild Mahazat as-Sayd protected area. Mahazat as-Sayd protected area in Makkah province of about 2,200 km^2 of area with fairly level, sandy plain. The substrate at Mahazat may be sand, gravel, or alluvial clays, and is usually loose, but not shifting, forming an even surface. Mahazat as-Sayd is one of the world's largest fenced protected areas. The entire 220 km perimeter is fenced with 2 m high chain-link fencing, topped with three strands of barbed wire, with 0.9 m of chicken mesh buried in the ground, and lying behind a large earth embankment. Lying in central Saudi Arabia Mahazat as-Sayd is a vast undulating plain. Protection from livestock grazing has allowed a spectacular recovery of native vegetation - the grasslands of the reserve are a reminder of what much of central Saudi Arabia must have once looked like. The vegetation recovery allowed the re-introduction of Arabian oryx, sand gazelles, houbara bustard and red-necked ostrich. The reserve holds large natural populations of red and Ruppell's fox and significant numbers of sand cat, wild cat and ratel, and the spiny-tailed lizard (***Uromastyx*** spp.) It is a major breeding area for the threatened lappet-faced vulture (***Torgos tracheliotus***) and an important stopover site for migrating birds.

Goals

The objectives of this initial, experimental re-introduction in Mahazat are:

- Goal 1: Restoration of the ostrich in the KSA.
- Goal 2: Captive-breeding of ***S.c. camelus***.
- Goal 3: To determine whether captive-born ostriches can survive and successfully reproduce in the area without supplemental food and water.
- Goal 4: If so, to begin establishing a free-ranging, self-sustaining population.
- Goal 5: Monitoring patterns of daily movement, and home-range of released ostriches.
- Goal 6: Determining when released birds become independent of provisioned food and water.
- Goal 7: Understanding how to handle and release this species into the wild.
- Goal 8: Determine the major components of the diet.

Success Indicators

- Indicator 1: Current population at Mahazat as-Sayd Protected Area - although the current number of ostriches in Mahazat as-Sayd is not known it is estimated to be between 90 and 100 birds. It is essential that some of these

birds are captured and marked, as this will facilitate both the monitoring of the birds and the estimation of the population size.

- Indicator 2: Only protected area in the region where red-necked ostrich has significant population.

Project Summary

The introduction of ostriches into Mahazat as-Sayd Protected Area was started in June 1994, when seven birds were released, four and a half years after having been translocated from the NWRC to the pre-release enclosure in Mahazat as-Sayd. Three of these birds died within one year. Two ostriches translocated to Mahazat as-Sayd in May 1995 were released two months later and died during the following year. Of the four birds translocated in July 1995 and released in December 1996, two died in the summer 1997. Three of the four ostriches which were translocated in June 1996 and released in December 1996 died during the 1997 dry season. Over half (58.8%) of captive bred adults released since 1994 have died after being released, irrespective of the duration of the pre-release period. Between 1997 and 2001 more birds were translocated from NWRC to Mahazat as-Sayd, compensating for deaths related to an outbreak of Newcastle disease in the flock, and bringing the total flock size to 20 (12 males : 8 females) birds. From 1994 to 2001, a total of 96 red-necked ostrich have been release in Mahazat as-Sayd. Because of the inability of ostriches to survive during summer at Mahazat as-Sayd, the release project was stopped until better forage conditions occur. Survivors were re-captured and kept in the pre-release enclosure.

Breeding success: The first eggs hatched in 1997 in Mahazat as-Sayd, and only two of the twelve chicks had died by the end of the summer. The eight surviving chicks joined the other four and their parents, forming a single group soon after hatching. Two more chicks hatched, but they died soon after hatching. Seven eggs were fertile and one was infertile (Haque, 1997). The hatching of wild chicks in Mahazat as-Sayd is an undeniable success. The survival of most of the chicks (only two of the 12 chicks died), compared with that of adults, appears to support the hypothesis that wild-hatched chicks are better adapted to natural conditions than captive bred adults, especially concerning their foraging ability. In 2001, five nests within the 25 ha pre-release enclosure. Between November 2000 and February 2001 progress of the incubation and hatching events were recorded. From first nest 10 eggs incubated with 40% of crude hatchability and 25% survival rate at one month old, from second nest 12 eggs incubated with 75% crude hatchability with 0% survival rate, third nest had 15 eggs with 100% hatchability and 100% survival rate, fourth nest had 17 eggs with 59% hatchability and 89% survival rate and fifth nest had 19 eggs with 68% hatchability and 92% survival rate. In 2002, seven nests were recorded with 6, 13, 14, 15, 8, 10 and 11 eggs with crude hatchability ranged between 61.5% and 84.6% and 92% on average survival rate. In 2003, a total of 47 chicks were produced out of four nests. Although the absolute ostrich productivity was lower than in 2002 (i.e. 62 chicks) the average productivity per nest was higher in 2003; 11.7 chicks/nest vs. 8.8 chicks/nest in 2002.

Between November 2004 and December 20005, seven ostrich nests were recorded in Mahazat as-Sayd Protected Area. Subsequently all the nests were periodically visited to record the progress of the incubation and hatching events. A total of 197 eggs hatched out of seven nests and 93 chicks were hatched with more than 60% survival rate. In January 2006, nine nests were recorded in Mahazat as-Sayd. Two nests failed to hatch and been abundant by the parents and the remaining eggs were removed and sent to the NWRC to determine whether they were fertilized.

Mortalities: Until 2001, introductions were carried out to determine whether ostriches could survive in the reserve without supplementary food and water. Results indicate that captive bred adult ostriches have difficulty surviving during the summer, even with food provided, because of the absence of the water (six of the 13 adults died in 1997). In 2005 more than 50 individuals were died during drought period and also in 2006, most of the ostrich flocks with chicks gathered in the vicinity of the Mammal Camp from 29th June water was provided till 15th July, around 25 ostriches managed to drink and others did not drink especially chicks as they were afraid from researchers presence and the presence of oryx that comes to drink from ostrich's water container. Mahazat as-Sayd is fenced, which prevents the migration of ostriches to more favorable sites. Some release methods therefore need to be changed to reduce this high adult mortality.

Management: The main question that should be addressed is: "***should introduced ostriches be provided with food and water, and if so, what should the provisioning strategy be?***" Released ostriches should be supported during the dry season because of the limitations on their movements imposed by the fence, and also because there are too few red-necked ostriches available for introduction to permit large losses of these birds. In July 2005 and 2006 water was provided to the ostriches at the pre-release enclosures in the Mahazat as-Sayd Protected Area. Despite this management regime 53 ostrich carcasses were recorded during the year, with 96% of the dead birds being chicks that hatched at the beginning of the year. The 51 dead chicks represent 55% of all the chicks that were found at the time of hatching. However, it is believed that a significantly higher proportion of the chicks might have died during the reporting period. It is essential that an attempt is made to effectively monitor the ostrich population in the Mahazat As-Sayd Protected Area. This could best be done by fitting radio-transmitters to 15 - 20 birds and marking additional 10 - 20 birds with numbered leg rings.

Some of the key questions to be answered include:

- What proportion of females breed, and what is the hatching success?
- What are the seasonal range sizes used by the ostriches and which habitats are seasonally important to the birds?
- What proportion of birds makes use of the supplementary food and water provisions, and what happens to those birds that do not use it?

Answering these questions would help elucidate whether it is hatching success and/or chick survival or adult survival that is limiting the ostrich population in the

Mahazat As-Sayd Protected Area. Furthermore it would help to put an efficient management regime for ostriches into place.

Major difficulties faced

- High mortality rate of adult as well as young birds during summer is a serious issue to be taken and evidence that wild hatched ostriches are also in poor condition during drought period.
- Ecology and biology of ostriches are not properly studied.
- No researcher appointed for this project.
- No species management prepared.

Major lessons learned

- The period of stay at the pre-release enclosure should be extended to at least a 10 - 12 month period so that birds can adapt to local environmental conditions.
- The time of the release should be at the onset of the winter, which should be a time of least environmental stress for the birds.
- Handling of the birds should be done as little as possible to avoid accumulating stresses.
- One or two birds should not be released, as ostriches are very social birds and learn a lot by mimicking and stimulating each other. Thus during the initial stage of re-introduction a large group of birds should be released. It is likely that large groups will demonstrate more adaptive initiatives than small ones.

Success of project

Highly Successful	**Successful**	**Partially Successful**	Failure
	√		

Reasons for success/failure:

- There were no ostriches in the wild and now at least a significant population found in Saudi Arabia.

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