CONSERVATION BREEDING FOR THE FUTURE RELEASE OF THE CRITICALLY ENDANGERED ASIAN *GYPS* VULTURES – PROGRESS OF THE PROGRAMME IN SOUTH ASIA AND WHY IT IS SO IMPORTANT

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Three South Asian *Gyps* vulture species are Critically Endangered with extinction, despite having been abundant in the 1990s. The main cause of the declines is now established, being ingestion of a veterinary painkiller, diclofenac, from cattle carcasses, which is toxic to the vultures. Two key actions have been identified by the range state governments and IUCN, namely the eradication of diclofenac from the environment and establishing a conservation breeding and release programme. The Bombay Natural History Society (BNHS) was the first to take up the challenge for India with support from the Partners of the new consortium, Saving Asia's Vultures from Extinction (SAVE). Further programmes are developing for one species in Nepal and Pakistan, which are also integrated through SAVE, and with the support of Central Zoo Authority (CZA), there is progress with additional facilities within India. The breeding programme is most advanced at the BNHS centres, and has already achieved successful breeding of all three species at the centre in Pinjore, Haryana. Artificial incubation techniques have also been developed at the Pinjore centre, with successful rearing, and most recently, allowing some pairs to double productivity by producing two nestlings to fledging within a season, despite the vultures' normal habit of laying one clutch per year. The total number of birds held in all centres combined for all three species combined is 270 in India, with a further 60 in Nepal, and 20 in Pakistan. The Central Zoo Authority supported centres hold additional birds to those held in India.

Key words: vultures, breeding programme, artificial incubation, diclofenac

INTRODUCTION

Why a breeding programme was needed

The scale and speed of declines of three *Gyps* vulture species: White-backed or Oriental White-rumped *Gyps bengalensis*, Long-billed or Indian *G. indicus*, and Slender-billed *G. tenuirostris* across South Asia (Prakash *et al.* 2003) was largely unprecedented for such widespread and formerly abundant bird species, and although the reaction to overcome the established main cause of the declines – the veterinary use of diclofenac – has also been relatively fast (Pain *et al*. 2008), there was no guarantee that these measures could or would take effect in time to prevent the extinction of these species. With this speed and uncertainty in mind, the precaution of taking viable numbers of these species into captivity was agreed in 2004 as a key element of the Recovery Plan [ISARPW (2004); IUCN (2012); MoEF (2006)]. At this time, with the declines still continuing at up to 45% per year in one of the species (Prakash *et al*. 2007) and knowing that extremely low levels of diclofenac remaining in the system would still cause population trends to continue to decline towards extinction (Green *et al*. 2004), all precautions needed full consideration. So while source populations were still available in the wild, birds of all three species were collected from as wide a range of potential sources as was feasible, and with custom-built facilities and expertise from related species available, the prospect for conservation breeding and ultimately reintroduction of the birds was agreed to be a necessary and viable prospect.

The question of whether the methodology would be sufficiently feasible to develop was addressed and heavily influenced by the recent success of the California Condor programme in USA, but perhaps even more so, by the success of programme for the more closely related *Gyps* vulture, the Eurasian Griffon *Gyps fulvus* in Europe. It still required enormous care to minimise any risks involved in capture,

housing and providing breeding conditions sufficiently free of disturbance or risks of food contamination (not least from diclofenac), as well as the need to bring a wide range of concerned bodies together to help authorise and agree on this course of action.

Fortunately, there was Government and state government support, as well as sufficient funding from a range of sources to allow progress and in time to build up the stock of birds across all five centres (Table 1). The chronology of these centres varies, and the growing breeding success largely reflects the timing of establishment of each one.

Establishment and progress of the breeding programme so far

Since the initial establishment and conversion of the rescue and diagnosis centre at Pinjore, Haryana, to a conservation breeding centre in 2004, there has been a series of centres established following a similar model in India: Rajabhatkhawa at Buxa Tiger Reserve, West Bengal, and Rani Forest, Assam (2005 and 2007 respectively). These were all established by Bombay Natural History Society, and the state governments of Haryana, West Bengal, and Assam respectively, largely with support from Darwin Initiative of the British Government, and the Royal Society for the Protection of Birds (RSPB). Meanwhile a centre was established at Changa Manga Forest in Punjab Province (established 2007), Pakistan by WWF-Pakistan and the Provincial Government of Punjab, and with a grant from the Abu Dhabi Environment Agency. The Central Zoo Authority has also supported five Indian zoos to develop vulture breeding facilities at or in close proximity to zoos in Gujarat, Andhra Pradesh, Madhya Pradesh, Orissa, and Jharkhand. These are at various stages of development and it is envisaged that they will become fully integrated with the overall programme. There are established governing bodies for each of the BNHS centres chaired by the state government Secretary of Forest Departments. Drawing upon experience from other parts of the world and comparable programmes, including raptor breeding expertise of UK's International Centre for Birds of Prey, California Condor work of the Peregrine Fund, and Eurasian Griffon Vulture successes in France and Spain is a crucial element that has already helped reach this point.

Major progress in the husbandry, including the use of large colony aviaries, and more recently, artificial incubation techniques and expertise have dramatically increased breeding productivity for these species each year. This is encouraging, especially considering they had not previously bred in captivity. The latest successes include definite cases of the incubation techniques inducing pairs to produce two successful fledglings in one season, hence hugely improving the potential capacity for the programme. The total numbers of birds (Table 1) is 271 in India, 60 in Nepal and 20 in Pakistan. The Indian CZA centres hold birds in addition to these.

Factors affecting captive population growth and probable release dates

With current progress and maturation of the birds held in the centres, there are several factors that will have major impacts on how quickly a surplus of birds will be available for release. A key factor is the starting number of birds, but other important factors are the age of first breeding (generally around 5 years), the proportion of paired-up birds, the sex ratio within any holding, and the survival rates of eggs laid. The survival of chicks to fledging has been improved by artificial incubation and hand-rearing, although birds of all three species have successfully fledged young within the aviaries. The potential for prompting double-clutching by early 'pulling' of the first egg, causing the birds to lay and rear a second egg and chick, has a massive impact and potential for speeding up the productivity. This artificial incubation option has been showing very promising signs of success since trials started in 2008. Among the anticipated variables that can influence the period until sufficient birds are available for release, whilst maintaining adequate future breeding stock. These positive signs mean that at the current rate we could have sufficient birds available as soon as 2016. Another important factor is the numbers of birds required for initial releases, and judging from work on the Eurasian Griffon Vulture, it is expected that a minimum of ten birds would be

Table 1: Numbers of each of the Critically Endangered *Gyps* species held in the SAVE Conservation Breeding Centres

Centre\ Species	Pinjore, Haryana, India	Rajabhatkhawa, W. Bengal, India	Rani Forest, Assam, India	Chitwan, Nepal	Changa Manga, Pakistan	Total
White-backed	62 (15)	52 (5)	27	60	20	221 (20)
Long-billed	66 (11)	17				83 (11)
Slender-billed	18 (4)	14 (1)	15			47 (5)
Total	146	83	42	60	20	351 (36)

(values in parentheses indicate numbers successfully fledged on site by November 2011)

required, and that additional releases of similar numbers of birds would have to be carried out at a given release site in the subsequent two years. Careful monitoring of the initial releases will be needed and there will be some differences between the three species, and from these the methodology and exact timing will be refined for subsequent cases.

Future plans and Summary

Breeding techniques have now been shown to be available for captive populations of all three *Gyps* species, and with growing experience, there is every prospect that productivity of these will continue to improve. With this success comes a growing need for careful genetic management of the captive stock and further stepping up of productivity, so that sufficient birds are available for the pre-release phases once there are sufficiently large areas of established diclofenac-free environment. These areas are currently in the process of being established through intensive awareness and advocacy work in 100 km radius areas termed Provisional Vulture Safe Zones. Meanwhile, we face the serious challenge of coordinating, resourcing, and running the breeding centres, and getting the required expertise and experience fully available across the programme.

Experience is already being shared between the centres in the three countries holding captive birds, and joint training sessions increasingly involve staff from multiple centres. Although the prospects for the exchange of birds across the national boundaries involved may be a major challenge, exchanges of birds between centres within India should ameliorate the management problems and improve the prospects of success, and this is an area for our attention in future. The consortium of partners under the banner of Saving Asia's Vultures from Extinction ('SAVE' www.save-vultures.org) is collectively responsible for the majority of vultures held in captivity, and coordinates these efforts, but is aiming to help provide support for all centres sharing the objective to release birds and generate self-sustaining wild populations.

Genetic management, full coordination between centres, the successful removal of diclofenac from the environment through tighter legislation, and the establishment of 'Vulture Safe Zones', as well as a system of legally-binding mandatory vulture safety-testing for all cattle painkillers entering the market, are all further challenges that need to be overcome before the ultimate objective of releasing the birds back into the wild can be undertaken, and the conservation objectives for the three Critically Endangered *Gyps* vultures will be fully achieved. The breeding programme is, however, a key element of these efforts, and an essential step to securing the future of these species.

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