

Eradication of the House Crow *Corvus splendens* on Socotra, Yemen

AHMED SAEED SULEIMAN & NADIM TALEB

The House Crow *Corvus splendens* is an invasive species which has caused severe ecological and economic damage in areas where it has become established outside its native range. The year of its arrival on Socotra is uncertain but was probably 1994 aboard a ship travelling from Aden. A small colony became established near the capital and the population reached at least 15 individuals. In 1999 an eradication programme was started but first attempts failed. Then, between 2002 and 2008, the numbers of adults were successfully controlled by financially rewarding children for taking young from the nests and bringing them to conservation staff to be killed. In April 2009 two professional snipers were hired to kill all the adults and this was accomplished in one week and hopefully ends the story of this alien crow on Socotra. The total cost of the control and eradication programme, excluding time, was US\$ 20 500.

INTRODUCTION

Situated in the Arabian sea, some 350 km south of the Yemen mainland, the Socotra archipelago is famed for its unique flora and fauna. Over 350 species of plants, 21 species of reptiles and 10 species of birds are endemic (Cheung & DeVantier 2006, Porter & Suleiman in prep). This high degree of endemism ranks Socotra among the top ten oceanic islands in the world for biodiversity. The biological richness of the islands encouraged UNESCO to declare Socotra a World Heritage Site in 2008.

However, the biodiversity of the archipelago faces a number of threats, and in 1998 the Socotra Biodiversity Project, supported by GEF/UNDP, started a research and conservation programme to help address them. One such threat was that posed by the House Crow *Corvus splendens* (Plate 1) and the following year BirdLife international, who were guiding the islands' breeding bird research and survey programme, recommended that the Environmental Protection Authority of Yemen (EPA) take immediate action to

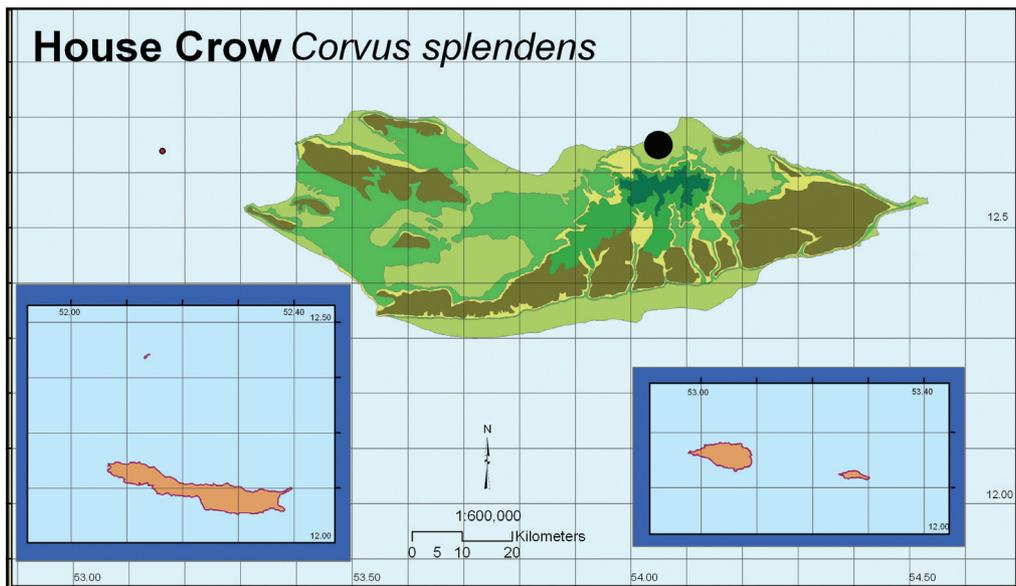


Figure 1. The breeding distribution of the House Crow *Corvus splendens* on Socotra, 1999–2009. Courtesy SCDP/ BirdLife International (Porter & Suleiman in prep)



Plate 1. House Crows *Corvus splendens*, Yemen © RF Porter



Plate 2. Wadi Hadibu, Hadibu, showing the habitat of the House Crow *Corvus splendens* on Socotra. © AS Suleiman

eradicate it from the island, because of the serious threat it posed to the native wildlife.

HISTORY OF THE HOUSE CROW IN ARABIA

The House Crow's native range extends throughout the Indian subcontinent from Sri Lanka north to Nepal, west to southern Iran and east to Yunnan. Since the mid 1800s it has spread to much of the Indian ocean rim including the Arabian peninsula, eastern and southern Africa, some Indian ocean islands and parts of southern Asia. Much of the spread has almost certainly been ship assisted. The first records of House Crows in Arabia were in Aden, where they were probably introduced deliberately in the 1840s. The crow is now a common and increasing resident in many coastal cities, towns and settlements along the gulf of Oman and Arabian gulf, more sparsely along the southern Arabian coast, with a large population in Aden, and also along the Red sea coast from the Bab al-Mandab to the gulf of Aqaba (Ryall 2010). In many places in Yemen it has reached pest proportions.

In the Aden area an eradication programme in the 1980s, although ultimately unsuccessful, succeeded in destroying an estimated 250 000 birds but made little impact on the overall population. Despite this the Yemen population in the early 2000s was estimated at 350 000 pairs (Ryall 2010).

The story goes that in April 1994 (though there is some debate that this might have been 1996) a ship belonging to the Yemenia Ports Company arrived at Hadibu, the capital of Socotra, after a four day journey from Aden (see acknowledgements). It was loaded with foodstuffs for the National Home Company (Socotra branch) and aboard were two adult House Crows and a nest with eggs or young which the parents attended. On arrival at Hadibu the crows flew from the port to nearby Wadi Hadibu at the edge of the capital. Here the 7–12 m high palm trees along the wadi provided good nesting sites, while the nearby settlements and fishing beach meant there was a ready supply of food including dead fish and animals (Plate 2). This breeding and feeding habitat proved ideal and by 2000 the population had reached at least 15 birds. Interestingly, the crow was only seen once away from Wadi Hadibu, at nearby Wadi Sirhan, a distance of less than 2 km and where there were no settlements. It took up its residence at the edge of the capital, close to the

Table 1. Highest counts of adult and fully fledged House Crows *Corvus splendens* at the Hadibu colony 1999–2009, Socotra. No count 2005. The highest count in 1996 was 3.

1999	9
2000	15
2001	13
2002	24
2003	26
2004	14
2006	15
2007	14
2008	12
2009	13

Table 2. The number of fledgling House Crows *Corvus splendens* collected by children on Socotra, 2002–2007.

	2002–2003	2004	2005	2006	2007
January		0	0	0	0
February		0	0	0	0
March		15	7	2	13
April		4	3	15	8
May		12	7	0	23
June		7	6	3	2
July		14	0	0	9
August		0	2	5	4
September		0	0	0	0
October		0	0	4	0
November		0	0	0	0
December		0	0	0	0
	77	52	25	29	59

Total 242

sea and remained there during its 15 years as an island alien (Figure 1). It is unclear what damage they caused to the native wildlife but crows were seen to take young Southern Grey Shrikes *Lanius meridionalis* from the nest, and also to harass the local chickens and to take chicks from hens. The population of crows was counted regularly by the Socotra Conservation and Development Programme (EPA) and BirdLife International and the highest annual counts are shown in Table 1.

THE CONTROL AND ERADICATION PROGRAMME

In 1999, under the guidance of the SCDP and BirdLife International, an eradication programme was started. Five attempts were made, the first three were unsuccessful, the fourth succeeded in controlling the population, and the fifth achieved the goal of eradication.

The first attempt deployed Larsen traps which were shipped by BirdLife to Socotra from the UK. The Larsen trap is a humane, wire-mesh trap with two compartments, one to hold a decoy bird, the other with a trap door into which hopefully a crow could be attracted with food. The plan was to trap three House Crows to use as decoys (one in each trap) then place the traps at the edge of Hadibu where House Crows were known to feed. Unfortunately it proved impossible to catch any House Crows to use as decoys and so this attempt was abandoned. The total cost of this failed project, excluding time, was approximately US\$1500 (cost of traps and shipping costs).

The second attempt was equally unsuccessful. In 2000 a crow trap was built using a design from the UK (Plate 3). This large wooden-framed trap was baited with fish and other food items to attract crows through its funnel-like roof, any bird caught then being humanely dispatched. The trap was sited on a roof near to the coast in Hadibu where House Crows were known to breed and feed. Again, after five months of trying not a single crow was caught! It is worthy of mention that three fledging crows were put in the trap as decoys but even that failed to entice any birds. The cost of this failed project was c\$700 for material for constructing the trap.

Following these failures attempts by army officers to shoot the birds were also unsuccessful. Four soldiers worked for four days in the wadis but without success. House



Plate 3. Crow trap on a roof top in Hadibu, Socotra, in 2000; it failed to catch any House Crows *Corvus splendens*. © RF Porter



Plate 4. Nadim Taleb and Ahmed Saeed Suleiman after receiving young House Crows *Corvus splendens* from children, Socotra. © AS Suleiman.

Crows are very canny birds and even the sight of a gun causes them to fly and hide in the palm trees. The cost of this third failed attempt was approximately \$800.

For the fourth attempt it was decided to try to simply keep the population under control by encouraging schoolchildren to search for nests and rewarding them for bringing nests and young birds to be humanely dispatched by SCDP or EPA staff. At first the children brought nests with eggs and during 2000 and 2001 a total of 161 eggs were collected. However it was soon apparent that taking eggs only resulted in the crows laying again and so this practice was stopped and the children were asked to collect only nests with fledglings (Plate 4).

As a reward for bringing these young birds to SCDP the children were given 1000–1500 Yemeni Riyals (c\$6–9) for each crow, depending on its age; and 2000 Riyals (c\$12) for an adult .

During 2002–2007 a total of 242 young House Crows were collected and killed by the SCDP/EPA team (Table 2). This control programme, which cost a total of \$2500 in reward payments, was successful in keeping the population under control and below 15 birds by the time it was fully operating (Table 1).

In addition to control of crow numbers, analysis of the data in Table 2 shows that the breeding season was at least from March to August with the highest number of young in May.

Despite the successful control programme, it was still necessary to eradicate the remaining adults. Thus it was decided in 2008 to engage InGrip-Consulting & Animal Control (Germany) with funding from the UNDP Small Grants Program (SGP) through its coordinator, Dr Omar Al-Saghier. In April 2009 Peter Haverson, a professional sniper, and Guntram Meier from InGrip arrived on the island to kill the birds following the approval and permission of H.E. Abdulrahman Al-Eryani Minister of Water and Environment and the Minister of Interior. Working closely with the SCDP/EPA team, nine birds were shot in the first day and three in the next few days. After a week the team from InGrip flew back to Sana'a. However, monitoring continued and it was discovered that a single bird still remained; so Peter Haverson flew back to Socotra to dispatch it. This final successful effort to eradicate the House Crow cost \$15 000 and brought to an end a potentially serious threat to Socotra's wildlife.

CONCLUSIONS

The removal of any alien invasive species can be a long and costly exercise. Not only in terms of finance and man-power, but also the government and international input that is necessary. We therefore strongly recommend much greater security and checking at air and seaports to ensure that no alien organisms—be they animal or plant—arrive on Socotra. There are important lessons here for local communities and young conservationists, not only in Socotra, but elsewhere in the world.

Now that the House Crow has been eradicated from Socotra it is important that any stow-away birds on ships travelling to the island are not allowed to come ashore. Such mistakes could easily happen due to the lack of environmental education and awareness, and a programme about the dangers of alien invasive species is urgently needed for this World Heritage Site and is currently under discussion.

We know, for example, that there are 65 alien plant species in Socotra, mainly being grown by people in home gardens, and of these 21 have the potential to become invasive. Most of the mammals that have been introduced to Socotra are domesticated, controlled and provide an important food resource, but four that are alien and invasive (to a greater or lesser extent) are the domestic cat, lesser Indian civet cat *Viverricula indica*, the black rat *Rattus rattus* and the Norway rat *Rattus norvegicus* (Banfield *et al* 2010). The most serious threat to birds, especially breeding seabirds is that posed by rats. The extent of this is not known, but is a priority for investigation under an invasive alien species programme.

ACKNOWLEDGEMENTS

We would like to thank Richard Porter of Birdlife International for encouraging us to write this paper, helping with its editing and supporting our bird conservation efforts. We also express our gratitude to H.E. Abdul-Rahman F Al-Eryani, the Minister of Water and the Environment, to Omar Al-Saghier for initiating the final eradication under the UNDP Small Grants Programme, and to the EPA for their support. Our thanks also go to Ahmed Mohamed Qasim, Abdooh Suliman Shamsan and Khalid Al-Haj Qaid for providing the account of the arrival of the crows on Socotra in 1994, to Abdullatif Saed Amer for translation and the team who worked with us on Socotra including Fhmy ba Hshuan, Ahmed Issa and Salim Dahq Ali. We thank Paul Scholte and his wife Stephany for their support and in helping with an initial draft.

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Ahmed Saeed Suleiman & Nadim Taleb, Socotra Conservation and Development Programme (Environment Protection Authority), Socotra, Yemen. qamhem@yahoo.com