

RATS, INCEST AND COCONUTS

Threats to the Seychelles Magpie Robin

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The case of the Seychelles Magpie Robin is a particularly interesting one and carries several important messages for the conservation of island faunas.

Brought back from the brink of extinction in the mid-1960s, this bird is facing new threats that might drive it once again to queue for a place in the species' cemetery.

The Seychelles Archipelago comprises 115 islands scattered over 1 340 000 km² of the tropical Indian Ocean. The inner group of islands, which includes the capital island Mahé, are unique among oceanic islands in being granitic. The outer islands, which include Aldabra, are coral atolls and cays. The islands are pinnacles of a submerged continent called the Seychelles Bank which was formed during the opening up of the Indian Ocean some 165–135 million years ago.

Historical impacts of man

The Seychelles' birds are a mix of species of African and Asian origins. Depending on one's taxonomic leanings, between 13 and 16 of the bird species found in Seychelles occur nowhere else in the world. Man first settled permanently in Seychelles in 1770, since when he has taken a severe toll on the islands' flora

and fauna through persecution, habitat destruction and the introduction of cats, rats and domestic livestock. Not long after settlement, the seacows and crocodiles were gone, never to return.

Surprisingly, among the birds, only two endemic subspecies of landbird are known to have become extinct in recent times: the Green Parakeet *Psittacula eupatria wardi* and the Chestnut-flanked White-eye *Zosterops mayottensis semiflava* both died out around 1900. The 1990s may have seen the loss of one endemic species, the Aldabra Brush Warbler *Nesillas aldabranus*, discovered only in 1967. There are several other endemic species, however, which are currently considered threatened, including the Seychelles Bare-legged Scops Owl *Otus insularis*, the Seychelles Magpie Robin *Copsychus sechellarum*, the Seychelles White-eye *Zosterops modesta*, and the Seychelles Black Paradise Flycatcher *Terpsiphone corvina*. ▶

The Seychelles Magpie Robin is one of the world's rarest birds. Every individual carries a unique colour ring combination.



The Seychelles Magpie Robin: 1950–1990

Historically, the Magpie Robin occurred on at least six of the Seychelles islands: Aride, Marianne, La Digue, Praslin, Mahé and its satellites, and Frégate. By the early 1950s, the only surviving birds were on Aride, Alphonse and Frégate; the Alphonse birds having been introduced there some time prior to 1893. By the end of the decade, however, cats had eliminated the Aride and Alphonse populations, leaving all the remaining birds on Frégate. To this day, there are none in captivity. By the mid-1960s the entire population consisted of no more than 12 birds.

They survived this bottleneck probably because of the active control of cats on the island, helped along by an outbreak of feline enteritis (cats were eradicated by 1981), an intensification of agriculture (which improved the food supply), and the absence of rats (Frégate at the time was one of only four rat-free islands in the inner Seychelles). Rats can prove devastating predators of island birds, their chicks and eggs, as well as competing with birds for food. Because such birds have mostly evolved in

the absence of mammalian predators, they have not developed effective anti-predator behaviour.

By 1978/79, the population had recovered to about 40 birds and it was at this time that the International Council for Bird Preservation (ICBP, now BirdLife International) started basic research over a two-year period into the biology and needs of the Magpie Robin.

There was also a reintroduction of 10 birds to Aride, by now cat free. This failed, however, and the last Magpie Robin on Aride died in 1988.

In 1988, a further two years of research was initiated by BirdLife International, funded by the Royal Society for the Protection of Birds. This research aimed to develop a recovery plan for the Magpie Robin. The recovery plan, which came into effect in 1990, had three major objectives. Firstly, to improve



conditions on Frégate through habitat restoration; secondly, to increase the number of young produced by providing nest boxes and supplementary food; and thirdly, to establish populations on other islands which were also cat- and rat-free. ▷

Seychelles is best known for its tropical climate, clear blue waters and palm-fringed beaches. It is also home to many unique plants and animals, some of which are threatened with extinction because of man's activities.



Early successes

When the plan was put into operation the Magpie Robin population on Frégate was down to about 20 birds – by mid-1996, this number had risen to about 45 birds. Introductions to Cousin Island were also very encouraging – two pairs were released there in 1994 and a third in 1995. To date, seven young have been fledged on Cousin and there are presently three actively breeding pairs. Birds on Cousin produce young at a faster rate than those on Frégate: the clutch of a Magpie Robin contains only a single egg, but one Cousin pair managed to fledge four chicks in less than 12 months.

A second reintroduction to Aride was less successful. Three pairs were released early in 1996, but only one pair established a territory. By mid-1996, five of the six birds had died, at least two of disease. Only one female remains.

Infertility – a problem of small populations

Although results to date suggest that the recovery plan is going very well (a trebling of the world population in only six years), some questions are looming on the horizon.

On Frégate, 47 per cent of eggs are non-viable 10–14 days after laying. Although some of these failures may be due to early death of the embryo, it is almost certain that a high proportion of eggs laid are infertile. There seems a very real possibility that the population, having gone through at least two small bottlenecks, is experiencing inbreeding depression linked to a high frequency of incestuous matings.

The genealogy of the Seychelles Magpie Robin population is known for the last eight years and it is therefore possible to calculate the relatedness of each individual to every other bird of the species on the island. When birds are selected for transfer to another island, they are chosen so as to be as distantly related as possible. Not only will this minimize incestuous matings, but it also helps to ensure that all the genetic material present on Frégate Island is duplicated on Cousin.



Four of Seychelles' endemic bird species occur on Frégate. The Seychelles Blue Pigeon (above) can still be found on the majority of the inner islands, but the Seychelles Fody (below) is confined to the small islands of Frégate, Cousin, Cousine and D'Arros.

The arrival of rats

Inbreeding depression may be one problem facing the Magpie Robin, but in September 1995 a far darker cloud appeared when a single Norway rat *Rattus norvegicus* was discovered on Frégate. BirdLife International immediately sought the advice of Don Merton, a world expert on island

rat eradication working at the New Zealand Department of Conservation. On his advice, 50 live traps were set to try and determine the extent of the problem. In two weeks of trapping, not a single rat was caught – but it is very difficult to trap rats when they are at low densities with plenty of food available.

The following month another rat was seen and, by November, an order was placed for 250 back-break traps and a supply of the rat poison difenacoum. By the end of November a trap grid had been set up on the low-lying coastal plain of the island and the first rats were caught after three days. Between November 1995 and February 1996 another 80 rats were caught. All except one of these were juveniles, suggesting the early stages of an invasion. Some poisoning was carried out at the same time and, although there was no evidence of harm to birds, the poisoning programme was terminated in February 1996 as it was deemed to be inefficient.

In February 1996, Mike Thorsen and Rachel Shorten were seconded from the Mauritian Wildlife Fund to initiate full-time rat control measures. Trapping efforts were increased to include higher-lying parts of the island but in the first month only two rats were caught. At this time it was decided to extend the poisoning campaign and tracks were cut through the bush for a 47-hectare poison grid. The reason for such a large grid was that a considerable time had now elapsed since the first rat sighting and there were fears that the rats may have already spread far into the island. Frégate is only 210 hectares in extent and rats could spread rapidly to occupy much of the island.

Funding for the poisoning was secured by early April 1996 and the operation was started immediately. This time, a different poison was used – a warfarin derivative containing brodifacoum. This poison acts through an anti-coagulant which causes death by haemorrhage. Although it does not affect invertebrates, it accumulates in the tissues of vertebrates, including birds. Both brodifacoum and difenacoum have been used successfully in rat eradication programmes elsewhere. ▷



The death of 'dark green – magenta'

The intention was to keep the poison grid active for 90 days. The poison is embedded in wax cubes and, under most conditions, it is fairly easy to tell whether the cubes have been nibbled by rats. On Frégate Island, however, the cubes are also nibbled by crabs and giant millipedes: consequently it was proving very difficult to assess the effectiveness of the operation.

The first sign of trouble arrived on 26 June 1996. During the morning 'round' of the island by BirdLife International researchers Rob Lucking and Vicki Ayrton, all seemed normal. By that afternoon, however, an immature Magpie Robin known as 'dark green – magenta', because of the colours of its leg rings, was found sick and was taken into captivity the following morning. Researchers were highly suspicious that 'dark green – magenta' had been poisoned. During the afternoon of 27 June, 'dark green – magenta' died and an autopsy clearly revealed the cause of death to be haemorrhage. The bird's parents, 'sky blue – sky blue' and 'pink – yellow' both appeared to be fine, but a further two, highly site-faithful, robins had been missing for several days and it was concluded that they too had succumbed to the rat poison. Some other non-territorial birds could also not be located and by late afternoon on 27 June the decision was taken to abandon the poisoning for fear that other birds may also have accumulated near-lethal doses of brodifacoum.

Future prospects

Precisely how rats were introduced to Frégate is not known, but what is known is that some rats survived the poisoning – fresh rat tracks were found on Frégate on the morning of 2 July, five days after all poisoned baits were removed.

The poisoning could lead to a short-to medium-term reduction in chick production, and a long-term reduction in chick production may result from inbreeding depression. These impacts



Several seabird species breed in Seychelles, and many of them have been heavily impacted by man. Fortunately, both Fairy Terns (above) and Lesser Noddies (below) are still common on Frégate.

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paint an uncomfortable picture for the Magpie Robin's future. The small population on Cousin provides some hope, but the ongoing development of a tourist facility on Frégate is a cause for concern. Increased boat traffic to the island will increase the risk of further rat introductions, possibly of the black rat *Rattus rattus*. This species is known to have caused the extinction of several island-endemic birds, including cavity-nesting species like the Magpie Robin.

Stringent measures are to be put in place to try to prevent such introductions, but only time will tell if they are successful. In the meantime, the best chance of aiding the Magpie Robin probably lies in trying to increase the area of suitable habitat on Frégate, rat-proofing nest sites and making additional translocations to other islands. These birds prefer fairly open forest with a well-developed litter layer in which they hunt for invertebrates. Such habitat on the island is rapidly being encroached upon by coconut palms, which have reached invasive, if not epidemic, proportions as a result of several years in which the plantations have not been managed.

Translocation is certainly a good option to offset some of the risks facing the Frégate birds, but there is a problem because of the lack of rat-free islands for such introductions. Perhaps consideration should be given to rat eradication on some other islands where food is presumably less super-abundant for the rats and poisoning is likely to be more effective than it was on Frégate.

In the past, rats have been successfully eradicated from several oceanic islands, but no eradication has been attempted at such an early stage of a rat invasion as at Frégate.

The saga of Frégate Island and its Magpie Robin, one of the world's rarest birds, is testimony to the maxim that prevention is better than cure. The only way to ensure that rat-free islands remain rat free is to institute stringent controls and regulations such that the likelihood of rats reaching the island is minimized or, preferably, eliminated. □