

Identification and management of nest aggressor to protect Endangered Mauritian birds on Ile aux Aigrettes



A Mauritius Olive White-eye building a nest (Picture by Jacques de Speville)

Report to the African Bird Club

Background

The Mauritius Olive White-eye *Zosterops chloronothos* is the most threatened of all Mauritian bird species. Surveys revealed the species' low numbers, localized range, fragmentation and continued decline. A species recovery programme was initiated by the Mauritian Wildlife Foundation (MWF) in 2005/2006. Following the success of the re-introduction of the Mauritius Fody *Foudia rubra* to Ile aux Aigrettes (2003-2006), another threatened endemic passerine, MWF designed a trial release programme (2006–2010) for the Mauritius Olive White-eye involving the monitoring of nests at Combo (Black River Gorges National Park), rescue of failing wild nests, incubation of eggs, hand-raising chicks and releasing fledglings onto Ile aux Aigrettes, a 26 Ha island off the southeast coast of Mauritius. The island is a Nature Reserve managed by MWF, is free of mammalian predators and the organisation is currently implementing forest and animal restoration projects, ecotourism and conservation education. The Mauritius Olive White-eye population on the islet is closely monitored and is supplementary fed. There are currently 70 birds on the island from an estimated global population of less than 270 birds, with none in captivity. We work in collaboration with the Mauritius National Parks and Conservation Service.

The Mauritius Olive White-eye is a Critically Endangered bird (IUCN classification), endemic to Mauritius. Surveys showed its continuous decline and range contraction, prompting the Mauritian Wildlife Foundation to take concrete action. Nest predation by Ship Rats *Rattus rattus* was identified as a major limiting factor affecting survival of Olive White-eye eggs and chicks in its source population. Following that, eggs and chicks were rescued from the source population (Combo) and the resulting juveniles re-introduced on Ile aux Aigrettes.

Since then, the population on Ile aux Aigrettes has grown, but not as quickly as predicted. Supplementary food is given to the White-eyes and Mauritius Fodies on Ile aux Aigrettes, and the birds breed well, suggesting that the problem did not lie with food availability or weather. More attention was then paid to nest monitoring; this suggested that this slow growth is due to aggression on the nest by introduced and invasive bird species but it could also be due to the endemic Mauritius Fody. We do not know which species are responsible and to what extent. Trapping multiple bird

species when we do not know the magnitude of their impact may prove to be ineffective, as we risk spending effort trapping birds that do not impact greatly on White-eyes and use trap designs that can trap a range of birds at varying success rate, some of which have no or negligible impact on White-eyes. In addition, trapping multiple species would be more time consuming than focusing on specific species, taking time away from other conservation related works, and may counterproductively reduce breeding success. Finally, trapping for multiple species would be expensive and require more traps.

Aims

The translocated Mauritius Olive White-eye population is breeding on Ile aux Aigrettes, but the breeding success is not as high as desired. Monitoring indicated that this might be due to nest aggression by other birds. The aim of this project is to identify aggressors using camera traps set up near the nests and then implement methods to control targeted competitors and aggressors.

Our study aims to identify which aggressor(s) is/are causing nest failures and allow management to more effectively target control or deterrence of nest aggressors and competitors. In island systems on Mauritius and globally attention is often focussed on introduced rodents. Our research will highlight other, perhaps unnoticed, impacts of introduced species or endemic aggressors like the Mauritius Fody *Foudia rubra*. Quantifying the role of additional nest aggressors will allow managers to deploy the right mix of actions to effectively recover the Critically Endangered Mauritius Olive White-eye, both on the rat free islet and remnant main island population but also for future passerine translocations.

This study would also be the base on which to build similar anti-nest aggression strategies in other endemic birds such as the Mauritius Fody and Mauritius Cuckoo-shrike *Lalage typica*, both of which are threatened (IUCN.org).

Methods

Since Mauritius Olive White-eyes, the target species, were not yet breeding on Ile aux Aigrettes, when the camera traps were received, we trialed the monitoring technique on Mauritius Fody and Pink Pigeon *Nesoenas mayeri* nests before being used on the Olive White-eyes; this data is also presented here.

The birds were monitored to find their nests with the help of binoculars. Once the nest was found, a camera trap was installed between 2 to 5 m from the nest to monitor the nest and identify nest aggressors. Nest camera monitoring covered the nest building to nesting success (a chick fledged) or failure (eggs or chicks died naturally or aggressed, or nest abandoned). The camera trap was checked weekly, the SD card changed and batteries changed, if needed.

Once the SD card was recovered, all the pictures captured were checked and we recorded if the nest was completely built, did it contain eggs, did the eggs hatch, did the chick(s) fledge or was the nest abandoned, did the breeding fail, was the nest aggressed. In case of aggression, we tried to identify the aggressor species.

The experiment started on the 1st July 2018 and ended on the 28th February 2019. During this time, 41 nests were monitored: 31 Mauritius Fody (due to greater breeding availability), 5 Pink Pigeons and 5 Mauritius Olive White-eyes nests.

Results

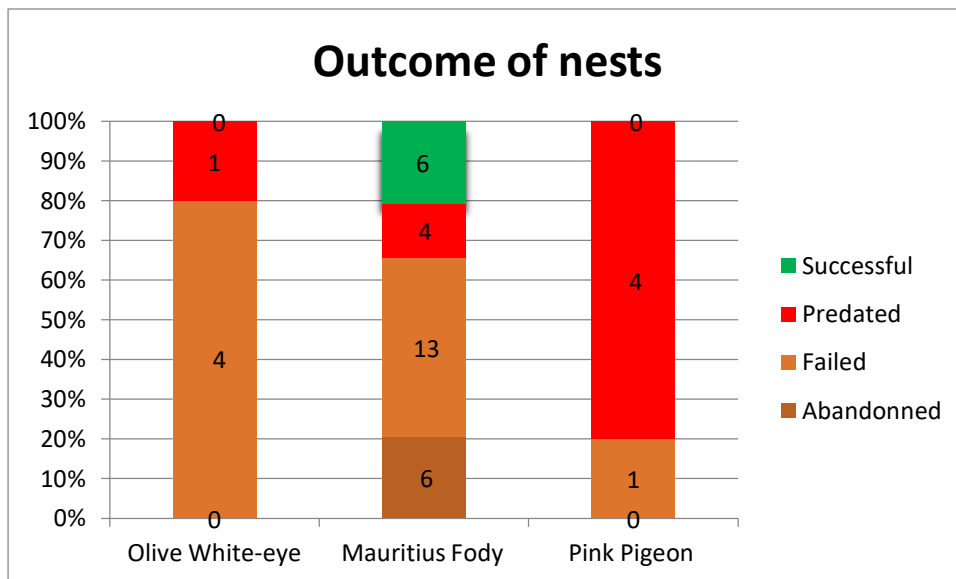


Figure1: Outcome of nests on Ile aux Aigrettes (%) for Mauritius Olive White-eyes (n=5), Mauritius Fodies (n=31) and Pink Pigeons (n=5). Outcomes of nests were assessed as 'abandoned' (nest abandoned at nest building stage), 'failed' (eggs or chicks aggressed or nest destroyed), and 'successful' (chick(s) fledged).

Overall, 22% (9) of the 41 monitored nests were predated during the monitoring period (Figure 1 & 2). Even if sample sizes were small, there were significant differences in nest predation between the three species (Wald's $\chi^2 = 6.97$, $df = 2$, $P = 0.031$). Mauritius Fody nests were more successful with 19% of the nest being successful at fledgling chicks, whereas Mauritius Olive white-eye and Pink Pigeons had no successful nests.



Figure2: Indian House Crow *Corvus splendens* predated a Mauritius Fody nest 3 days after the camera was installed.

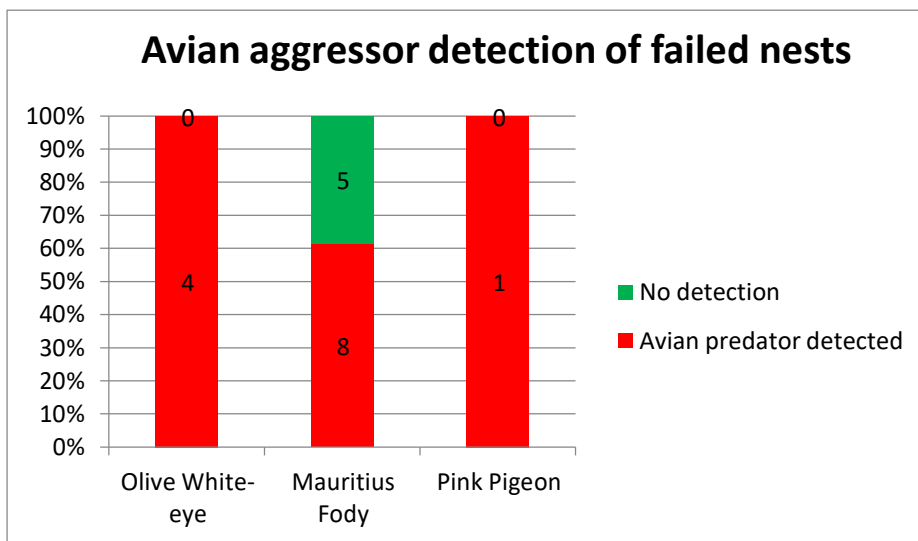


Figure3: Detection of aggressors of failed nests (%) for Mauritius Olive White-eyes (n=4), Mauritius Fody (n=8), and Pink Pigeons (n=1).

On closer investigation of the failed nests (Figure 3), 72% (13) of the failed nests had an avian predator detected close by. Even if we cannot prove it through this study, there appears to be a relationship between failed nests and avian predator detected close by.

The avian species most noticed next to the nests were the Indian House Crow *Corvus splendens*, Red-whiskered Bulbul *Pycnonotus jocosus* and the Indian Mynah *Acridotheres tristis* (Figure 4). The Indian House Crow seems to be the main culprit implicated in nest failures as it is often noticed at the time of failures and is further proven by nest cameras (Figure 2 and Figure 4).

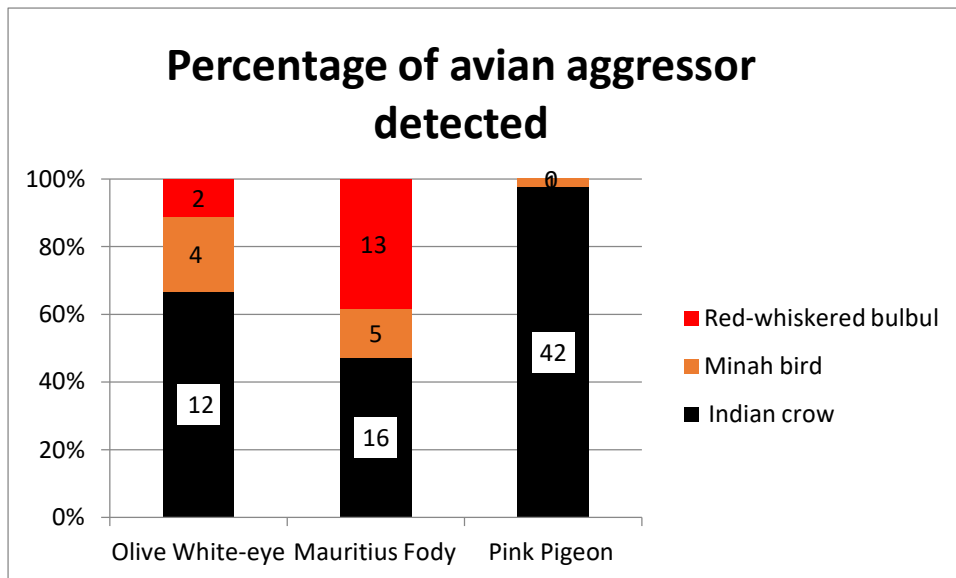


Figure 4: Detection of avian predators (%) near failed nests of Mauritius Olive White-eyes (n=20), Mauritius Fodies (n=34) and Pink Pigeons (n=41).

Discussion

Results from this study indicate that camera traps are effective at monitoring breeding attempts. Camera traps were used to monitor the outcome of nests for three threatened species, the Mauritius Olive White-eyes (Critically Endangered) and Endangered Mauritius Fodies and Pink Pigeons, and failures due to avian predators deducted. However, one needs to interpret the results with care, since the placement of the camera traps may also have impacted on the outcome of the nest and causing it to fail due to disturbance. This was particularly true for the Mauritius Olive White-eye, who did not appear to welcome nest cameras close to their nests.

The results also show that avian predators have an impact on nest outcome either directly by predation of the nest or indirectly by causing the nest to fail and the parents abandoning the nest, with the main culprit being the Indian House Crow. Albeit the

small sample size we also found that the crows affected the three focal species differently having a bigger impact on Pink Pigeons and Mauritius Olive White-eye compared to Mauritius Fodies. This could be linked to different factors such as the shape of the nests (Pink Pigeons and Mauritius Olive White-eyes build more open nests compared to Mauritius Fodies), varying levels of defence of the nests, and acceptance of an alien feature (nest camera) close to the nest. The study also needs to be continued to investigate causes of nest failure in greater detail and to confirm tendencies with a larger sample size.

Despite the small sample size, it is clear that Indian House Crows are having a big impact on the birds' breeding success and actions need to be taken to control the crows. At the moment, full eradication from Mauritius is not an option, but could be possible in future. The Mauritian Government is already conducting a national crow control and have been asked by MWF to intensify the control on the mainland facing Ile aux Aigrettes. MWF has also proposed to the government a plan for the eradication of crows from Mauritius. Furthermore, we will develop plans to control of crows on Ile aux Aigrettes through Ladder traps and Larsen traps (Figure 5). These could be set up on the island and using the camera traps obtained during this study, find out how the crows behave towards traps. This would help to select the best traps for the crows and if these do not work we should investigate other traps or methods of control.



Figure5: Ladder trap and Larsen traps that may be used to control Indian House Crows on Ile aux Aigrettes.

Conclusion

Thanks to the camera traps purchased through funding from the African Bird Club, we confirmed that an introduced avian predator is having a direct impact on the breeding success of endemic birds on the mammalian predator-free island, Ile au Aigrettes. The main avian culprit detected in nest failures was confirmed as the Indian House Crow. Actions are needed to control crows on Ile aux Aigrettes and on the mainland, whilst plans for a national eradication plan are driven further by the Mauritian Wildlife Foundation.

Financial report

January 2018 to February 2019

Description	ABC Budget Rs	ABC Actual Rs	ABC Actual £
Equipment			
Camera Traps Acorn (5)	25,515	20,333	455
Camera Traps Crenova (5)	16,145	19,062	426
Binoculars (2)	2,700	4,866	109
SD Cards (10)	3,600	4,868	109
Rechargeable batteries (6 packs of 8)	3,240	6,134	137
Battery chargers (2)	900	1,460	33
Bird traps (5)	3,150	0	0
Ladders to access trees for fixing cameras	2,250	0	0
Consumables: fixing cameras	1,500	1,347	30
Costs of field assistant	25,000	32,000	715
TOTAL	Rs84,000	Rs90,071	£2,014

Funding

Received from African Bird Club		Rs89,459	
Exchange rate	42	44.73	
TOTAL UK Pounds	£ 2,000	£ 2,000	