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AVIAN ECOLOGY

FLEEING BY WHIMBREL *NUMENIUS PHAEOPUS* IN RESPONSE TO USE OF A RECREATIONAL DRONE IN MAPUTO BAY, MOZAMBIQUE

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Summary
Report on an anecdotal observation of a flock of 40 Whimbrel reacting to the deployment of a recreational drone on the beach in Maputo Bay, Mozambique. The feeding flock responded rapidly on seeing the drone at ca. 20m altitude, taking flight and 'fleeing' in a way similar to the response to an aerial predator. Part of the flock then attempted to return to the nearby feeding area, before abandoning the vicinity and all birds retiring to the high tide roost earlier in the tide cycle than normal. Whimbrel in Maputo Bay are used to people, and reacted to the drone by fleeing at a greater distance than would normally be expected if the disturbance was simply from humans.

Introduction

The use of drones is increasing for recreational photography, for scientific research and potentially for delivery of lightweight packages (Gibbs 2016). Reviews of the impact of drones on birds have mostly been for the development of guidelines for the use of drones as a research tool (e.g. Vas et al. 2015 and McEvoy et al. 2016). There is as yet little published research on the unintended impact of recreational drones on birds.

Whimbrel use Maputo Bay as a non-breeding feeding area in a temporal pattern similar to other southern African coastal bay wetlands (Allan 2012, Bento 2014 and Parker 1999). The Whimbrels of Maputo Bay have been the subject of close observation since the finding of two Steppe Whimbrels *N. p. alboaxillaris* in February 2016 (Allport 2016a, b). Up to 650 birds use the northern part of the bay in January (G.A. pers. obs.). Approximately 70 Whimbrel were in the area at the time of the observation reported herein, 15 May 2016. There were no other shorebirds in the vicinity at that time.

Study

Regular counts of Whimbrels and other shorebirds were made in the northern part of Maputo Bay at least every two weeks onwards from February 2016 by a small team of voluntary observers. The shorebirds feed on sandy-mud substrate of the bay when the intertidal area is revealed by low water (<2m tidal height; normal spring tide range 0.9-3.2m) and either roost on mud banks offshore on neap tides or flight inland 1km to roost in mangroves in lagoons on higher tides. Regular counts focus on the rising tide as birds concentrate in intensity of feeding activity and into pre-tidal roost departure groups on the mudflats.

Disturbance

The beach in Maputo is heavily used for recreation by bathers, football players, joggers and dog walkers. The beach area is zoned with one section for wind surfers, another section for traditional prayer, one for marriages and three areas for launching dhow fishing boats. There are also many local shellfish collectors who use the lower beach on spring tides. In six years of regular observations no hunting nor any other direct human threat to birds has been recorded (G.A. pers. obs.). Whimbrel in north Maputo Bay are thus in regular

benign, close contact with man (Fig. 1) especially when feeding and roosting, and they show minimal avoidance, e.g. walking away, short flights and rarely fleeing (G. A. pers. obs.).

Figure 1. Whimbrels *N. phaeopus.* in northern Maputo Bay are relatively tolerant of humans. This bather is *ca*. 30m from a group of 90 Whimbrels, which are loafing unconcerned (photo credit: Gary Allport).

The beach is regularly patrolled by Peregrine Falcons *Falco peregrinus*, normally singly but with pairs and up to five birds in the area at times. Whimbrels normally respond rapidly on sight of Peregrines, 'fleeing' in fast flight from the mudflats heading out offshore low over the water calling frequently, with often scattered feeding birds rapidly forming into a tight group in flight, before climbing and circling over the water, calling frequently (G. A. pers. obs.) until the falcon has left the vicinity.

Circumstances of the observation

On a high tide roost count 10.00hrs on 15 May 2016 a scattered group of 40 Whimbrels were found feeding actively on the rising tide. There were no other shorebirds in the immediate vicinity. The tidal range was low (high tide of 2.45m at 13.35hrs) Observations from the adjacent road were underway (at 25°54'36.6"S 32°39'09.9"E) for 30 minutes using 8x40 binoculars, 20-40x telescope and Digital SLR camera with a 400mm lens. .

At 10.24hrs a group of three men (the only people on the beach within at least 1km in each direction at the time) were 200m southward from the nearest Whimbrel. They launched a drone from the beach. The drone was of a 'Phantom' type with four rotors (Fig. 2.). The men had been in that position for at least 30 minutes and were otherwise normally behaved. The Whimbrels had been following their normal high tide behaviour, moving southward along the bay shore as the tide rose, which took them towards the men. There was no prior evidence that the drone was to be launched.

The drone was started on the ground and clearly audible from the observation 200m to the north west, ran for ca. 1 minute, and was then observed as it lifted and hovered for ca. 1 minute at ca. 5m altitude. At this point it was probably not visible to some of the Whimbrel (out of sight behind some mangroves), and then lifted to ca. 20m and visible to all the feeding birds where it hovered for at least ten minutes whilst the men huddled around a tablet computer presumably reviewing images.

Figure 2. Part of a flock of 40 Whimbrel flying within ca. 150m of the drone (visible below left). Distance effects are foreshortened by use of 400mm telephoto lens at 300m range (photo credit: Gary Allport).

Reaction by Whimbrel

On the initial sound of the drone the nearest Whimbrels took interest but showed no sign of especial alarm. On seeing the drone rise to 5m the nearest birds stopped feeding entirely and three birds raised their wings and walked away rapidly calling amongst each other and stopped to watch intently after around 30 seconds. On seeing the drone rise to 20m all the Whimbrel in a scattered flock (some birds up to 400m distant) called vociferously and took flight within a few seconds, 'fleeing' low over the water, drawing in all the scattered birds to a tight flock. They flew out into the bay, at a tangent south-eastwards (i.e. not in the exact opposite direction away from the drone) and then climbed to ca. 30m and headed south calling. After ca. 3 minutes, they turned northwards and headed back towards the feeding area, staying in a tight flock over the water, calling but flying hesitantly. As they approached the drone they split into two groups, one turning back southwards, the other continuing north eventually passing the drone ca. 150m to the east, and then circling over the feeding area sometimes in panicky 'fleeing' flight again (Fig 3.). Three birds split off and landed for a few seconds before leaping back into the air and re-joining the group which continued to circle offshore and to the east for five minutes. In the intervening time the second group also flew back northwards and re-joined the group, and continued to circle. After another ca. 2-3 minutes the group turned southwards and headed purposefully for the high tide roost site in the mangroves, thereby departing the feeding area ca. 45 minutes earlier than would be expected on a tide of that height.

Observations were terminated at this point. The drone was still airborne on departing the observation point at 10.34hrs. The interaction was photographed throughout and the timings were taken from the image metadata.

Discussion

Gill et al. (2001) pointed out that disturbance responses of animals is akin to that of a predator response and is likely to reflect the availability of alternative habitat that can be used and, linked to this, the likely fitness cost of the response disturbance exposure. Thus some animals apparently expressing high levels of disturbance sensitivity may simply be freely moving to an easily available alternative undisturbed locality. This would seem to be the case in this instance with alternative feeding widely available. However, some of the birds chose to attempt to return to their original feeding area, but ultimately retired to a non-feeding safe roost location,

neither of which fits into the pattern described by Gill et al. (2001). However, it has to stressed that this is only a single observation.

Figure 3. Part of the flock of Whimbrel circling upward in 'fleeing' flight (photo credit: Gary Allport).

Animals in regular benign contact with man showing reduced disturbance impact (Samia et al. 2015). Individual Whimbrel feeding on mudflats in an area less used by man on Inhaca Island, Maputo Bay, showed a measurable reduction in percentage time spent feeding when humans approach within 150m and a mean minimum approach distance (i.e. when taking flight) of 100m, significantly higher than the other smaller species of shorebird present there (de Boer and Longamane 1996). These measurements have not been repeated on Whimbrel in north Maputo Bay but birds are clearly more tolerant here, often easily approachable to within 30m (G.A. pers. obs. and Fig 1.).

There is therefore a good basis to suggest that the fleeing reaction of the Whimbrel reported herein was not a result of the three men visible to the birds, but that the drone was the source of disturbance. The reaction of the Whimbrel was consistent with the response to a significant predator rather than to normal human disturbance.

Reviews of the impact of drones on birds have mostly been for the development of guidelines for use of drones as a research tool. Vas et al. (2015) reported on approaching birds with drones from a range of angles, noting that Greenshanks *Tringa nebularia* could be approached to within 4m without showing signs of disturbance if done carefully. Similarly McEvoy et al. (2016) concluded that drones could be used for waterfowl surveys, recommending protocols to minimise disturbance.

As yet there seems to be little published research on the impact of drones on birds when deployed for recreational or other uses not subject to operational protocols.

Although the single observation reported herein is meagre evidence, it is nevertheless useful and an initial cause for concern.

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