OPPORTUNISTIC OBSERVATIONS OF TRAVEL DISTANCES IN COMMON MYNAS (Acridotheres tristis)

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OPPORTUNISTIC OBSERVATIONS OF TRAVEL DISTANCES IN COMMON MYNAS (*Acridotheres tristis*)

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Abstract: *Understanding patterns and drivers of movement in invasive species is critically important to modelling their spread and evaluating their impact. The Common Myna (Acridotheres tristis according to http://www.worldbirdnames.org/, but recently proposed to be re-classified as Sturnus tristis, Christidis and Boles 2008) is an introduced commensal passerine which is expanding its range across the East coast of Australia. Aside a few published anecdotes of long distance travel, nothing is known about the spatial behaviour of mynas. Here, we report a series of opportunistic observations on the movement of translocated individuals in this species. These observations show that the Common Myna appears to have a strong homing instinct when it is translocated away from its home base and is capable of covering long distances (40 km). Homing occurs even when individuals have been held in captivity for a substantial amount of time. One can only assume that homing must be enabled by excellent navigation capabilities. We also noted that two long-term bonded pair of mynas remained together from capture, during captive holding and during post-release travel and were found within proximity of their original trapping location, with one pair known to be breeding. These observations confirm published reports that mynas form behaviourally monogamous, life-long pair bonds.*

1. Introduction

Long-distance movements might be an important component explaining the invasive success of certain species. Indeed, the ability to move quickly and/or for a large amount of time could accelerate the spread of invasive populations and promote rapid geographic range expansion, particularly at a front edge (Hui *et al.* 2012; Llewelyn *et al.* 2010; Niewiarowski *et al.* 2012; Phillips *et al.* 2006). It is therefore crucial to use realistic information on movement ability to understand how a species can travel and to predict future range expansion rates (Chiaverano *et al.* 2014; Hastings *et al.* 2005; Miller and Holloway 2015; Strona 2015; Wilson *et al.* 2009).

The Common (Indian) Myna is a highly commensal passerine native to India and south-east Asia which has been introduced to Australia in the 1860s (Feare and Craig 1999; Hindwood 1948). Following a series of independent introduction events, the Common Myna has experienced global spread and is now present in North America, the Middle East, South Africa, North Africa, Australia, New Zealand and islands throughout the Pacific region (IUCN Global Invasive Species Database 2015). It is one of only three species of birds to be nominated by the Invasive Species Specialist Group among the "100 World's Worst" invaders (Lowe et al 2000). The Common Myna is now well established in major urban centres along Australia's eastern and south-eastern coastline and still expanding its range.

A study on the invasion sequence of the Common Myna showed a slow rate of demographic range expansion for this species (Grarock *et al.* 2013). Common Myna population sizes seem to increase slowly before reaching a peak growth rate that lasts until the maximum population size is reached (Grarock *et al.* 2013). Then, the growth rate slows and the population size decreases again (Grarock *et al.* 2013). This slow growth pattern reinforces the common perception that Common Mynas have a sedentary nature. Indeed, movements of adults have been reported to be limited to an average travel distance of three kilometres between the roost and feeding sites (Feare and Craig 1999). This is consistent with observations made in Canberra of banded individuals that were re-sighted less than 3 km from the capture location (Nicholls and Nicholls 2010). This distance is even smaller in Singapore, where a study showed an average of only 0.4 km from roost to feeding sites (Kang 1989).

But can the Common Myna travel longer distances under certain conditions? A small number of references suggest that this species might be capable of long-distance flights. In Canberra, two birds are reported to have travelled more than 3 km from their capture location (respectively 4 km and 9.5 km) (Nicholls and Nicholls 2010). In Dhami *et al* (2010), the authors mention observations of flights between islands 50 km apart. In another paper, Parkes and Avarua (2006) refer to Watling (2004) who showed that birds flew from Tutuila to Manu'a (American Samoa, 134 km distance). Similar observations of movement across the sea (colonization of n. Tasmania from Victoria and some offshore islands in New Zealand) are reported by Higgins *et al.* 2006. However, how these observations were quantified is not clear.

In our Comparative Cognition Laboratory based at the University of Newcastle (NSW, Australia), our research team has been studying the Common Myna since 2005, investigating why this species is ecologically so successful. Our research has focused primarily on its opportunistic and behaviourally flexible nature. Amongst other things, we have demonstrated that Common Mynas learn from each other about novel predators (Griffin 2008) and dangerous places and that they show consistent individual differences (*i.e.* personality) in exploration, approach of novelty and problem solving tendencies (Diquelou *et al.* 2015; Griffin and Diquelou 2015; Griffin *et al.* 2013; Sol *et al.* 2011). The outstanding learning capacities of this monogamous vocal mimic are in line with published scientific studies reporting bait avoidance learning (Feare 2010) and learning of armed myna shooters and their whereabouts (Dhami *et a*l. 2010). These behavioural traits no doubt contribute to the extraordinary success of this ecological invader. For references and more information on our research, please go to http://andreasgriffin.weebly.com/. Recently, we have begun investigating the spatial movements of this species. Within the context of this novel angle to our myna research, we report a series of opportunistic observations collected in our laboratory.

2. Observations

Part of the work in our laboratory involves trapping birds and transporting them into captivity for testing. As part of our routine processing, each bird is measured and tagged with a unique combination of coloured leg bands. Over the years, a handful of accidental releases of tagged birds have occurred for reasons outside our control (*e.g.* our research facility was broken into; a super storm destroyed our aviaries; our traps have been vandalized). On the occasions reported here, these tagged birds have been resighted in the wild by members of our research group. With knowledge of the original trapping location (presumably their home base), the release location and the re-sighting location, we have been able to document several important aspects of myna spatial, but also pair bonding behaviour. This series of re-sightings is reported in Table 1 and Fig 1 and summarised briefly below.

Three birds (100, 110 and Dark blue, see footnote in Table 1) trapped at the Broadmeadow Racecourse in Newcastle on the 15 Jul 2014 were transported to the Central Animal House at the University of Newcastle and held in captivity for testing. One month later (on the 01 Aug 2014 they were accidentally released. One of them was re-sighted on the 28 Jul 2015 (almost one year later) in close proximity to the location where it was originally captured (32°55'53.7"S 151°44'47.9"E), seven kilometres from the University of Newcastle Central Animal House. The two other birds were observed breeding twice in a nest box at the racecourse on the 26 Nov 2015 and the 5 Jan 2016 (16 to 17 months after release).

Two further birds (208 and 211, Table 1) were trapped at the racecourse between the 12 and 14 Nov 2014 and escaped from the Central Animal House five months later (kept paired together in an aviary) during the storm (22 Apr 2015). Both were re-sighted near the racecourse on 15 Jul 2015 (32°55'35.8"S 151°44'47.2"E).

Lastly, one very noticeable event was reported. A bird (14) trapped on the 21 May 2013 in the Newcastle suburb of Jesmond (Blue Gum Road, NSW 2299) was transported and held in the Central Animal House. On approximately the 25 Nov 2013, the bird was moved to Cooranbong to serve as a caller bird inside a trap (Freemans Drive, Cooranbong NSW 2265). On 28 Nov 2013, the trap was vandalized and the bird escaped. Eleven months later, this bird was re-sighted in Darby St in Newcastle, 40 km away from the release site.

Table 1. Details of the observations of accidentally released common mynas in Newcastle.

Birds	ID				Capture	Release	Re-sighted	
No.	**Band No.**	**Colour bands (as sighted)**	**Age**	**Sex**	**Date**	**Date**	**Date**	**Dis-tance (km)**
1	14	Orange/Red	Adult	Unknown	21 May 13	28 Nov 13	18 Oct 14	40
2	211	White/Grey	Adult	Male	14 Nov 14	22 Apr 15	15 Jul 15	7
3	208	Orange/ Light Green	Adult	Female	12 Nov 14	22 Apr 15	15 Jul 15	7
4	*	Dark Blue	Adult	Unknown	15 Jul 14	01 Aug 14	28 Jul 15	7
5	110	Light Blue/ Light Blue	Adult	Female	15 Jul 14	01 Aug 14	26 Nov 15	7
6	100	Light Blue/Dark Blue	Adult	Male	15 Jul 14	01 Aug 14	5 Jan 16	7

*Seven escaped birds were banded with at least one dark blue band. Of those seven, six were captured on the date and location indicated in the table and one was trapped on 16 Sep 14 in Gavey St and escaped on the 06 Apr 2015 from the CAH. This uncertainty as to the exact identify of this bird will not change the distance travelled between release and re-sighting (7 km).

3. Discussion

Common Mynas are thought to be sedentary and previous studies showed that they were mostly travelling short distances (around 3 km) between roost and feeding sites (Feare and Craig 1999; Kang 1989; Nicholls and Nicholls 2010). Yet, the Common Myna is a very successful invader across all the locations to which it has been introduced. Its Australian range is still expanding. As such, we might expect this species to show some ability for long-travel to support its geographical expansion. Our observations show that the Common Myna is capable of long-distance travel. Indeed, five birds had moved 7 km between a release site and a re-sighting location, and one bird travelled 40 km.

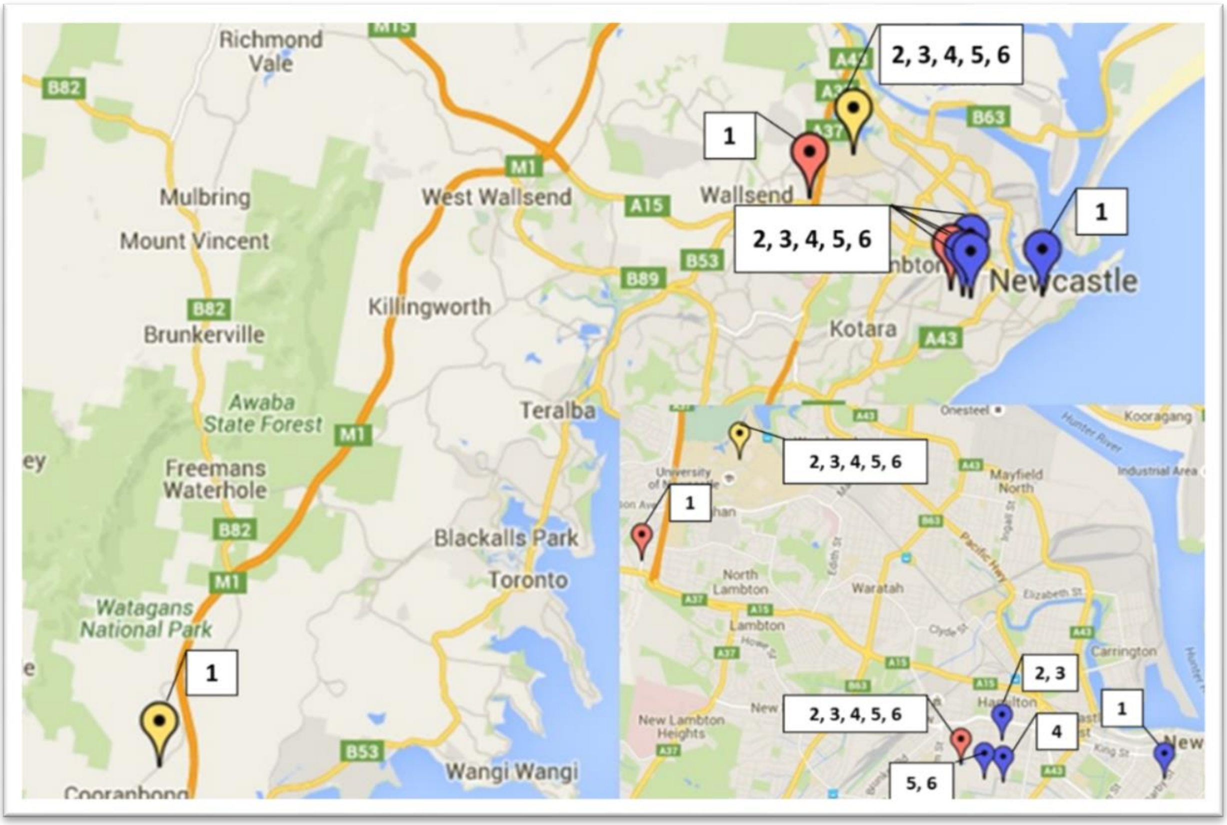

Figure 1. Map of the different event locations (trapping, release, and re-sighting). The numbers on the map match the observation number indicated in Table 1. In red (medium grey in b/w print): trapping sites; in yellow (light grey): release sites; in blue (dark grey): re-sighting positions.

Previous research on spatial movements in birds suggests that translocated individuals having a stronger tendency to move than resident birds (Armstrong *et al.* 1999; Coates *et al.* 2006; Toepfer 1976). For example, a radio-tracking study on Greater Prairie-Chickens (*Tympanuchus cupido pinnatus*), a resident species with relatively short distance movements, showed that translocated individuals could travel an average of 330 km over the course of a year, with one bird moving up to 10 times that distance (3988 km) (Vogel *et al.* 2015). Another study on the same species suggested that longer movements might be linked to the stage of the breeding cycle in translocated birds (Toepfer 1976). Birds transplanted during the breeding season had large wandering movements. This suggested a searching pattern in a potential effort to return to their original breeding territories. On the other hand, a bird transplanted after the breeding period and that was then no longer under the influence of a territory drive, did not wander and seemed to accept a new area immediately.

In line with the findings from these studies, our observations indicate a tendency for birds translocated from what was presumably their home base to come back to that location, even after several months in captivity. All individuals were adults when captured. Therefore, based on the behaviour of prairie chickens, this homing instinct might have been linked to the fact that the birds might have already established their adult breeding territory. This hypothesis receives support from additional observations in our research group. In this case, mynas in juvenile plumage escaped, but were re-captured several months later at the release site, suggesting that these young individuals had remained at the location where they were held in captivity instead of returning to their capture location.

Our observations seem to lend support to the reported sedentary nature of common mynas. The birds preferred to go back to their territory rather than remain in an alternative location. This sedentary nature seems difficult to reconcile with the fact that the Common Myna is an invasive species, still spreading across Australia. We can note that all escapees were captured in Newcastle, in a long-established (more than 60 years) population. Research in several invasive species is revealing that differences exist between populations at the source and front of the invasion wave in relation to morphological, physiological and/or behavioural characteristics that might promote dispersal (Liebl and Martin 2012; Liebl and Martin 2014; Llewelyn *et* al. 2010; Martin and Fitzgerald 2005; Phillips *et al*. 2006). It is therefore possible that birds at the front of the NSW invasion wave would have behaved differently to our Newcastle sample. These are aspects of myna behaviour we are currently investigating.

Lastly, our observations provide insight into the close, long-term pair bonding that exists in mynas. Firstly, two birds were captured in the same trap on the racecourse and then held together in an aviary for about five months. They produced a clutch in captivity prior to being accidentally released during a super storm that destroyed part of our facilities (observation numbers 2 and 3). A few months later, they were re-sighted together near the racecourse. Secondly, two others birds trapped at the same time on the racecourse and held in captivity for one month were sighted breeding in a nest box on the racecourse more than a year after their release (observation numbers 5 and 6). These observations lend support to another biological characteristic of Common Mynas: they form behaviourally monogamous, life-long pair bonds (Feare and Craig 1999).

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