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Short Note

Are Southern Black Flycatchers *Melaenornis pammelaina* associated with Fork-tailed Drongos *Dicrurus adsimilis*?

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Southern Black Flycatchers *Melaenornis pammelaina* and Fork-tailed Drongos *Dicrurus adsimilis* are common birds in the woodlands, savannas and forest edges of south-eastern Africa (Dean 2005, Johnson 2005, Monadjem 2005). These two species have similar foraging strategies, such as hawking or pouncing on prey from an exposed perch (Fraser 1983, Perrins 2009, Flower 2011). In addition, both birds have all-black plumage and are similarly-sized making them similar in appearance (Herremans 1992). Nonetheless, the Fork-Tailed Drongo is known to be a highly aggressive bird, whereas the Southern Black Flycatcher is not (Dean 2005, Johnson 2005). It has been suggested that this similarity in morphology and behaviour may be due to mimicry, providing the Southern Black Flycatcher with some form of advantage (Herremans 1992, Caro 2005). This hypothesis, however, has yet to be tested.

Fork-tailed Drongos typically hawk insects, which are often caught after being flushed by large mammals (Dean and Macdonald 1981) or fires (Dean 1987). Drongos are commonly found foraging in mixed species groups (Thomson and Ferguson 2007), which appears to improve their foraging efficiency (Herremans and Herremans-Tonnoeyr 1997). They frequently attend veld fires in mixed foraging groups (Dean 1987) and their behaviour within those groups is often aggressive and can include kleptoparasitism (Dean 1974, 1988, Ridley and Raihani 2007). For example, drongos use alarm calls to rob birds and mammals of their prey (Herremans and Herremans-Tonnoeyr 1997, Ridley and Raihani 2007, Flower 2011). What has yet to be determined is if the relatively docile Southern Black Flycatcher actually follows the aggressive Fork-tailed Drongo and why. Possible benefits for the Southern Black Flycatcher include increased foraging efficiency and/or reduced risk of predation.

Our objective for this study was to determine if the presence of the Southern Black Flycatcher is closely associated with that of the Fork-tailed Drongo and to generate hypotheses on the possible reasons behind this relationship.

Material and methods

The study took place in the lowveld of Swaziland, the low-lying region between the northern Drakensberg

Escarpment and the Lubombo Mountains. The lowveld lies in the eastern half of the country and is the lowest, warmest, and driest region. Vegetation is characterised as lowveld savanna, with three distinct broad-scale vegetation types: *Acacia* savanna, broadleaved woodland, and riverine forest (Mucina and Rutherford 2006). We specifically sampled in Mlawula Nature Reserve, Mbuluzi Nature Reserve and the town of Simunye. The vegetative communities in both nature reserves are dominated by acacias *Acacia (Vachellia)* spp., ironwood *Combretum imberbe* and marula *Sclerocarya birrea*. The town of Simunye, approximately 10 km from Mbuluzi Nature Reserve, is a small town dominated by suburban lawns, parks and low-density development.

From 14 to 23 May 2011, we conducted walking surveys for Fork-tailed Drongos and Southern Black Flycatchers in Mlawula Nature Reserve, Mbuluzi Nature Reserve, and Simunye. We walked 10 systematically placed 5 km transects during the early morning (07:00 to 11:00) and late afternoon (16:00 to 17:00). We walked slowly and recorded any Southern Black Flycatchers or Fork-tailed Drongos that were observed.

When a Fork-tailed Drongo and/or Southern Black Flycatcher was sighted, we watched the bird(s) for approximately 1 min to observe its behaviour, and recorded any other bird species within an estimated 20 m of the initial bird spotted. If a Fork-tailed Drongo or Southern Black Flycatcher was spotted but could not be adequately observed during the 1 min time period, the sighting was excluded from our analyses.

We recorded our observations in three categories: Southern Black flycatcher only, Fork-tailed Drongo only, and both species. We then estimated the probability of observing a Southern Black Flycatcher with a Fork-tailed Drongo and the probability of observing a Fork-tailed Drongo with a Southern Black Flycatcher. We used a chi-square (χ^2) test of independence to test for differences between these probabilities. We predicted a greater probability of observing a Fork-tailed Drongo when a Southern Black Flycatcher was present, indicating a positive association between the Southern Black Flycatcher and Fork-tailed Drongo, but not *vice versa*.

Results

We recorded Southern Black Flycatchers and Fork-tailed Drongos on all three sites for a total of 50 detections. Of these, Fork-tailed Drongos were observed alone on 28 occasions, Southern Black Flycatchers alone on seven occasions, and the two species together on 15 occasions. The probability of observing a Southern Black Flycatcher when a Fork-tailed Drongo was present was 0.34 (95% CI 0.21–0.50), whereas the probability of observing a Fork-tailed Drongo when a Southern Black Flycatcher was present was 0.68 (0.45–86). These probabilities were significantly different ($\chi^2 = 6.49$, $df = 1$, $p = 0.011$).

Discussion

As predicted, we observed significantly more Southern Black Flycatchers with Fork-tailed Drongos than Drongos with flycatchers. This suggests that Fork-tailed Drongos do not associate or follow Southern Black Flycatchers, but rather the Southern Black Flycatchers appear to indeed be associating themselves with Fork-tailed Drongos (Ridley and Raihani 2007, Flower 2011). Potential benefits that birds might gain through an association with drongos are a decreased risk of predation or increased foraging success (Ridley and Raihani 2007, Radford et al. 2011). In fact, Radford et al. (2011) suggested that the Pied Babbler *Turdoides bicolor* had higher foraging efficiency when Fork-tailed Drongo calls were played. The Pied Babblers spent less time with their heads up watching for predators when Fork-tailed Drongo calls were played than when background noise was played (Radford et al. 2011).

It is also possible that the Fork-tailed Drongo has a symbiotic or mutualistic relationship with the Southern Black Flycatcher similar to the relationship between the Greater Racket-tailed Drongo *Dicrurus paradiseus* and its symbionts in Sri Lanka. Racket-tailed Drongos lead foraging flocks more often than expected, experiencing higher rates of energy gain by doing so (Goodale and Katagama 2005, Satischandra et al. 2007). At the same time, other species benefited from the Racket-tailed Drongo's reliable alarm calls in times of danger (Katagama and Goodale 2004). Similarly, Fork-tailed Drongos may gain energy benefits from their association with the Southern Black Flycatcher. Moreover, Fork-tailed Drongos are also known to engage in and likely benefit from kleptoparasitism (Herremans and Herremans-Tonnoeyr 1997, Ridley and Child 2009). On the other hand, the Southern Black Flycatchers may be benefiting from alarm calls in a similar manner to the Greater Racket-tailed Drongo's symbionts.

The Southern Black Flycatcher may also enjoy the benefits of reduced vigilance and increased foraging because other birds may be unable to distinguish the flycatcher from Fork-tailed Drongos because of their similar appearance and foraging behavior (Fraser 1983, Sinclair et al. 2002). It has been suggested that other species such as meerkat *Suricata suricatta* and Southern Pied Babbler (Ridley and Raihani 2007, Flower 2011, Radford et al. 2011) benefit from associating with Fork-tailed Drongos, demonstrating that mimicry is not always necessary. However, mimicry may be important for the diminutive, non-flocking and hence vulnerable Southern Black Flycatcher.

An alternative explanation for our results is that Fork-tailed Drongos exploit microhabitats or food sources that flycatchers do not; however, there is no microhabitat data to test this alternative explanation. If researchers can rule out the possibility of habitat partitioning, what remains to be elucidated are the specific benefits Southern Black Flycatchers receive from their behaviour.

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