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Ornithology

Prey items of Southern Fiscal *Lanius collaris* in southern Namibia

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Abstract

Although Southern Fiscals *Lanius collaris* are a common species in southern Namibia, we found only 18 impalements of prey items. We discuss these in relation to the species impaled, the site of impalement, the height above ground and the time of the year. We suggest that the small number of observations was due to the fact that the study period (July 2017 to June 2022) had below average rainfall, that food was therefore scarce and consumed, and that impalements events were rare.

Introduction

Southern Fiscals *Lanius collaris* are known predators of various vertebrates, ranging from trout to tadpoles, snakes to bats, birds and mice, and a plethora of invertebrates, mainly a variety of beetle species (Pearson 1962, Skead 1995, Kopij 1999, Fry et al. 2000, Soobramoney et al. 2004, Hockey et al. 2005). Even snails, ticks, caterpillars and fruit are included in their diet, indicating the wide range of food items, with virtually nothing being sacred (Roberts 1940, Broadly 1974, Roos & Roos 1988, Skead 1995).

Although Southern Fiscals do not cache as much as their northern hemisphere counterparts (Harris & Arnott 1988), prey items are often impaled or wedged on thorns, wood splinters, and barbs of wire fences (Hockey et al. 2005) which serve as a 'storage' function (Bevan & England 1969) or as a display for territorial advertisement and to attract females (Yosef & Pinchow 1989).

Methods

Southern Namibia is part of the core of the range of Southern Fiscals (Hockey et al. 2005), and they were frequently observed during our study period, between July 2017 and June 2022 at two sites in southern Namibia: farm Kanaan (25°53'23.7"S, 16°09'08.7"E; 1,046m) in the Helmeringhausen area, and farm Korhaan (28°16'12.7"S, 18° 03'44.1"E; 740m) in the Grünau area. The farm Kanaan consists of Dwarf Shrub Transition Zone and the farm Korhaan of Nama Karroo, so that the vegetation types are dominated by dwarf shrubs and grasses (Mendelsohn et al. 2002). We kept a watch for impalements made by Southern Fiscals and encountered prey items serendipitously. For each impalement, we recorded the date, the prey species, the plant species (or fence) on which the impalement took place, the height of impalement above ground level and the height of plant (or fence). We considered the impalements in relation to these variables.

Results

Eighteen prey impalements were recorded during the five-year study period. The most numerous prey items recorded were Orthoptera (39%) and Coleoptera (33%), followed by Aves (22%) and Reptilia (6%) (Table 1; Figure 1).

The locations of impaled prey items were mainly associated with natural features such as the spines, and/or woody parts, of trees and shrubs (83%) compared to fences (17%). 56% of the impalements were on *Parkinsonia africana* (greenhair tree) and *Rhigozum trichotomum* (three-thorn) (Figure 2).

50% of the prey items impaled were at heights between 1.0 m and 1.5 m and 67% of prey items were impaled at heights greater than 1.0 m (Figure 3). Given that the habitats at the farms consist of dwarf shrubs and grasses, this indicates that the Southern Fiscals selected high vantage points to cache and display their prey items.

89% of the prey items were observed between April and August (Figure 4). 83% were in the three midwinter months June, July and August (Figure 4).

Arthropods as prey items

Southern Fiscals prey on a wide variety of arthropods, mostly insects, with Hymenoptera, Orthoptera and Coleoptera being the three most important groups determined in KwaZulu Natal, South Africa (Soobramoney et al. 2004); Kopij (1999) indicated that Tenebrionidae and Scarabaeidae form the largest (and equal) part of Coleoptera prey in the Free State, South Africa.

We identified seven arthropod taxa of which four were Orthoptera (locusts and crickets): *Anacridium moestum*, *Acanthoplus* spp., *Hoplolopha* spp., *Locustana pardalina*; we found three species of Coleoptera (tenebrionid beetle species): *Onymacris multistriata*, *Psammodes striatus*, *Somaticus aeneus* (Cunningham & Cunningham 2021) (Figures 5–7, Table 1).

Two locust species occasionally form swarming plagues in southern Namibia: *Anacridium moestum* (tree locust) (Figure 5) and especially *Locustana pardalina* (brown locust) (Marais & Wittneben 1997, Namibia Biodiversity Database). In contrast, *Hoplolopha* spp. (saw-backed locust) are never common albeit widespread throughout Namibia. Outbreaks of brown locust were experienced during 2021 and again during early 2022 in southern Namibia, probably increasing their occurrence as prey item during this period. *Acanthoplus* spp. (armoured ground cricket) (Figure 6) can also occasionally reach plague proportions although this has not been recorded in southern Namibia (pers. obs).

Onymacris multistriata is a near endemic diurnal species to Namibia (Louw & Seely 1982, Namibia Biodiversity Database) and usually associated with sandy areas in southern Namibia (John Irish pers. comm.). As few insects are active during the activity periods of *O. multistriata*, they potentially have many predators (Duncan 2003). There are 12 species of the genus *Psammodes* (for example, *P. striatus*, striped toktokkie, Figure 7) in Namibia of which six species are viewed as endemic (Namibia Biodiversity Database). *Somaticus aeneus* (tar darkling beetle) is known to occur in south-eastern Namibia (Namibia Biodiversity Database), although it is more widespread in South Africa, where they scavenge on plant and animal material (Picker et al. 2019).

Birds as prey items

Birds included in the diet of Southern Fiscal include African Quail Finch, Brubru, Cape Canary, Cape Sparrows, Grey Tit, Golden-breasted Bunting, Helmeted Guineafowl (chicks), House Sparrow, Levaillant's Cisticola, Mountain Wheatear, Speckled Pigeon (chicks), Stonechat, Wailing Cisticola, (Siegfried 1965, Ade 1978, Weaving 1980, Dean & Dean 1987, De Swart 1989, Claasen & Claasen 1989, Roos & Roos 1988, De Swart 1990, Skead 1995, Kopij 1999, De Swart 2016). However, birds only account for between 1–2% of all prey items as determined in KwaZulu-Natal, South Africa (Soobramoney et al. 2004).

We identified one Black-eared Sparrow-lark *Eremopterix australis* (Cunningham & Cunningham 2021) and two lark species, Stark's Lark Spizocorys *starki* and Fawn-coloured Lark *Calendulauda africanoides*. The entire carcass (minus head) of the Black-eared Sparrow-lark was impaled while only the head and/or parts thereof with

Table 1: Details of Southern Fiscal prey items (n=18) recorded between July 2017 and June 2022 from two locations in southern Namibia.

Date	Prey item			Height (m)		Farm
	Scientific name	Common name	Impaling location: plant species or fence	Impaling height	Total height	
2017/07/21	*Trachylepis occidentalis*	western three-striped skink	*Rhigozum trichotomum*	0,7	1	Korhaan
2018/08/13	unidentified bird chick	unidentified bird chick	*Salsola nolothensis*	0,25	0,5	Korhaan
2020/04/03	*Onymacris multistriata*	–	*Boscia foetida*	1,5	2	Korhaan
2020/04/21	*Eremopterix australis*	Black-eared Sparrow-lark	*Boscia foetida*	1	2,25	Korhaan
2020/09/06	*Somaticus aeneus*	tar darkling beetle	*Boscia foetida*	1,4	2,5	Korhaan
2021/05/09	*Locustana pardalina*	brown locust	fence	1,6	1,6	Korhaan
2021/06/04	*Somaticus aeneus*	tar darkling beetle	fence	1,5	2,5	Kanaan
2021/06/19	*Spizocorys starki*	Stark's lark	*Parkinsonia africana*	1,4	2,5	Korhaan
"	*Calendulauda africanoides*	Fawn-coloured Lark	*Parkinsonia africana*	1,2	2,5	Korhaan
"	*Psammodes striatus*	striped toktokkie	*Parkinsonia africana*	1,2	2,5	Korhaan
2021/07/05	*Somaticus aeneus*	tar darkling beetle	*Rhigozum trichotomum*	0,4	0,5	Kanaan
2021/07/15	*Anacridium moestum*	tree locust	*Acacia erioloba*	2	3,5	Kanaan
2021/07/20	*Acanthoplus discoidalis*	armoured ground cricket	*Rhigozum trichotomum*	1	1,5	Kanaan
2021/08/01	*Locustana pardalina*	brown locust	*Parkinsonia africana*	1,2	2,5	Korhaan
"	*Hoplolopha spp.*	saw-backed locust	*Parkinsonia africana*	1,2	2,5	Korhaan
2022/02/22	*Locustana pardalina*	brown locust	*Rhigozum trichotomum*	1	1	Korhaan
2022/06/16	*Locustana pardalina*	brown locust	fence	1,5	1,5	Korhaan
2022/06/26	*Onymacrus multistriata*	–	*Parkinsonia africana*	2,1	2,3	Korhaan
			Mean (Standard deviation)	1.23 (SD 0.48)	1.95 (SD 0.81)	

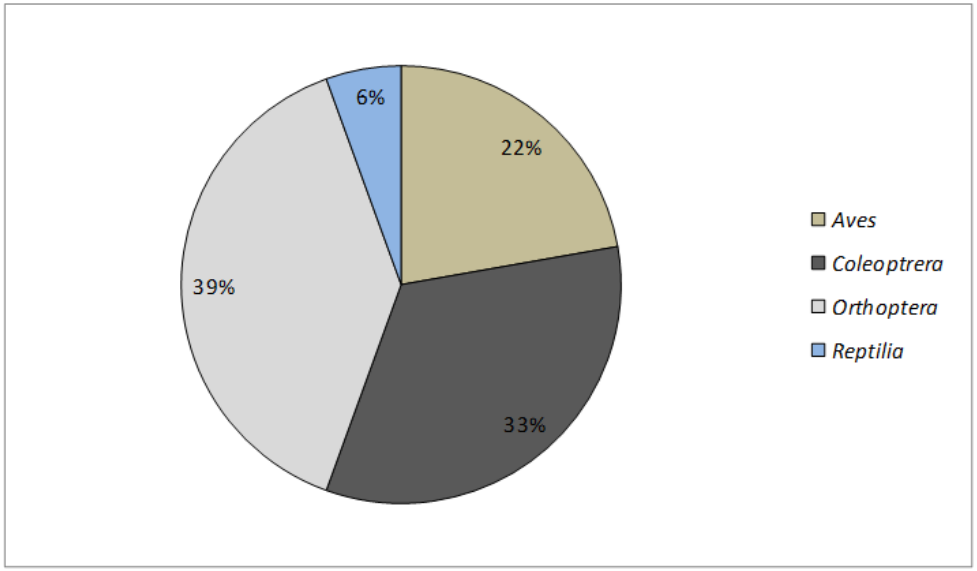

Figure 1: Prey items (n=18) classified to group level. Recorded between July 2017 and June 2022 from two locations in southern Namibia.

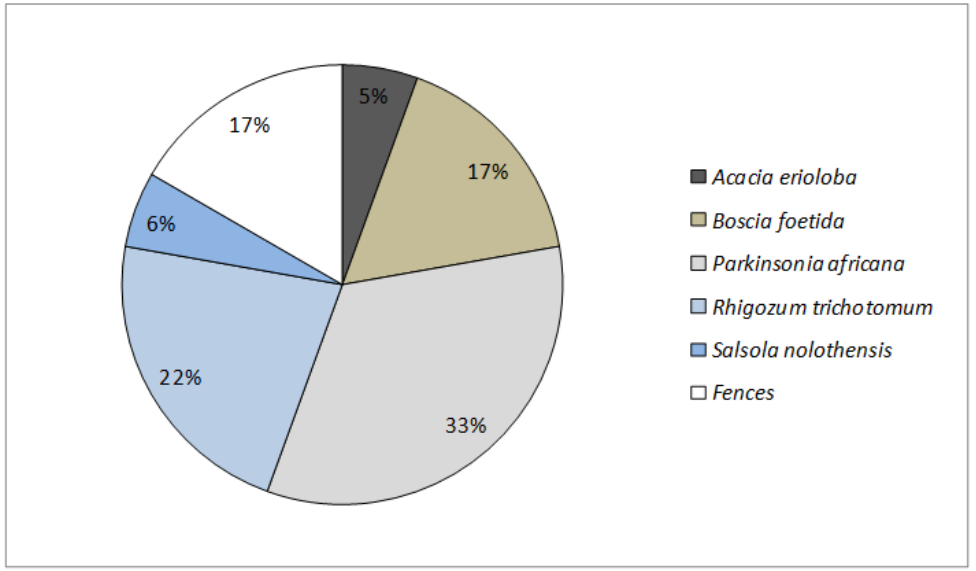

Figure 2: Location of impaled prey items of Southern Fiscals. Records were made between July 2017 and June 2022 from two locations in southern Namibia.

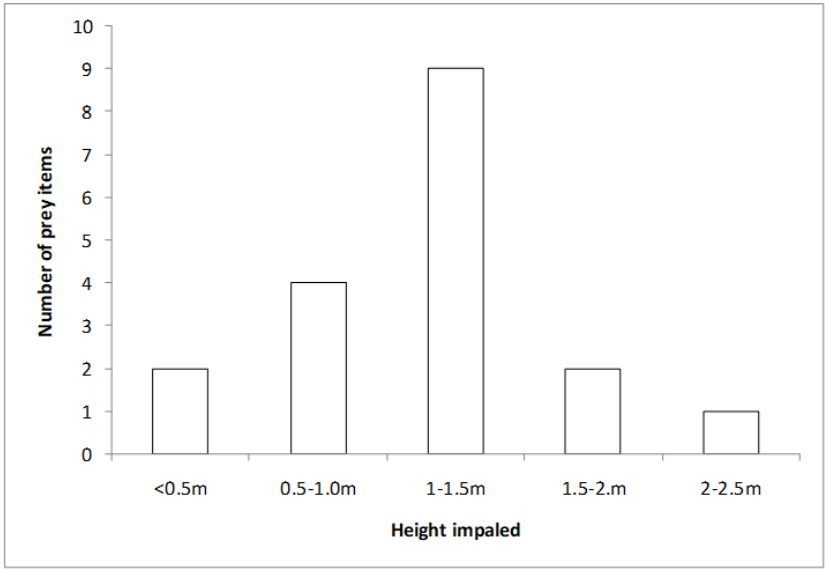

Figure 3: Histogram of heights above ground of prey items impaled by Southern Fiscals. Records were made between July 2017 and June 2022 from two locations in southern Namibia.

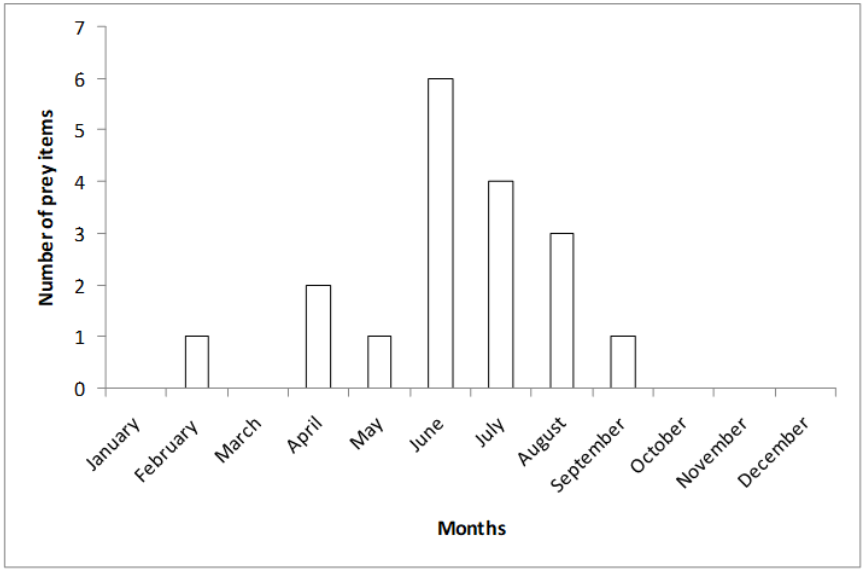

Figure 4: Histogram of monthly distribution of prey items impaled by Southern Fiscals recorded between July 2017 and June 2022 from two locations in southern Namibia.

the bill were observed for Stark's and fawn-coloured lark, respectively (Figure 8). Black-eared Sparrow-larks are nomadic and only associated with above average rainfall events while Stark's and Fawn-coloured Larks are resident species. The remains of an unidentified chick (probably Grey-backed Sparrow-lark *Eremopterix verticalis*) were also encountered, although could not be confirmed to species level (Table 1).

Reptiles as prey items

Southern Fiscals are predators of vertebrates (Hockey et al. 2005) although these usually make up a small percentage of the diet (for example, less than 10% of the diet in KwaZulu-Natal (Soobramoney et al. 2004)). While lizards are known to fall prey to a variety of predators (e.g. Branch 1998, Marais 1992, Alexander & Marais 2007), there is a paucity of data regarding specific predators. *Trachylepis occidentalis* (western three-striped skink) was the only reptile species encountered as prey item from southern Namibia (Cunningham 2018) (Table 1).

Discussion

Southern Fiscals were often seen in southern Namibia, although impaled prey items were infrequently encountered. However, drought conditions with below average annual rainfall were experienced from 2015 to 2021 in southern Namibia. Relatively few arthropods were observed during this dry period. Similarly Black-eared Sparrow-larks were rare. Under these conditions, with reduced food availability, it is likely that Southern Fiscals (1) would prey on anything they can catch and (2) consume what is caught rather than caching it. This hypothesis will need to be confirmed during high rainfall periods.

Arthropods are dominant in marginal desert environments. Their top ranking in the diet is consequently expected from a species with a catholic diet (Figure 1).

Apart from *Acacia erioloba* (camel thorn) trees, which are limited to ephemeral drainage lines, *Parkinsonia africana* (greenhair tree) is the largest tree or shrubs scattered throughout the Nama Karroo vegetation type. This, coupled with the spines suitable for impalement probably explains why it is the top-ranking plant used as a larder (and/or display) site (Figure 2). The height of impalement indicates that the larger trees/shrubs are selected in a habitat dominated by dwarf shrubs and grasses (Table 1). This would increase the display advantage of such prey items and protect it from other terrestrial scavengers.

Most of the prey items were observed during the cool and dry winter months in southern Namibia. Because the breeding season for Southern Fiscal is typically between August and January (Tarboton 2001) and between August and June (Jarvis et al. 1999) with 77% of the nest records between September and February (Brown n.d.) in Namibia, the observed prey items probably serve as a larder during the dry season rather than as a social function. Only 13.8% of nest records (n=65) were recorded during the winter months (May-August) in Namibia (Brown n.d.). To support the larder assumption, some prey items were placed within a tree/shrub and not on the periphery, as would be expected for display purposes. However, one dead *Parkinsonia africana* (greenhair tree) was used regularly, often with more than one prey item impaled, either indicating a favourite larder tree or a "trophy" tree, if used for "kill and display" purposes although it is not clear how Southern Fiscal view their surroundings.

Although our data are limited and collected on an *ad hoc* basis, the prey items confirmed nevertheless contribute to our knowledge of the diet and larder selection (requirements) of Southern Fiscal from southern Namibia.

Acknowledgments

Chris Brown, Faansie Peacock, and Neil Thompson are thanked for their attempts at identification, from photographs, the impaled lark bits, albeit only as 'best guesses' and John Irish is acknowledged for the identification of *Onymacris multistriata*.

Figure 5: *Anacridium moestum* (tree locust) impaled on a farm boundary fence in southern Namibia.

Figure 6: *Acanthoplus* spp. (armoured ground cricket) impaled on a twig of a *Rhigozum trichotomum* (three-thorn) in southern Namibia.

Figure 7: *Psammodes striatus* (striped toktokkie) impaled on a spine of *Parkinsonia africana* (greenhair tree) in southern Namibia.

Figure 8: Stark's Lark *Spizocorys starki* head impaled by a Southern Fiscal on a twig on the outer perimeter of *Parkinsonia africana* (greenhair tree) in southern Namibia.

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