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FORAGING BEHAVIOUR OF SOME MEMBERS OF THE GLEANING GUILD IN SOUTHERN AFRICA

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Introduction

There are a number of small bird species that forage within the leaf zone of trees and shrubs feeding off arthropods. Although not clearly defined these birds have been termed the "foliage gleaners" and the "gleaning guild". In South Africa there are some 30 species that can be classified as being foliage gleaners and these are birds that weigh from 6 to 15 g and belong to the families Sylvidae and Muscicapidae.

Each woodland and forest habitat has a number of these foliage gleaning species that occur in varying numbers and these co-exist apparently sharing a broad food source. However, in avoiding or lessening competition between guild members it is likely that a number of factors come into play and these could include differences in feeding techniques, dietary specialisation including specific search image of favoured prey and differing foraging movements could expose different prey. MacArthur (1958) found that some species in their search through the foliage appeared to crawl along the branches whereas others hopped across; some concentrated on vertical movements others on horizontal and such apparently superficial differences may be directed at different prey.

The object of this study is to describe the foraging behaviour of certain foliage gleaners and to determine any behavioural differences that could be factors in the ecological separation of these species in South African woodland habitats.

Fig 1 - Bar-throated Apalis searching for prey on the stem of a tree
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Study methods and sites

Field observations were made on foraging techniques, movements while foraging and general direction of these movements. Three foraging techniques were recognised: (1) *gleaning* – the capture of prey on the foliage by a bird not in flight and entails a searching movement through foliage; (2) *flycatcher-glean or hawking-gleaning* – the capture of prey on foliage by a bird on the wing with the movement initiating from a perch; and (3) *fly catching or hawking* – the capture of flying prey by a bird in flight with the movement initiating from a perch. Each movement of the bird under observation was recorded noting the direction of the movement and foraging techniques used. Owing to the small size of the prey generally taken

by these birds, it was very difficult to determine whether a foraging attempt was successful or not.

Field observations were recorded using a hand-held cassette tape-recorder and the recording of observations commencing when the subject was first seen in the foliage and continued until lost from sight either by flying off or moving behind foliage. During this period of observation the recorder was left running and on transcription the length of the observation was timed using a stopwatch and all movements counted and categorised. Data are presented on foraging techniques used, number and direction of moves and foraging rate (food capturing attempts) per minute. I also calculated the number of moves per food capturing attempt.

Table 1 gives details of the study sites and species observed.

Table 1 – *Study sites with short description of vegetation/habitat and a list of species observed at the site*

Site	Vegetation/habitat	Species observed
Leopard Kloof Nature Reserve, North West Province, South Africa	Rocky Highveld Grassland – rocky ridges and hills with pockets of thick woodlands and riverine woodland.	• African Paradise Fly-catcher *Terpsiphone viridis* • Bar-throated Apalis *Apalis thoracica* • Chestnut-vented Tit-babbler *Sylvia subcaerulea* • Chinspot Batis *Batis molitor* • Long-billed Crombec *Sylvietta rufescens* • Fairy Flycatcher *Stenostira scita* • Burnt-necked Eremomela *Eremomela usticollis*
		• Grey-backed Camaroptera *Camaroptera brevicaudata* • Willow Warbler *Phylloscopus trochilus*
Pafuri Restcamp, Kruger National Park	Well-developed riverine woodlands in Mixed and Sour Lowveld Bushveld	• Yellow-breasted Apalis *Apalis flavida*
Timbavati River, Kruger National Park	Mixed Lowveld Bushveld and Riverine woodlands	• Burnt-necked Eremomela *Eremomela usticollis* • Long-billed Crombec • Yellow-breasted Apalis.
Chobe River, Northern Botswana	Mixed and Riverine Woodlands	• Long-billed Crombec • Grey-backed Camaroptera • African Paradise Fly-catcher • Chinspot Batis • Willow Warbler • Burnt-necked Eremomela
Sabi River Country Club, Mpumalanga, South Africa.	Riverine Woodlands	• Yellow-breasted Apalis
Kasuma Pan, Northern Botswana	Mopani and Mixed dry woodlands	• Willow Warbler
Royal Natal National Park, Kwazulu-Natal, South Africa	Afromontane Forest and camp gardens	• Cape Batis *Batis capensis* • Fairy Flycatcher
Mopelane, Kwazulu-Natal, South Africa	Coastal Bushveld-Grassland – forest patches on coastal dunes.	• Yellow-breasted Apalis

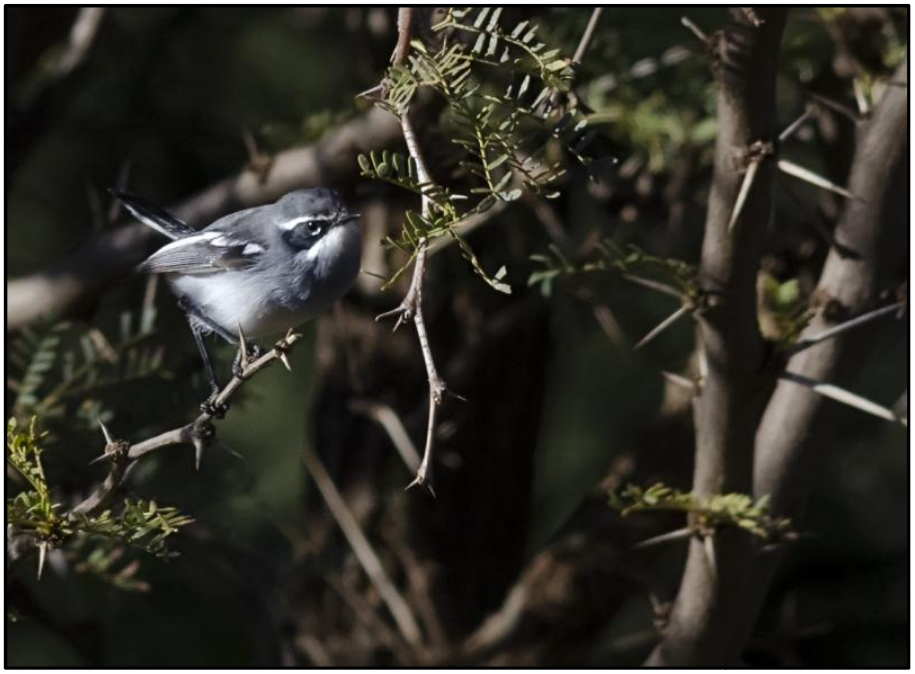

Fig 2 – A Fairy Flycatcher foraging in a tree of the *Vachellia* spp
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Results

Table 2 gives details on foraging techniques used and Table 3 numbers of moves during foraging. Each use of a foraging technique was assumed to be a food capturing attempt. The number of food capturing attempts per minute, defined as the foraging rate per minute varied between 1.8 attempts per minute for the Yellow-breasted Apalis to 6.5 for the Fairy Flycather (Table 3). The number of moves per foraging attempt varied between 4.0 for the African Paradise Flycatcher to 12.9 for the Cape Batis (Table 3).

Based on Tables 2 and 3 two groups are clearly discernible: i) those that predominantly glean with over 25 moves per minute; and ii) those that predominantly hawk-glean with less than 20 moves per minute.

Table 2 *– Foraging techniques used by the different species observed as percentage of total number of techniques employed during observation.*

	Foraging techniques used - %		
	Gleaning	Hawking gleaning	Hawking
Fairy Flycatcher	73	21	6
Willow Warbler	87	13	0
Bar-throated Apalis	89	11	0
Yellow-breasted Apalis	71	29	0
Long-billed Crombec	96	4	0
Burnt-necked Eremomela	89	10	1
Chestnut-vented Tit-babbler	100	0	0
Grey-backed Camaroptera	94	8	0
Cape Batis	34	65	1
Chinspot Batis	12	65	23
African Paradise Flycatcher	13	62	25

All species moved predominantly across the foliage and no distinctive directional movement was discernable except for the Grey-backed Camaroptera (see below).

Brief accounts of foraging behaviour follow:

The **Fairy Flycatcher's** foraging strategy is one of short, quick movements and looking around and down. At times it makes sudden darts at prey, a movement that often disturbs the prey with the bird flying or darting after it. Many times the prey attempted to escape capture by dropping down to the ground.

The **Willow Warbler** moves rapidly through the foliage stopping after each move to look around in all directions – except down. It does not look down at the perch as it moves. It will descend to the ground to retrieve prey dropped but does not forage on the ground and has been recorded gleaning off grass growing within woodland.

The two **Apalis spp.** move in short hops through the canopy. They have upright stances and look all around.

The **Long-billed Crombec** has a distinctive foraging movement appearing to creep or move in short hops along the branches and tangles. It looks down onto its perches and continually peering underneath, often hanging upside down to do so. It breaks off bits of lichen and bark to get to prey.

Unlike the rest of the study species which foraged in a variety of trees, the **Burnt-necked Eremomela** was recorded foraging only in two *Vachellia* species (*V. tortilis* and *erioloba*). Moving in small groups the birds systematically search through the canopy staying in one tree for a long time. Looks all around from a perch often stretching upwards to reach prey or jump to hang upside down to glean.

Table 3 *– A comparison of time spent observing species, movements while foraging, foraging rate and movements per foraging attempt*

	Minutes of observation	Moves while foraging per minute	Foraging attempts per minute (Foraging rate)	Moves per foraging attempt
Fairy Flycatcher	18.5	40.3	6.5	6.2
Willow Warbler	23.4	33.1	4.7	7.0
Yellow-breasted Apalis	6.2	30.6	1.8	17.0
Chestnut-vented Titbabbler	5.1	26.9	2.7	10.0
African Paradise Flycatcher	20.1	10.4	2.6	4.0
Bar-throated Apalis	17.1	29.6	2.3	12.9
Long-billed Crombec	21.9	29.3	2.9	10.1
Burnt-necked Eremomela	17.9	27.8	3.4	8.2
Grey-backed Camaroptera	23.5	26.2	3.6	7.3
Cape Batis	21.2	17	3.6	4.7
Chinspot Batis	62.6	10.1	1.9	5.3

The **Chestnut-vented Tit-babbler** tends to look down at the foliage as it moves through the canopy. This tendency was also reflected in

that it was not recorded hawk-gleaning, a technique requiring the scrutiny of overhead foliage.

Unlike the other study subjects, the **Grey-backed Camaroptera** spent considerable time on the ground and in vegetation below the height of 1 m. Of the recorded time 59% was spent foraging in vegetation below 1 m and on the ground; 14% in vegetation 1-2 m high and 27% above 2 m high.

From perches the **Chinspot Batis and Cape Batis** generally look around and upwards by tilting the head. They move through the canopy in long hops or short flights.

The **African Paradise Flycatcher** looks outwards and upwards from a perch within the canopy. It may occasionally search along branches and in thicker tangles.

Discussion

For foraging behaviour to play a part in the ecological separation of gleaning guild species, it must allow a broad food source to be divided through differing foraging patterns. All the birds studied are capable of a wide variety of movements and those that appear similar to an observer may have slight differences that are hard to detect. However, there are certain predominant foraging patterns for each species and these indicate that foraging behaviour can play a role in the ecological separation of the foliage foragers.

The use of differing foraging techniques divides the study species into two distinct groups but this does not necessarily indicate that different prey is being taken by each group. However, it does suggest that the location of the prey differs.

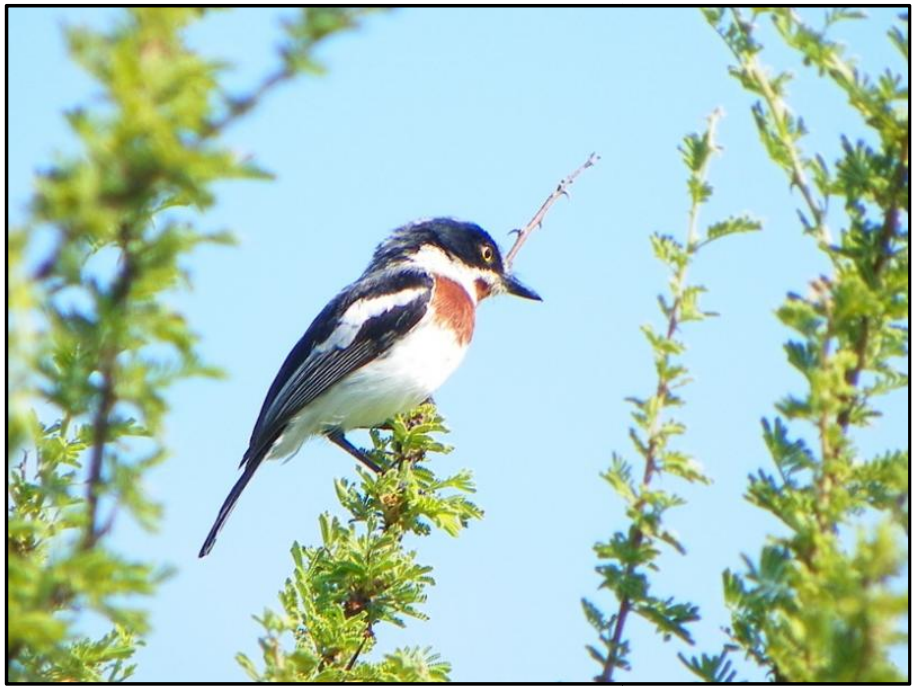

Fig 3 – A Chinspot Batis perched on a *Vachellia* branch
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A specific way of moving through the foliage may allow a species to target on certain prey, expose prey more readily or allow exploitation of prey located in specific areas or positions. Individual stances while foraging like that of the Crombec, expose different areas to search. The species differ considerably in the number of moves per minute. The Fairy Flycatcher is the most rapid of the study species and makes four times as many moves as the Batis species. Rapid movement coupled with techniques like displaying startling colours could make cryptic prey move (Root, 1967) and this seems to be the case in the Fairy Flycatcher when it darts after prey. In contrast rapid movement is unlikely to assist the species that forage mainly by

hawking-gleaning which requires the prey to be sighted first and therefore move more slowly through the canopy.

The data of Table 2 also suggest that the gleaners make a greater effort to get food than the hawking-gleaners and the two species of Apalis. Bearing in mind the differing masses of the study species and therefore their differing energy requirements, the foraging rate indicates that different size prey are taken with the Fairy Flycatcher and Willow Warbler taking large numbers of smaller prey and the gleaning-hawking species and the Apalis spp. taking fewer and therefore larger prey. The data also suggest that although active in different habitats related species forage in similar ways and possibly target similar prey.

Although covering only a small percentage of the gleaning guild's members, this study does indicate that foraging behaviour is a factor in lessening competition between the species. It could be worthwhile to continue and broaden similar studies.

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References

MacArthur RH 1972. Population ecology of some warblers in north eastern coniferous forests. Ecology 39: 599-619.

Root RB 1976. The niche exploitation pattern of the Blue-gray Gnatcatcher. Ecological Monographs. 37: 318-350.