ARTICLES

NECTARIVORE RINGING IN THE SOUTHWESTERN CAPE

M. W. Fraser, L. McMahon, L. G. Underhill,
G. D. Underhill and A. G. Rebelo

INTRODUCTION

(Numbers in brackets refer to reference titles)

Large numbers of nectarivorous birds are a familiar sight at flowering stands of certain plants. Nectar-rich food plants such as species of Proteaceae, Ericaceae, *Aloe* and *Cotyledon* flower according to a strict calendar (1,3,7,15,17,18,20), but shorter-lived plants, annuals and early successional species such as *Leonotis*, have seasonally less predictable flowering displays (9,10,22). The relative seasonal dependence of nectarivores on different flowering plants is unknown, however, as are the distance and timing of movements which the birds must undertake to utilize these resources.

Over 300 species of plant in the Fynbos Biome appear to be bird pollinated (18). Evidence that birds are the major pollinators of *Proteas* (17) has been questioned (2), but there seems no doubt that many Proteaceae and *Erica* species are pollinated by Cape Sugarbirds *Promerops cafer* and Orangebreasted Sunbirds *Nectarinia violacea* (3,4). Thus, the survival of such plants would be jeopardised by the elimination or isolation of their pollinators. Destruction of fynbos vegetation through urbanisation, agriculture and infestation by alien plants continues apace, particularly in the lowlands (11,13). This increasingly fragments and isolates the feeding areas of nectarivorous birds, necessitating longer movements by such birds both between sites and between seasons. Knowledge of such movements would allow some assessment to be made of the birds' requirements and would facilitate appropriate conservation measures.

In view of the above and because of their relative ease of capture, we have directed much of our recent ringing efforts at nectarivores. In the southwestern Cape these are Cape Sugarbird, Malachite Sunbird *Nectarinia famosa*, Lesser Doublecollared Sunbird *N. chalybea* and Orangebreasted Sunbird. The Cape Sugarbird and Orangebreasted Sunbird are endemic to the Fynbos Biome (23).

METHODS

We have mistnetted and ringed nectarivores at thirteen sites in the southwestern Cape since 1984 (Fig. 1 opposite - coordinates are given in Table 1 on page 6). The length of mistnetting used on each session ranged from 9 m to 240 m and averaged about 100 m. In addition to the standard metal ring, unique colour-ring combinations were added to all sugarbirds ringed at Teeberg and to the majority at Kirstenbosch and, between 1984 and 1986, to most sunbirds at Olifantsbos. Site-specific colour rings (one colour per site) were placed on all sugarbirds trapped at Kirstenbosch, Betty's Bay, Durbanville, Helderberg, Paarl, Swartboskloof and Jonkershoek and to some sunbirds trapped at Olifantsbos, Helderberg, Swartboskloof and Jonkershoek. Cape Sugarbirds at Kirstenbosch were checked for colour-rings on 27 occasions between October 1985 and May 1988 (16). Otherwise, recoveries depend on chance findings by members of the public, reported to the authors or to SAFRING. Requests for sightings of colour-ringed birds were placed in the Cape Bird Club newsletter (Promerops) and local press (Cape Town Argus). Ringing and recovery data for the ringing years 1984/1985 - 1988/1989 are included in this report.

RESULTS AND DISCUSSION

Although many years may elapse before sufficient retraps and recoveries accumulate to provide an accurate picture of nectarivore movements, we feel it worthwhile to present our few results to date. In this way we highlight the potential of the exercise and, hopefully, encourage other ringers to give nectarivores the attention which, in our opinion, they deserve. The numbers of these nectarivores ringed prior to 1984 in the study area, and indeed in South Africa as a whole, are low. For example, SAFRING records show that only 54 Malachite Sunbirds were ringed in South Africa between 1975 and 1983, with only single birds ringed in the years 1975, 1976 and 1979.

Table 1 gives the numbers of Cape Sugarbirds, Malachite, Lesser Doublecollared and Orangebreasted Sunbirds ringed at 13 sites in the southwestern Cape from 1984/1985 to 1988/1989. Netting intensity at these sites varied from almost weekly at Olifantsbos between 1984 and 1986 and at least monthly at Helderberg between 1986 and 1988, to a single visit to Paarl.

Table 2 (page 7) presents the proportion of each nectarivore species ringed at each site. This measure gives a more representative picture of the structure of nectarivore assemblages than actual numbers. Although the results are biased by our siting the nets preferentially to catch particular species, the proportions do support generally the 'qualitative folklore' that surrounds nectarivores (e.g. that Orangebreasted Sunbirds occur mainly in Mountain Fynbos). Table 2 may also provide ringers, unfamiliar with fynbos, with some indication of

the habitat in which they should net to catch particular species, given that the food plants are in flower, of course.

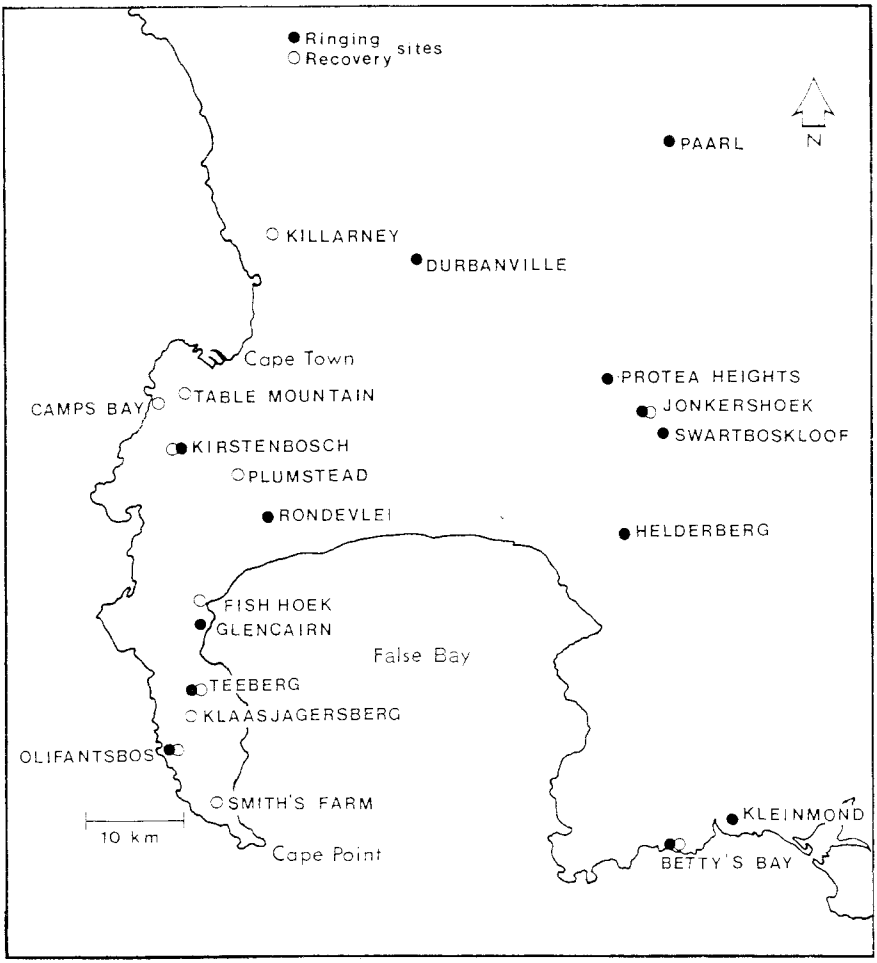

FIGURE 1

CAPTURE (CLOSED CIRCLES) AND RECOVERY (OPEN CIRCLES) SITES OF NECTARIVORES RINGED IN THE SOUTHWESTERN CAPE, 1984-1989.

TABLE 1

NUMBER OF NECTARIVORES RINGED AT SITES IN THE SOUTHWESTERN CAPE

LOCATION AND CO-ORDINATES	CAPE SUGARBIRD	SUNBIRDS			RINGERS
		MAL	LDC	OB	
Olifantsbos, Cape of Good Hope Nature Reserve (CGHNR) 34 16S, 18 23E	2	611	286	14	MWF, LM, Cape Bird Club (CBC) Helderberg Ringing Group (HRG)
Teeberg, CGHNR. 34 14S, 18 24E	55	22	1	143	MWF, AGR, HW Seiler
Glencairn 34 10S, 18 26E	8		1	2	MWF, LM
Kirstenbosch Botanic Gardens 33 59S, 18 26E	89	6	8	19	MWF, LM, AGR, HW Seiler, GDU
Rondevlei Bird Sanctuary 34 04S, 18 30E			21		MWF, LM, GDU, LGU
Durbanville Wildflower Garden 33 50S, 18 38E	89	109	38		GDU, T Robertson
Protea Heights, Stellenbosch 33 54S, 18 49E	5	2	25		MWF, LM, GDU, LGU
Paarl Wildflower Garden 33 40S, 18 58E	17			4	MWF, LM, H. Oschadleus, GDU
Swartboskloof, Jonkershoek Valley 34 00S, 18 57E	31	6	7	125	MWF, LM
Jonkershoek Forestry Research Centre, Stellenbosch 33 58S, 18 56E	4	4			MWF, LM
Helderberg Nature Reserve, Somerset West 34 03S, 18 52E	1 079	23	55	48	MWF, LM, GDU, HRG
Betty's Bay 34 21S, 18 56E	452	16	74	96	GDU, LGU
Kleinmond* 34 19S, 19 00E				12	AGR
TOTAL	1 831	799	516	463	

* Cape Sugarbirds also caught, but not ringed

TABLE 2

VEGETATION TYPES AND MAJOR FOOD PLANTS AND THE PERCENTAGE OF NECTARIVORE SPECIES RINGED AT EACH SITE

LOCATION, VEGETATION TYPE AND MAJOR FOOD PLANTS	% RINGED AT EACH SITE				
	CAPE SUGARBIRD	SUNBIRDS			(TOTAL)
		MAL	LDC	OB	
Olifantsbos; coastal thicket (strandveld) *Leonotis oxymifolia, Lycium* spp.	0,2	66,9	31,3	1,5	(912)
Teeberg; Mountain Fynbos *Protea lepidocarpodendron, P. repens*	24,9	9,9	0,4	64,7	(221)
Glencairn; garden *Tecomaria capensis*	72,7		18,2	9,1	(11)
Kirstenbosch; Mountain Fynbos/ gardens *Protea* spp.	72,9	4,9	6,5	15,6	(122)
Rondevlei; coastal thicket (strandveld) *Salvia africana/S. lutea*			100		(21)
Durbanville; semi-formal garden *Protea* spp., *Leucospermum* spp.	40,4	47,2	12,4		(236)
Protea Heights; semi-formal garden *Protea* spp., alien ornamentals	7,1	3,6	89,3		(32)
Paarl; semi-formal garden *Protea* spp., *Erica* spp.	81,0			19,0	(21)
Swartboskloof; Mountain Fynbos/ kloof woodland *Protea* spp., *Erica* spp.,*Cunnonia capensis*	24,8	3,5	5,6	73,9	(169)
Jonkershoek; semi-formal garden *Protea cynaroides, L. cordifolium*	50,0	50,0			(8)
Helderberg; Mountain Fynbos/ semi-formal garden *Protea* spp., *L. cordifolium, Erica* spp.	89,5	1,9	4,6	4,4	(1 205)
Betty's Bay; Mountain Fynbos, *L. conocarpodendron*	76,7	2,8	5,8	14,7	(638)
Kleinmond; Mountain Fynbos *P. lepidocarpodendron, Erica* spp.				100*	(12)

*Cape Sugarbirds also caught but not ringed

Cape Sugarbird

Visits to Helderberg Nature Reserve between one and three times per month between September 1986 and October 1988 (8), are largely responsible for the high number of Cape Sugarbirds ringed (Table 1). Most individuals were netted during the flowering period of *Leucospermum cordifolium* (August - November). Many sugarbirds were also present at Helderberg when *Protea repens* (April - June) and *P. aurea* (January - March) were in flower, but the tall and dense bushes made for difficult netting in vegetation dominated by these plant species. At Betty's Bay most sugarbirds were netted at flowering *Leucospermum conocarpodendron* between October and January. Those ringed at Teeberg (Cape of Good Hope Nature Reserve) were netted amongst flowering *P. lepidocarpodendron* over three days in June, 1985.

Cape Sugarbird recoveries span virtually the entire study area (Fig. 2 opposite). Almost 500 retraps and five recoveries or resightings of this species have accrued from netting at Helderberg. Sugarbirds are known to leave the Helderberg Nature Reserve and visit suburban gardens in Somerset West during the spring and summer (N. Myburgh, pers. comm.), an observation now reinforced by three such sightings of colour-ringed birds, one within a day of ringing in October (these local movements are not included in Fig. 2). Single Helderberg-ringed birds moved across the Cape Flats to Kirstenbosch and along the Hottentots Holland mountain chain to the coast at Betty's Bay (Fig. 2). The bird reported from the last-mentioned site was ringed in October and recovered in December, the movement coinciding with the end of the *Leucospermum cordifolium* flowering period at Helderberg.

Five Teeberg sugarbirds have been resighted and one controlled at Kirstenbosch. The only Teeberg bird which moved south (Fig. 2) was recovered in September 1987, 27 months after ringing. A fire which destroyed the fynbos vegetation at Teeberg in February 1986 (not 1985, as given in Oschadleus and Fraser, 16), may have induced the northward movement of some of these. However, at least one bird was recorded from Kirstenbosch prior to the Teeberg burn. The others were found at Kirstenbosch two and eight months after the fire (i.e. between 10 and 16 months after ringing). However, non-fire related emigration from the Cape of Good Hope Nature Reserve is further suggested by observations that Cape Sugarbirds are very scarce there from late summer to early winter and most abundant between August and November when *Leucospermum conocarpodendron* and *Mimetes fimbriifolius* are flowering (Fraser, pers. obs.). Details of re-sightings and site-attendance of colour-ringed Cape Sugarbirds at Kirstenbosch are given by Oschadleus and Fraser (16).

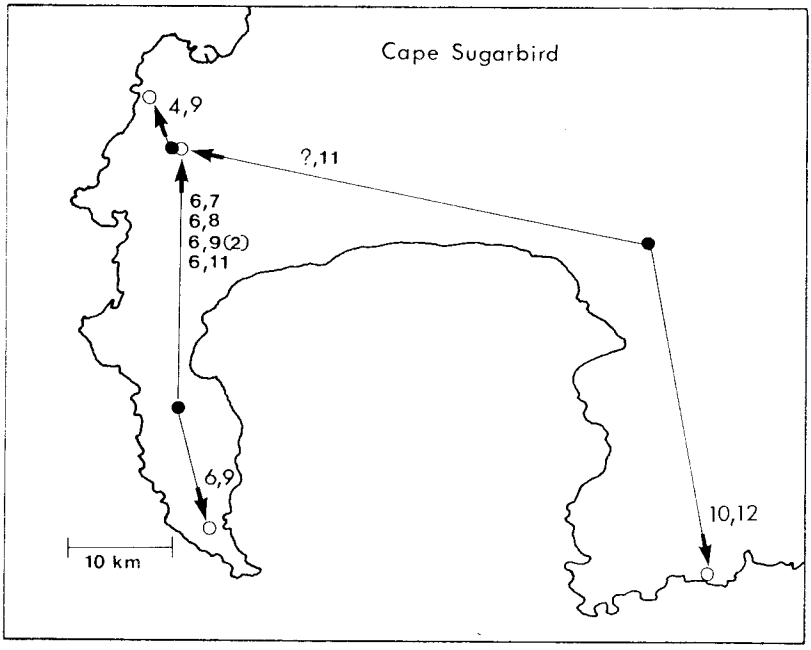

FIGURE 2

CAPTURE (CLOSED CIRCLES) AND RECOVERY (OPEN CIRCLES) SITES OF CAPE SUGARBIRDS *PROMEROPS CAFER* RINGED IN THE SOUTHWESTERN CAPE, 1984 - 1989. NUMBERS REFER TO THE MONTH OF RINGING AND RECOVERY RESPECTIVELY

Malachite Sunbird

The Olifantsbos *Leonotis oxymifolia* patch has proved particularly productive (in real and proportional terms) for ringing this sunbird. However, the numbers of birds caught there are not consistently high when the number of ripe *Leonotis* blooms appears to be roughly the same on different visits. For example, four Malachite Sunbirds were caught there from 5 - 7 December 1986; from 4 - 7 December 1987, when the number of flowers appeared to be similar to the previous year, 202 new birds were caught of an estimated 540 visiting the flowers (5,6,22). This supports Skead's (20) observation that a particular nectar source may be heavily utilised by Malachite Sunbirds one year, but not be visited at all the next. At Olifantsbos this may be a reflection of breeding success, as 80% of those trapped in December 1987 were juveniles.

Seven movements (mean distance 4,5 km) were recorded within the Cape of Good Hope Nature Reserve (Fig. 3a: two movements of 1 km are not illustrated). The furthest (7 km) involved the resighting of a colour-ringed adult male caught in the Teeberg *Protea lepidocarpodendron* patch in June and resighted feeding from *Watsonia* flowers in January. Of the four Malachites recovered outside the Reserve, three were ringed as juveniles in November and recovered the following spring (Fig. 3a). The fourth, an immature male, was ringed in March 1987 and recovered in June 1989 near Piketberg. Its movement of 161 km makes it our most travelled nectarivore to date (Fig. 3b on page 13). The Helderberg bird which reached Jonkershoek (Fig. 3a) was also a juvenile ringed in November, but recovered six weeks after ringing. Therefore, with the exception of the one adult mentioned above, what we have recorded so far is not necessarily movement related strictly to season or food supply but is post-fledging dispersal. It is perhaps surprising that none of the 202 ringed in December 1987 has been recovered, given that the recovery rate of this nectarivore is relatively high (Table 3). Of the species dealt with here, the Malachite Sunbird has the widest distribution in southern Africa (12), giving the potential for more distant recoveries.

TABLE 3

NATURE OF RECOVERIES OF NECTARIVORES

NATURE OF RECOVERY	CAPE SUGARBIRD	SUNBIRDS			TOTAL % OF RECOVERIES
		MAL	LDC	OB	
Control	1	2	1		4 (14,8)
Sightings of colour-ringed birds	5	2		2	9 (33,3)
Cat kill	1	2	1		4 (14,8)
Road kill	3			1	4 (14,8)
Window kill	1				1 (3,7)
Trapped in building and released		1			1 (3,7)
Concussed on window and released		1			1 (3,7)
Unknown (dead)		2	1		3 (11,1)
TOTAL	11	10	3	3	27
PERCENTAGE RECOVERED	0,60	1,25	0,58	0,65	0,73

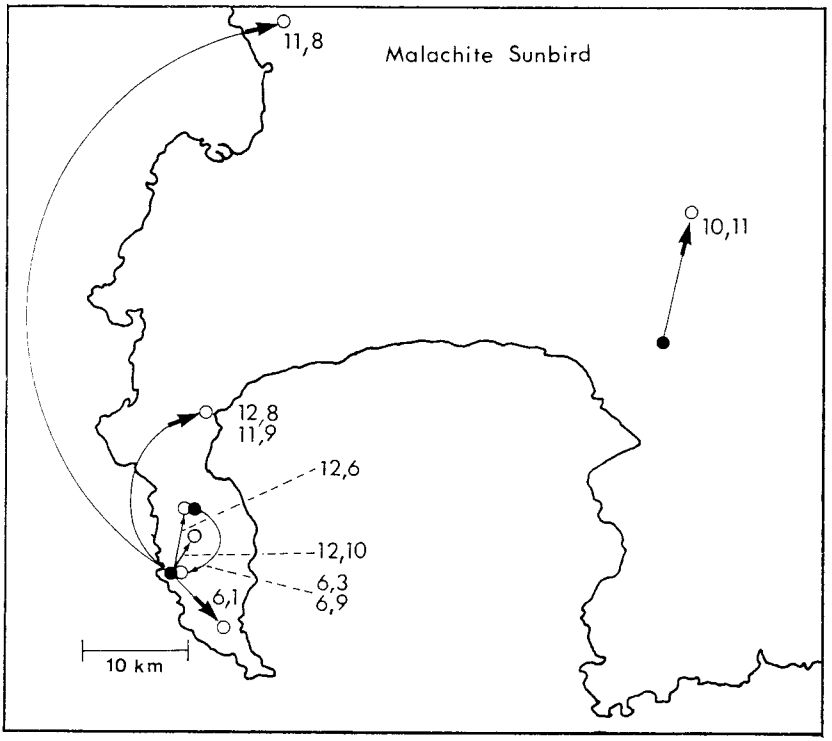

FIGURE 3a

CAPTURE (CLOSED CIRCLES) AND RECOVERY (OPEN CIRCLES) SITES OF MALACHITE SUNBIRDS *NECTARINIA FAMOSA* RINGED IN THE SOUTHWESTERN CAPE, 1984 - 1989.

NUMBERS REFER TO THE MONTH OF RINGING AND RECOVERY RESPECTIVELY

Lesser Doublecollared Sunbird

Olifantsbos has again proved the most productive site for this

species, although it occurs in lower numbers there than the Malachite. Proportionately, the Lesser Doublecollared is most numerous in the *Salvia* at Rondevlei. When it flowers in August/September this plant is visited by many bird species (notably Cape Bulbul *Pycnonotus capensis* and Cape White-eye *Zosterops pallidus*) in addition to the sunbirds. At other times of year at the Rondevlei ringing site the sunbirds are scarce or absent (G. D. Underhill, pers. obs.).

The two longest movements are of birds ringed as juveniles in November and moving from their assumed natal areas to lower altitudes in autumn/winter (Kirstenbosch to Plumstead - 5 km) and Helderberg to Betty's Bay (34 km - Fig. 4 on page 14). The Olifantsbos to Klaasjagersberg individual was an adult female which had moved little in altitude. Shorter movements not illustrated in Fig. 4 or included in Table 3, are ten of 1 km (including two birds making the same return journey), and one of 3 km within the Cape of Good Hope Nature Reserve. The Helderberg to Betty's Bay individual (Fig. 4) was ringed by M.W.F. and controlled by L.G.U. and G.D.U., providing a tantalising indication of the results which could accrue with more intensive ringing at more sites, and by more ringers. The only movement prior to this study which we can trace is of a nestling colour-ringed at Strandfontein in September 1962 and recorded in Pinelands the following February (19).

Although Maclean (12) describes the Lesser Doublecollared Sunbird as resident, it is perhaps more accurately classified as nomadic or a seasonal migrant in the southwestern Cape. Schmidt (19) records its presence in Cape Town suburbs in summer until the onset of the winter rains (May - July) and in the Strandfontein breeding area from the first winter rains until November.

Orangebreasted Sunbird

Of all the sunbirds, the Orangebreasted is most dependent on fynbos vegetation (20) and occurs virtually exclusively in this habitat. For example, the coastal thicket ringing site at Olifantsbos is less than 100 m from the nearest Mountain Fynbos vegetation, in which Orangebreasted Sunbirds are numerous (Fraser & McMahon, pers. obs.). They seem reluctant to move into the adjacent coastal thicket (Strandveld), however, and form only 1,5 % of the total number of sunbirds trapped in this vegetation type (this tendency is also displayed by the Cape Sugarbird). Competition with the other two sunbirds at Strandveld nectar sources seems unlikely since all three species occur together at flowering *Erica gilva* in Mountain Fynbos (13). There are no apparent features of the *Leonotis* or *Lycium* flowers which could make them difficult for Orangebreasted Sunbirds to probe and yet not hinder feeding by Malachite and Lesser Doublecollared Sunbirds.

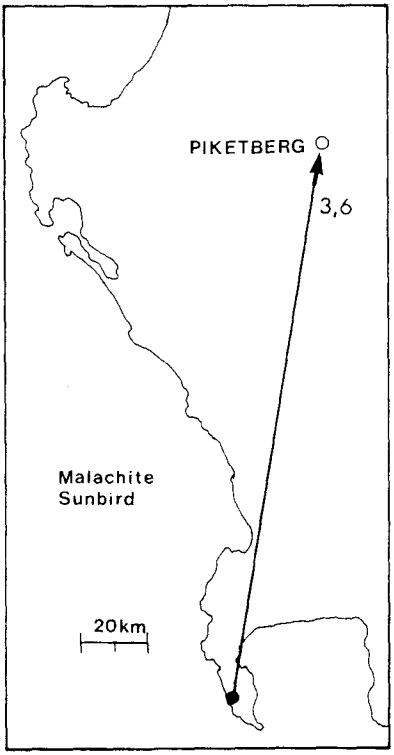

FIGURE 3b

LONG DISTANCE RECOVERY OF A MALACHITE SUNBIRD *NECTARINIA FAMOSA*

The longest movement to date involved an adult male ringed at Kirstenbosch in July and resighted on Table Mountain the following September (Fig. 5 on page 15). Although this bird had moved only 4 km, it had risen in altitude some 320 m. This single observation does at least support the contention that this species migrates up mountains in summer, when flowering food-plants are scarce at lower altitudes, and returns to the lower slopes when *Protea* and *Erica* begin flowering there in autumn and winter (1, 17). However, recent observations of Orangebreasted Sunbirds in Cape Town's suburban gardens in summer complicate the picture (21, C. Hilton-Taylor pers. comm.). A shorter movement (Teeberg to Olifantsbos) in the Cape of Good Hope Nature Reserve is the only other one recorded (Fig. 5). The often mountainous and more restricted distribution of the Orangebreasted makes it the sunbird species least likely to provide many recoveries.

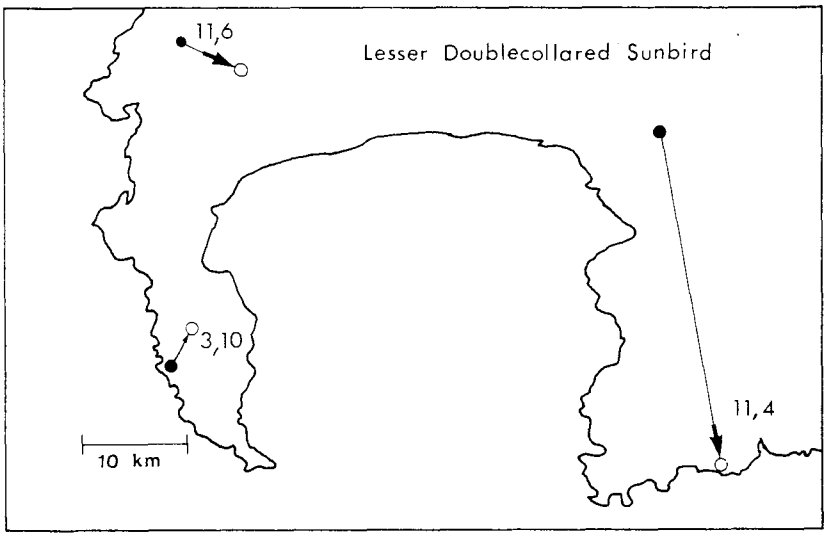

FIGURE 4

CAPTURE (CLOSED CIRCLES) AND RECOVERY (OPEN CIRCLES) SITES OF LESSER DOUBLECOLLARED SUNBIRDS *NECTARINIA CHALYBEA* RINGED IN THE SOUTHWESTERN CAPE, 1984 - 1989.

NUMBERS REFER TO THE MONTH OF RINGING AND RECOVERY RESPECTIVELY

NATURE OF RECOVERIES

Although the sample is small, some indication of the relative importance of the various forms of recovery can be gained from Table 3. Ringers, or their helpers, were responsible for all but two reports of colour-ringed birds. Only one report was directly attributed to publicity. This involved a dead Cape Sugarbird retrieved from a cat; the metal-ringed leg was missing but it had unique colour-rings on the other leg! On this basis it would appear that ringers will have to track down their own birds after colour-ringing them. The number of controls is encouragingly high and indicates that more ringing at more sites in the region would prove beneficial.

From these data it can be predicted that the Malachite Sunbird will be the most worthwhile to ring in terms of recoveries. Given the relative paucity of ringers and interested members of the public, the recovery rate of this species is particularly high. Indeed, the recovery rates of all the nectarivores considered here compare well with those of intensively ringed 'sedentary' birds of roughly the same size in the British Isles,

e.g. Great Tit *Parus major* 0,91 % recovery rate from 661 028 ringed; Blue Tit *P. caeruleus* 0,98 % from 1 548 665 (sic) ringed; Wren *Troglodytes troglodytes* 0,48 % from 239 172; Dunnock *Prunella modularis* 0,98 % from 447 654 (14). More nectarivore recoveries are now required to confirm that the previous ones were not mere flukes!

CONCLUSIONS

We consider nectarivore ringing to be one of the most worthwhile projects available to ringers and would encourage its adoption and expansion within and beyond the southwestern Cape. The recovery rates reported here (if more than pure luck), support our contention that continued and increased ringing of these birds will prove very worthwhile. Although it could be concluded that colour-ringing is worthwhile only if the ringers themselves search for their birds, it is felt that site-specific colour-ringing should be continued in the interests of long-term studies. Concentrations of nectarivores at localized food sources allows large numbers to be caught in relatively short periods (e.g. on single days, excluding retraps: - 126 sugarbirds at Helderberg; 118 Malachite Sunbirds at Olifantsbos and 62 Orangebreasted Sunbirds at Swartboskloof). Traditional utilization of feeding sites by the birds also allows moult and survival data to accumulate through retraps.

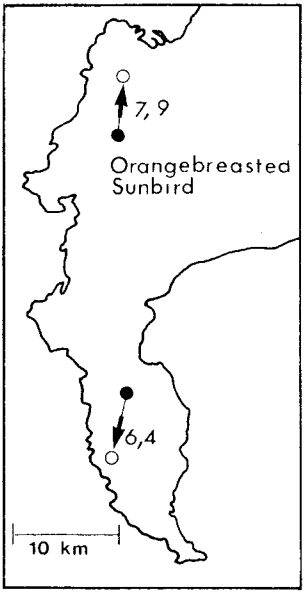

FIGURE 5

CAPTURE (CLOSED CIRCLES) AND RECOVERY (OPEN CIRCLES) SITES OF ORANGEBREASTED SUNBIRDS *NECTARINIA VIOLACEA* RINGED IN THE SOUTHWESTERN CAPE, 1984-1989. NUMBERS REFER TO THE MONTH OF RINGING AND RECOVERY RESPECTIVELY

ACKNOWLEDGEMENTS

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M. W. Fraser, c/o Percy FitzPatrick Institute of African Ornithology, University of Cape Town, RONDEBOSCH, 7700

L. McMahon, 'Sandbanks', Kenmuir Steps, Hopkirk Way, GLENCAIRN, 7995

L. G. Underhill, Department of Mathematical Statistics, University of Cape Town, RONDEBOSCH, 7700

G. D. Underhill, 12 Roseberry Avenue, MOWBRAY, 7700

A. G. Rebelo, c/o Percy FitzPatrick Institute of African Ornithology, University of Cape Town, RONDEBOSCH, 7700.

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