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14 Red-billed Quelea Movements in Southern Africa shown by Ringing Recoveries in the SAFRING Database

H. D. Oschadleus

SAFRING, Avian Demography Unit, University of Cape Town, Rondebosch, 7701, South Africa
(email: dieter@maths.uct.ac.za)

ABSTRACT

Summaries of quelea movements, based on recoveries in the database of the South African bird-ringing scheme (SAFRING) are presented. By 1999, the database included details of 510 recoveries of Red-billed Quelea, with recovery rates for quelea ringed as adults or juveniles unchanged since the 1960s (0.24% in 1966; 0.29% in 1980; 0.25% in 1995). Inclusion of ‘non-significant’ recoveries (birds caught again within a few days of ringing) increased the overall rate to 0.38%. Short-term movements were examined by analysing the average and median distances, for each month, of recoveries with elapsed times of less than 6 months. Data on movements according to the month of recovery are presented in maps. The longest movement (2545 km) for a quelea in SAFRING’s database was by a bird recovered in the Democratic Republic of Congo in November 1998. Four other birds (adults and immatures) were ringed in South Africa and recovered in foreign countries more than 1000 km distant. The results are discussed in relation to prevailing meteorological conditions in southern Africa and the short-comings inherent in analyses of ringing recovery data.

INTRODUCTION

The Red-billed Quelea, *Quelea quelea*, is a pest of small grain crops. The quelea is mobile, flying long distances on a daily and seasonal basis (Mundy and Herremans, 1997). Understanding its movements could help to predict when the birds are likely to arrive in an area. Ward (1971) proposed that throughout Africa quelea have two main migrations in their annual cycle. The ‘early rains’ migration involves quelea being forced out of areas where grass seed germination has occurred following the first rains, and flying over the approaching rain-front to areas where fresh grass seed has been produced. The subsequent ‘breeding’ migration follows the rains in successive breeding attempts. This report brings previous summaries of quelea movements, based on the recoveries in the database of the South African bird ringing scheme (SAFRING) (McLachlan, 1966; Jarvis, 1989; Jones, 1989; Tree, 1989), up-to-date.

METHODS

All recovery reports of quelea were checked, or entered into the database of SAFRING, including ‘non-significant’ recoveries, i.e. those caught again after ringing (controlled)

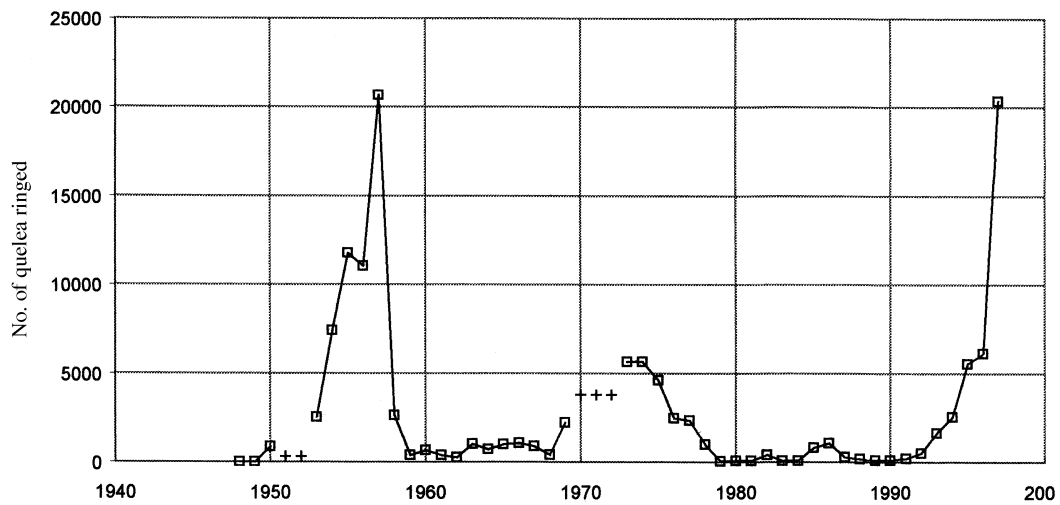


Figure 1 The number of Red-billed Quelea ringed in southern Africa from 1948 to 1998. The squares represent the number of quelea ringed in a particular year. The crosses represent the average number of quelea ringed in years when annual totals are not available.

within a few days of ringing. To study short-term movements, only recoveries with elapsed times of less than 6 months were analysed.

RESULTS

The total number of quelea ringed in southern Africa between 1948 and July 1998 was 133,574 (SAFRING database; Figure 1). The peaks in ringing in the late 1950s and late 1990s indicate periods of involvement by the South African Department of Agriculture (by

Table 1 Distribution of Red-billed Quelea recoveries by country and month of recovery; data are for all recoveries, including non-significant ones

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Sum	%
Democratic Republic of Congo												2	2	0
Malawi					1		1	2	1	2	3	1	11	2
Zambia								1	1				2	0
Namibia					1				1			1	3	1
Botswana										1		1	2	0
Zimbabwe		1	3	2	2	2	3	10	14	16	10	6	3	72
South Africa:														
Northern Province		22	4			1	3	2			1		44	9
North West Province		3	2	2	2		1	3	1	6	13	193	13	239
Gauteng		5	2	1					3	2	13	17	23	66
Mpumulanga		1					1	2	1			2	4	11
Northern Cape										1		1	2	0
Free State			2		1	1	3	2	2	2	10	12	13	48
KwaZulu Natal													1	1
Eastern Cape						3				2	1		1	7
Sum		32	13	5	5	6	13	19	25	33	51	237	71	510
%		6	3	1	1	1	3	4	5	6	10	46	14	

ringing and sponsoring ringing, respectively). By 1999 SAFRING's database included details of 510 recoveries of Red-billed Quelea, ringed with SAFRING rings over the previous five decades (16 of these records were recaptures of living birds by ringers). The recovery rates for quelea ringed as adults or juveniles did not change between the 1960s (0.24% McLachlan, 1966; 0.29% Jones, 1980, who also reported a recovery rate of only 0.05% for birds ringed as nestlings) and 1995 (0.25% Oatley, 1995a), although including 'non-significant' recoveries increases the overall rate to 0.38%. Of these recoveries, 46% occurred in November and 47% were in the North West Province (Table 1), due largely to a control operation at Barberspan on 19 November 1975 during which 181 recoveries were made. Such events and the variable search efforts associated with ringing recovery data introduce biases to be borne in mind when making interpretations from them.

The maps (Figure 2a-l) show the recoveries by month of recovery. Points of interest, summarised for convenience according to the arbitrary criterion of month of recovery, include:

- *January* (Figure 2a). Recoveries appear to converge on the highveld. The maximum number of recoveries during January in any one year was 7. Except for six birds, all movements were greater than 100 km but 25 recoveries occurred within 6 months of ringing, so birds recovered in January had made relatively long movements in a short time.
- *February* (Figure 2b). (From February until June, the number of recoveries is small.) The majority of long-distance recoveries (85% between 100 and 800 km) and mostly within short periods (69% within 6 months).
- *March* (Figure 2c). Two long-distance recoveries (846 and 1162 km) from South Africa to Zimbabwe, both within 5 months of ringing.

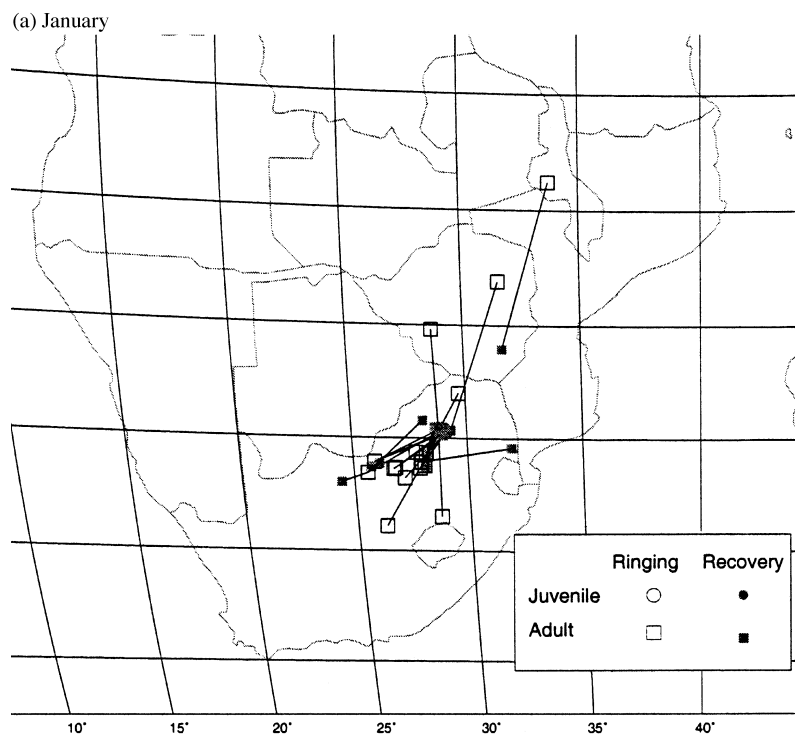


Figure 2 Maps showing recoveries of quelea, with lines linking ringing site (open circles or squares) and locations of recoveries (dark circles or squares). a January; b February; c March; d April; e May; f June; g July; h August; i September; j October; k November; l December.

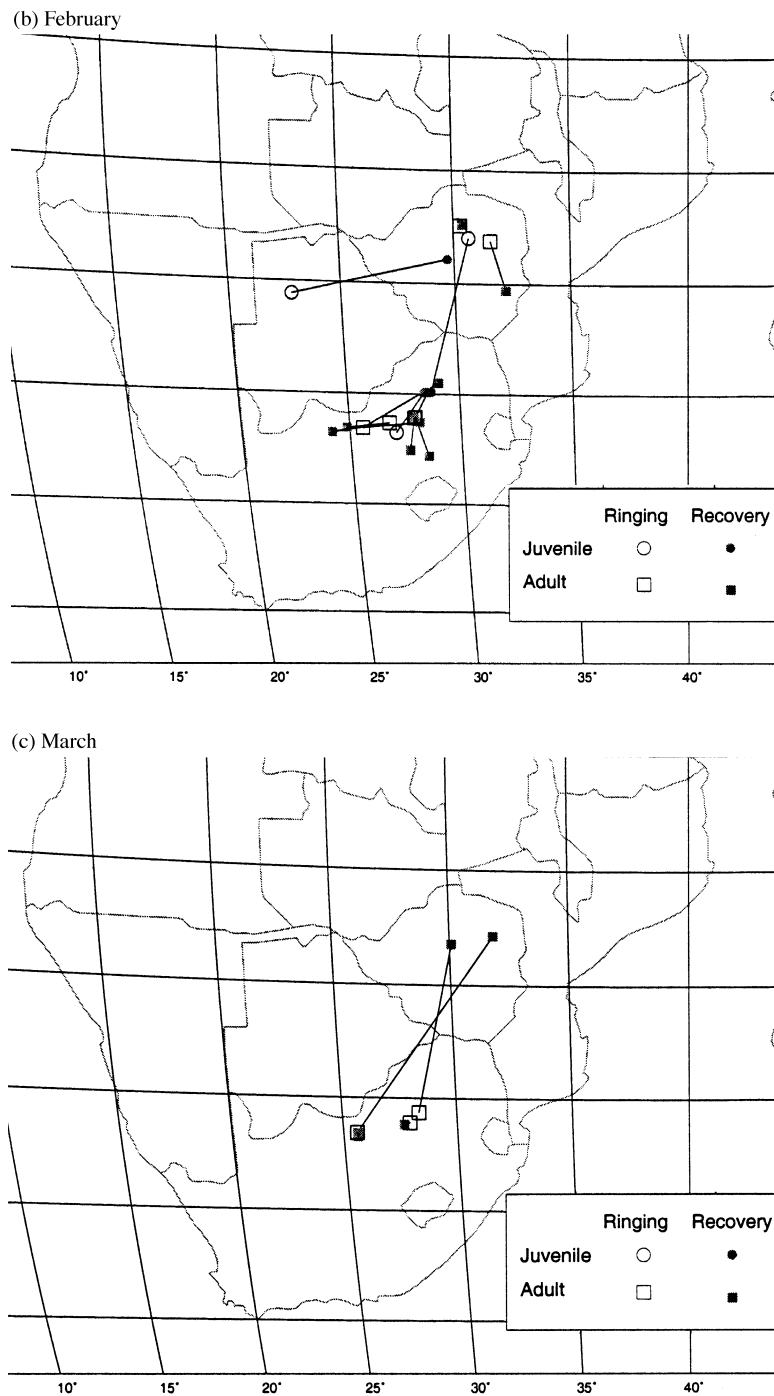


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- *April* (Figure 2d). One long distance movement of 778 km, within 6 months of ringing.
- *May* (Figure 2e). All the recoveries in May occurred more than 6 months after ringing, most having covered medium distances (> 100 km).
- *June* (Figure 2f). Eight recoveries were more than 100 km, and only three within 6 months of ringing.
- *July* (Figure 2g). Most of the movements occurred within the country of ringing. There was one long-distance migration between KwaZulu-Natal and Malawi: a nestling (AC00815) ringed in January was recovered 6.5 months later (Oatley, 1995b).

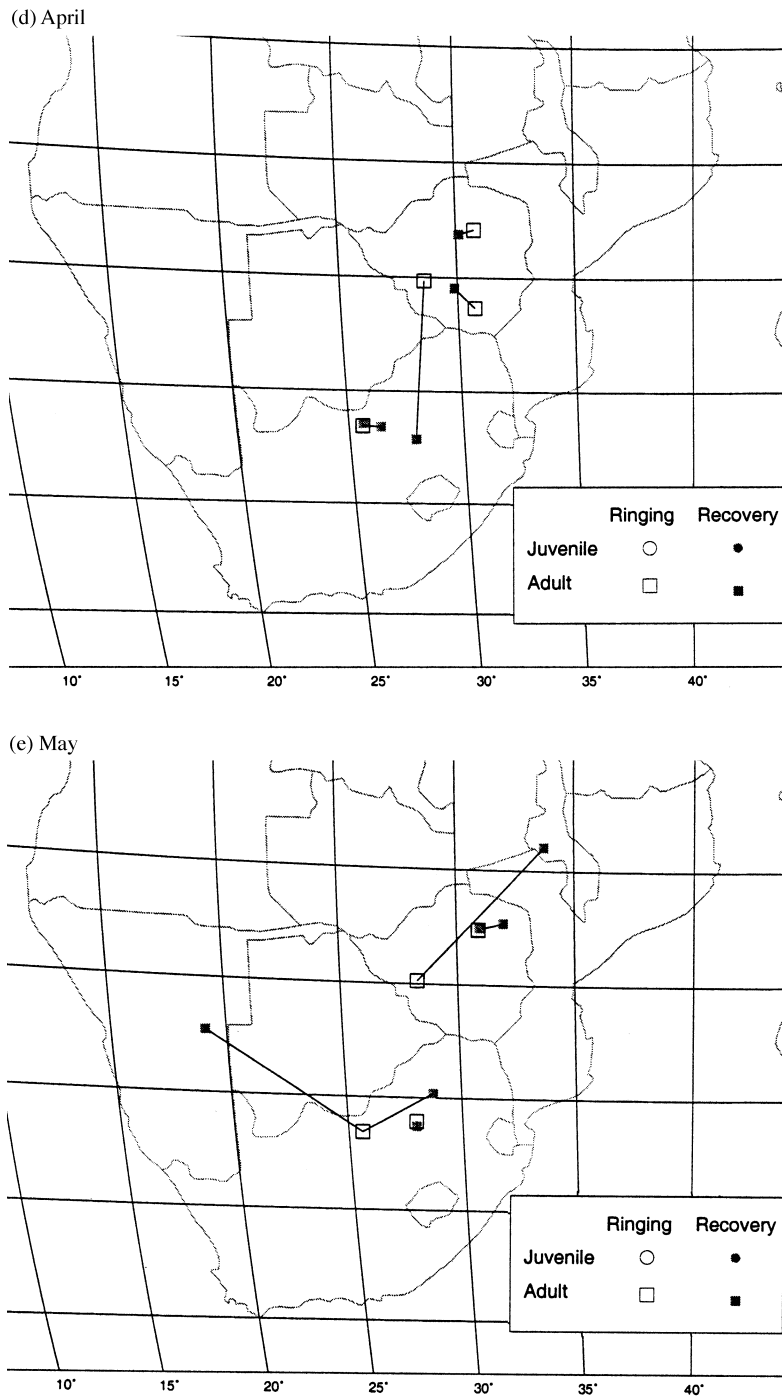


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- *August* (Figure 2h). A juvenile (AA26591) was recovered in Malawi in August, 11 months after being ringed in Namibia. Five quelea ringed at Barberspan in the 1970s were recovered in Zimbabwe, all more than 12 months later.
- *September* (Figure 2i). The six longest distances moved were by adults ringed in North West or Gauteng Provinces during August to December. One was recovered in Malawi 9 months later, the rest in Zimbabwe more than 12 months later.
- *October* (Figure 2j). The longest migration was by bird AD49898, ringed in North-West Province and recovered 2 years later in Malawi (Oatley, 1996). The next three

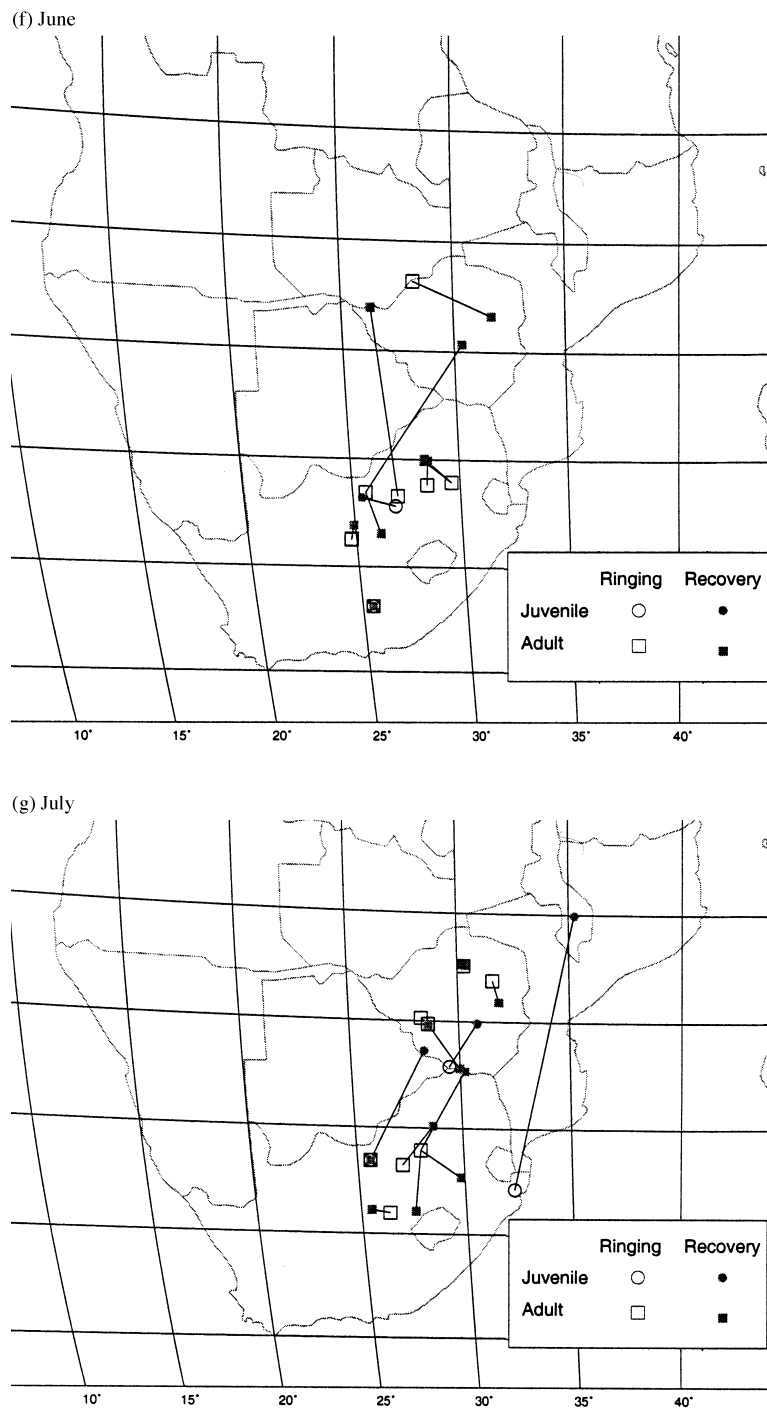


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longest movements were from Gauteng to Botswana, and from Zimbabwe to Malawi and Gauteng respectively, all having elapsed times of 11 to 14 months. Sixteen recoveries occurred in South Africa within 6 months and within 40 km of ringing.

- *November* (Figure 2k). The longest movement for a quelea in SAFRING's database is by bird AE10821, recovered in the Democratic Republic of Congo in November 1998 (Oschadleus, 1999). Four other birds (adults and immatures) were ringed in South Africa and recovered in foreign countries more than 1000 km distant (in different directions; Figure 2k). The elapsed times were between 12 and 18 months. One bird flew

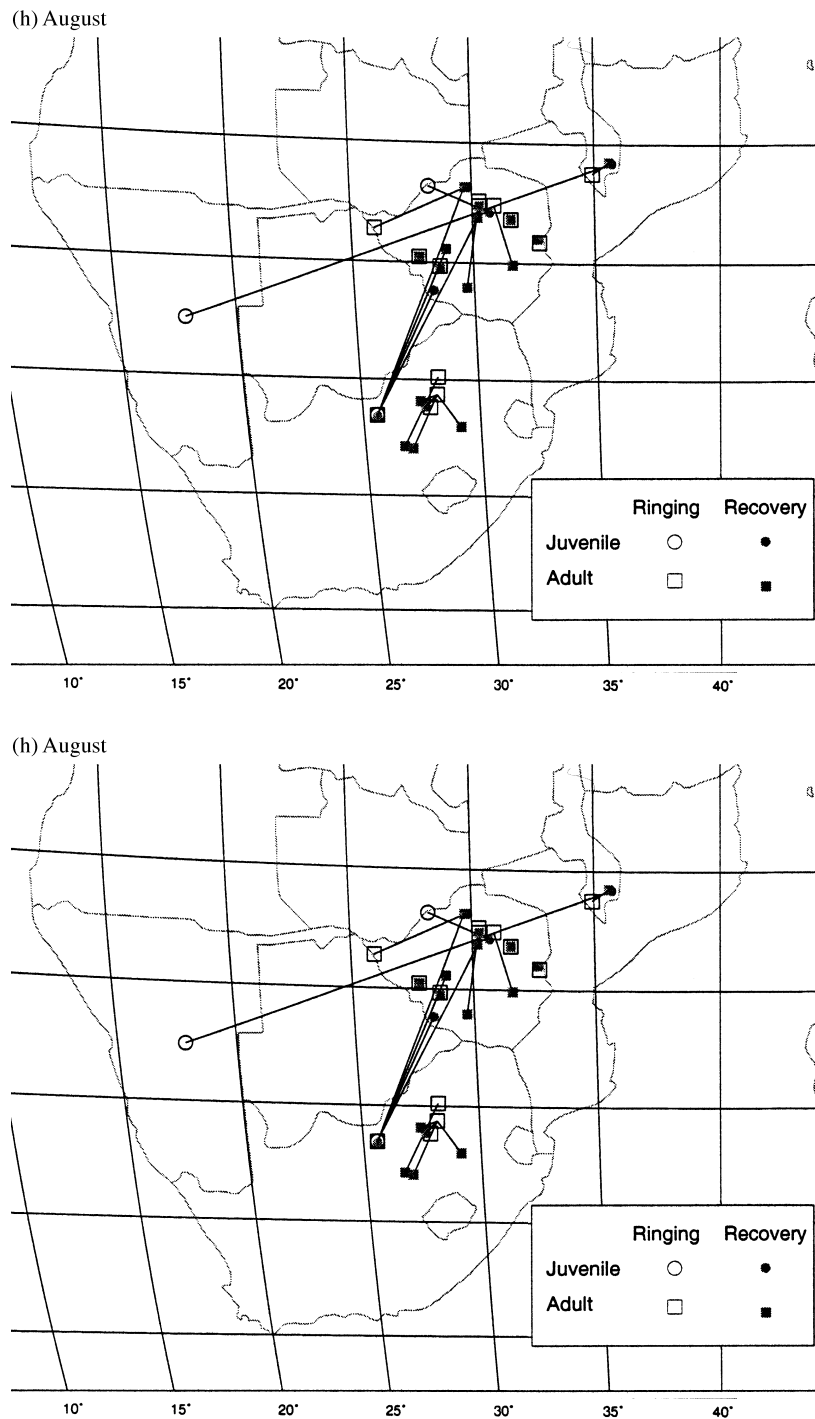


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from Zimbabwe to South Africa, the elapsed time being 2 years. After a control operation on 19 November 1975 at Barberspan, the largest number of recoveries (181) for one site was obtained. All the birds had been ringed at Barberspan within 4 km of the control operation, from the preceding day to over 3 years previously, indicating some site fidelity. Seventy-eight recoveries were of birds ringed less than 1 month previously, and 82 prior to that. Although the 1975/76 ringing report gave a total of 203 quelea recoveries (Vernon, 1977), this does not include the recoveries made 1 or 2 days after ringing.

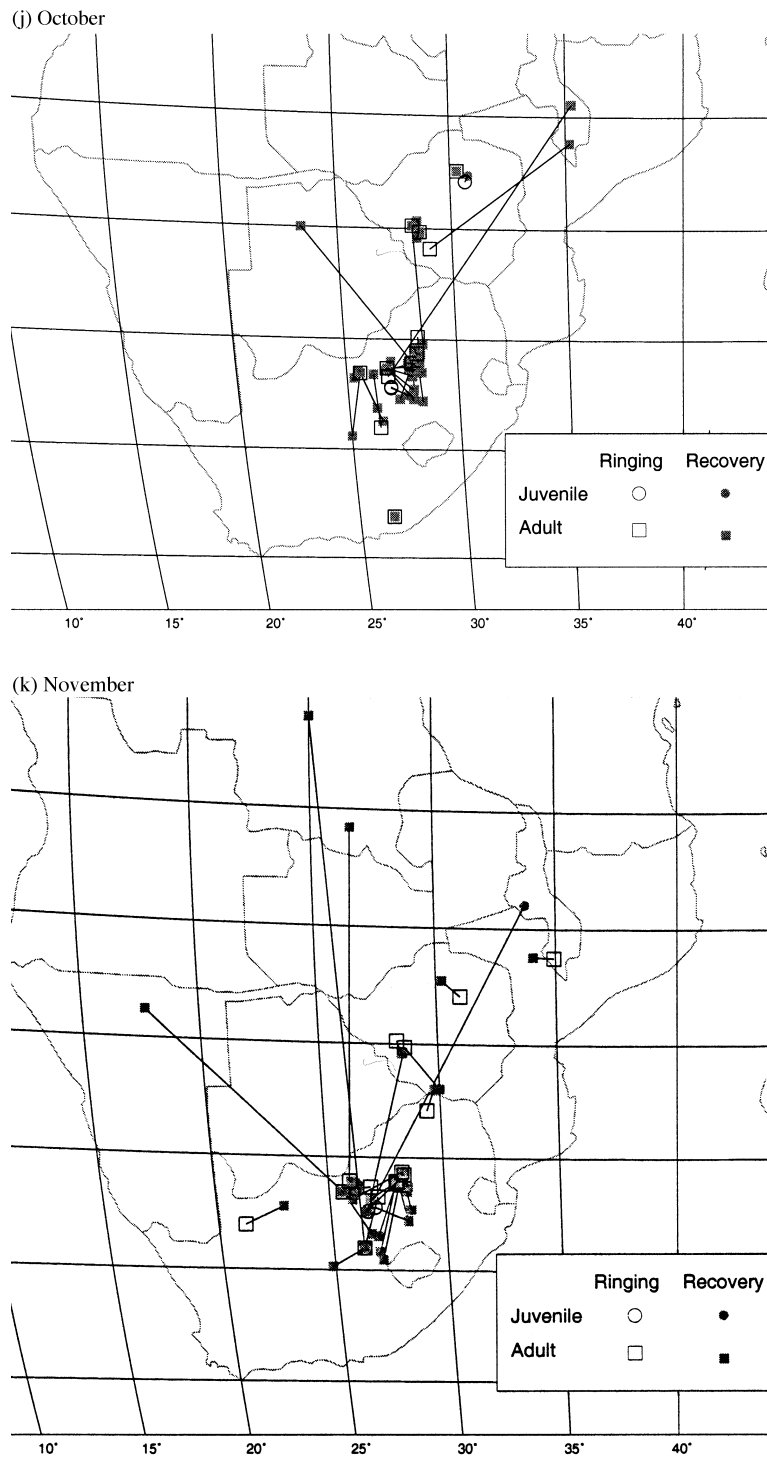


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- *December* (Figure 2i). An adult (5504721) was recovered in Malawi (1957), having been ringed 2 years previously in Johannesburg (McLachlan, 1962). One adult moved from Barberspan to KwaZulu-Natal during 1.3 years. Of the rest, 47 birds (68%) were recovered within 6 months. In Zimbabwe two adults moved 309 and 229 km south in 10 days and 7.5 months, respectively. The greatest elapsed time was of a quelea (60174461), ringed on 28 December 1963 in Zimbabwe as a first-year male and recovered 244 km away, 7 years 1 month later (Tree, 1989).

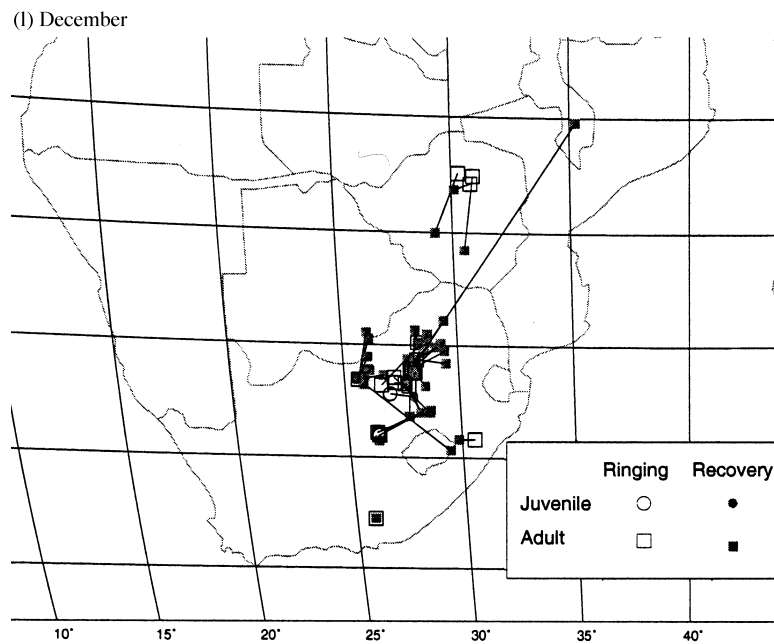


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Table 2 Distance moved by Red-billed Quelea ringed in southern Africa, and recovered within 6 months (184 days) of ringing, classified by month of recovery

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean	215	185	671	248		52	83	28	37	15	10	71
Median	206	196	846	101		0	13	13	12	13	4	35
Standard Error	36	43	346	178		52	38	13	24	3	2	12
Minimum	6	7	4	12		0	0	0	0	0	0	0
Maximum	838	417	1162	778		157	272	89	220	40	263	309
<i>n</i>	25	9	3	4	0	3	9	8	9	23	192	47

To look at movements over a relatively short time, the recoveries with elapsed times of less than 6 months were analysed by the average and median distances for each month (Table 2). Although the sample sizes are small in many months, and the different sample sizes may introduce a bias, the maximum distance travelled within 6 months was less than 300 km for birds recovered between June and November, and the median distances were all 13 km or less. From January to April the maximum distances exceed 300 km and the median exceed 100 km.

DISCUSSION

From April to July there were few short or long distance recoveries (Table 2, Figure 2d–2g). Most long-distance recoveries were of birds found during September, perhaps reflecting direct movements between South Africa and Zimbabwe, following the start of the rains in KwaZulu-Natal. From October to December there was a high proportion of short-distance recoveries in the crop-growing Free State and North-West Provinces. During these months the rain front passes from east to west across southern Africa. The scale is too coarse to determine whether quelea are flying over the rain front. Also they probably congregate in the crop-growing areas where irrigated crops provide a reliable source of

food, reducing the need to travel. The recoveries in January to March decrease in number but increase in distance, probably as a result of the breeding migration.

Analyses of the data on recoveries are limited in several respects. Using the recovery data from five decades is insufficient to determine patterns of quelea movements relative to rainfall since the start, intensity and duration of the rains is variable from year to year. Many recoveries are made within days of ringing due to control operations and coverage of both ringing and control operations during the year varies widely. There were no recoveries from Angola or Mozambique, where quelea do occur, probably due to lack of both ringing and control operations, and only two from Botswana, although there are probably extensive movements of quelea between South Africa and these countries. The recovery rate of quelea is low (0.38%), requiring a large number of birds ringed. The cheapest way to ring the large numbers of quelea needed to generate sufficient recoveries to discern patterns of movements is to involve amateur bird ringers, who are prepared to volunteer their time and expertise. Provided the costs of rings, transport and accommodation are covered, they are willing to go to great lengths and endure considerable hardship in undertaking the ringing (Scott, 1996). Most ringing and controlling of quelea have been in South Africa and Zimbabwe, so that the most useful areas for concentration of quelea ringing efforts in surrounding countries in future would be in Botswana.

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**SESSION 3 CURRENT UK-BASED MIGRANT
PEST RESEARCH**