DURBAN MUSEUM
Novitates
ISSUED BY THE DURBAN MUSEUM, DURBAN 4001, SOUTH AFRICA
VOL. X, PART 4 ISSUED 1ST MARCH, 1974

THE MIGRATORY BLACK KITE *MILVUS MIGRANS MIGRANS* (AVES: ACCIPITRIDAE) OF THE PALAEARCTIC IN SOUTHERN AFRICA

by

R. K. BROOKE
(Scientific Officer, Durban Museum, Durban)

INTRODUCTION

This paper examines the distribution in space and time of the migratory palaearctic Black Kite *Milvus migrans migrans* (Boddaert), 1783, in southern Africa (Africa south of the Zambezi and Cunene Rivers) on the basis of material examined, literature perused, personal sight records and those communicated to me. Methods of determining specimens and sight records are set out in relation to the commoner intra-African migrant Yellowbilled Kite *M.m.parasitus* (Daudin), 1800, which is the breeding subspecies of the region at present under consideration. Data on times and modes of moult are given, partly for their interest and partly because it is one of the characters used in distinguishing specimens of the two races. Reasons for regarding both forms as conspecific are given.

DISTRIBUTION

Although the first South African specimen of *M.m.migrans* was obtained in 1912 (Table 1), Sclater (1924) did not admit its occurrence in Africa south of north-eastern Zaire, and it did not appear

unequivocally in books on our area till 1940 (Hoesch & Niethammer; Roberts). It is apparent that Gurney (1872), following C. J. Andersson, had the two races muddled since he gives a first arrival date of 24 August, though we know from Hoesch & Niethammer (1940) that Andersson did obtain a specimen in northern South-West Africa in the last century. Even in 1963, Rudebeck did not believe that it was an annual visitor to our area. It is apparent from Map I and Table I that *M.m.migrans* is common and widespread in our area between October and March at least as far south as the valley of the Orange River (*c.*30°S). Since it occurs at times in spectacular numbers and is not difficult to shoot, the question arises why it was so long before its presence was appreciated. Admittedly, many of the specimens now in our museums are road casualties and the multiplication of roads and vehicles is largely a post-war phenomenon, but it is difficult to see how the flocks of hundreds in which it sometimes occurs were neither reported nor sampled with a gun if it was as common before the war as it is now. It would, therefore, appear that it is a form which has expanded its numbers within its old wintering range or has developed a new such range this century.

Map I shows the localities of all specimens reported in the literature, or personally examined, as well as sight records. Table I lists all dated specimens and all dated sight records for southern Africa other than Rhodesia. The inclusion of Rhodesian sight records would have made the list intolerably long, and the number of specimens available from that country makes it unnecessary to list the sight records. I am indebted to Prof. G. J. Broekhuysen who made his working papers on this species for his 1971 report on migration available to me. Records from these papers are given in Table I, and the source is given as G. J. B. when no observer's name is recorded; otherwise the recorder's name is given. The records of D. R. Calder and F. S. van Nierop discussed below were not used since I am not satisfied that they knew how to distinguish immature and juvenile *M.m.parasitus* with their black bills from *M.m.migrans*. This may apply to one or more records in Table I but these fall within the pattern established by a study of specimens and the sightings of competent observers.

In Zambia it is found chiefly on southward passage in October and November and on northward passage in late January and February (Benson *et al.* 1971). It has not been recorded from the Huila District of Angola (Pinto (1970)). It appears from Map I and Table I that *M.m.migrans* winters regularly as far south as the valley of the

Orange River, *i.e.*, to *c.*30°S. It is probably not of regular occurrence south of that in the Cape Province, though the position in the eastern Cape where both Dr. A. C. Kemp and I have recently recorded it while driving across country needs further study (see also Tree (1973)). This kite arrives early in October on the east side of southern Africa but not until November on the west. After Christmas the bulk of the population moves westwards to an extent varying on the rainfall in the Kalahari and adjacent arid areas to the west and south. F. S. van Nierop's record of one on 1 September, 1957, near Rustenburg, Transvaal, is almost certainly due to confusion with a second year *M.m.parasitus*, since there is as yet no evidence for overwintering in our area by nominate *M.migrans*. D. R. Calder's record of one on 14 March, 1965, at Umhlanga Rocks on the north coast of Natal is probably also due to confusion with a juvenile *parasitus*, since there is no confirmatory evidence for the occurrence of *M.m.migrans* on the east coast after November.

On the Palaearctic breeding grounds from western Siberia eastwards the nominate race is replaced by *M.m.lineatus* (J. E. Gray), 1831, which is larger, duller (even less reddish), and has white inner secondaries. As Moreau (1972) has pointed out, many west and central Siberian breeding birds migrate to Africa, and it seems unlikely that some elements of *M.m.lineatus* do not also come to Africa despite the fact that this has yet to be reported. The day after examining the Durban Museum's series of *Milvus* and consulting the authoritative work by Dement'ev & Gladkov (1966) at that centre, I saw two apparent *M.m.lineatus* in a party of raptors and swifts feeding on termite alates in the Umkomaas Valley, near Ixopo, Natal, on 3 November, 1972. The white on the underside of the inner wing was very obvious with binoculars (10 x 50), even at a range of nearly 1 km. The other raptors present were *Buteo b.vulpinus* (several), *M.m.migrans* (several) and *M.m.parasitus* (the majority). Dr. M. Courtenay-Latimer, the former Director of the East London Museum, advises (*pers.comm.*) that she has seen a number of these white-winged kites in the eastern Cape over the years. But more to the point in establishing the occurrence of *M.m.lineatus* in Africa is the presence of a specimen in the National Museum of Rhodesia, Bulawayo, taken at Selukwe, Rhodesia, which has the white inner secondaries described for *M.m.lineatus*. Unfortunately, neither Mr. Irwin nor I could locate the specimen again for further examination and measurement. It appears that *M.m.lineatus* probably occurs in eastern Africa in small numbers among the vast numbers of the nominate race.

MOULT

Active moult of the primaries is found in all adult specimens of *M.m.migrans* taken in October and November and all save one in December. Only one January bird has not completed its moult of the primaries. The mode is always a simple descending one. There is no evidence that migrants moving south interrupt the moult of the primaries. Moult of the rectrices continues slightly later as the bird with completed wing moult in December has not completed its rectrix moult and two of the January adults have yet to complete the growth of their rectrices. Both centrifugal and three centre modes of rectrix moult are found, more commonly the latter. These are probably older birds, at least third year ones (Brooke *et al.* 1972). Postjuvenal moult does not normally occur in southern Africa, though the early stages of contour moult are observable in one specimen taken on 12 February. Normally, the postjuvenal moult does not start until April judging from the findings of Russian authors.

In adult *M.m.parasitus* active moult of the primaries is not found until late December, the first bird to show it having been collected on 24 December. The postnuptial moult does not start until the young are some time out of the nest, since the first fledglings appear in late November. All adults obtained in January and February show active moult in the simple descending mode, but one bird taken on 8 March has completed its moult of the primaries. Other March-taken specimens show advanced active moult. The period of moult of the primaries is thus late December to the end of March, and an individual bird probably takes *c.*10 weeks to grow some 2 335mm of primaries on each wing, a rate of growth of 33,3mm per day per wing, which is very fast, since normally only one feather per wing grows at a time. Juvenile *parasitus* do not appear on the wing until late November, by which time juveniles of the nominate race are in noticeably worn plumage. The beginning and bulk of the postjuvenal moult of *parasitus* takes place in their unknown winter-quarters, since immature (second year) birds taken in our areas have either completed the moult or have it far advanced.

MENSURAL AND PLUMAGE CHARACTERS

Mensural characters are set out in Table 11 according to race, age and sex classes. Linear measurements are given in mm and weights in g. Wings were measured with a tape-measure over the wing and read to the nearest half cm, since abrasion of the feathers can shorten the wing of a raptor by at least that much, and also as a means of

avoiding the error of spurious accuracy caused by variation in the tension of the held tape. The culmen from the anterior edge of the cere, the hind-claw and the tail-fork with the tail held closed were measured with dividers and read to the nearest mm. Most weights were recorded in the imperial system: these have been converted to the nearest 10g since a more accurate conversion would be spurious in such large birds. Similarly, weights on labels given in the metric system have been reported to the nearest 10g.

It appears from a study of over 200 specimens that there is no mensural character which will unequivocally determine a specimen as to race, age or sex. It seems that adults have longer culmens and hind-claws than juveniles, *i.e.*, that these continue to grow slowly for nearly a year after fledging. It appears that females have longer culmens and hind-claws than males and weigh more. The sexing of birds in southern African museums is not always accurate and it may well be that with accurately sexed series the average differences would be greater. However, I do not expect that any absolutely dimorphic character will be found since some mensurally extreme specimens were personally sexed by leading ornithologists.

The descriptions of plumage in Brown & Amadon (1968) hold on average but not always for individuals, particularly juveniles, which are more variable in appearance than adults, as was also noted by Friedmann (1930). In sorting the large series of juveniles in the Bulawayo museum I eventually found that the only method for certain discrimination was the state of wear of the plumage: *M.m.migrans* fledges in July in Russia, whereas *M.m.parasitus* fledges from late November onwards in southern Africa. A fledged juvenile obtained or seen before mid-November must be of the nominate race, and thereafter the state of wear of the plumage, particularly of the remiges and rectrices, readily permits the determination of juvenile specimens. In December and January the very fresh plumage of juvenile *parasitus* is noticeable even in the field.

Because of the difficulty of separating specimens when large series covering much of the actual phenotypic variation are available, I cannot follow Chapin (1932) in regarding *M.aegyptius* (Gmelin), 1788, as a species separate from *M.migrans* (Boddaert), 1783, merely because yellow- and black-billed birds are not known to meet and intergrade. All the races recognized by Vaurie (1965) and Brown & Amadon (1968) represent the same stock and are not so clearly differentiated morphologically that they should be regarded as other than one species. The corollary of the variability

of the specimens is that only well characterized races can be sustained. Although I have not seen topotypes, let alone topotypical series, of *M.m.arabicus* Swann, 1922: Lahej, South Yemen, and *M.m.tenebrosus* Grant & Mackworth-Praed, 1933: Beoumi, Ivory Coast, I do not expect them to merit recognition since they have been questioned by most workers. Zambian birds are no darker than those from further south, *i.e.*, true *parasitus*, and they are not *tenebrosus* as claimed by Grant & Mackworth-Praed (1933), hence the treatment in the recent *Birds of Zambia.*

It appears from Table II that *parasitus* weighs less than nominate *migrans*. It also seems that nominate *migrans* is lighter in its winter-quarters than on its breeding grounds. Further enquiry is needed to determine if this is truly so and, if so, why. Glutz *et al.* (1971), cite Britton & Dowsett (1969) as having recorded a weight of 500g for nominate *migrans* in Zambia. An examination of the latter work does not lead me to concur. The latter authors refer to *M.migrans* binomially and either race can be understood, and it is probable that the lighter *parasitus* was weighed.

It is said by some authors that the deeper tail-fork of *parasitus* is a good field character for separating it from nominate *migrans*. It is apparent from Table II that this, like other characters, is only true on average and it is also complicated by the fact that it varies with age. It will be noted that there is a great range of variation in this character whenever any number of birds not moulting the relevant feathers (rectrices 1 and 6) are measured. The deeper tail-fork of *parasitus* is produced almost entirely by the greater length of the sixth (outermost) rectrix vis-à-vis the fifth, which equals the delta-length of my swift papers.

The black bill does not serve to diagnose nominate *migrans* in the field. It is always found in juvenile *parasitus* and in some if not all second year (immature) *parasitus* even though, as Chapin (1932) pointed out, the black is not as intense as in nominate *migrans*. These immature birds are shown separately in Table II and were diagnosed upon a combination of a black bill and either the presence of advanced juvenal moult or a fresh adult-style plumage. They cannot be aberrant nominate *migrans*, partly because of their size and partly because of the timing of the moults. It will be noted that their culmen and hind-claw lengths are adult but not their wing and tail-fork lengths. Although Dement'ev & Gladkov state that there is an immature plumage in nominate *migrans*, which is intermediate between those of juveniles and adults, it was not apparent among the

specimens examined unless the centrifugal mode of moult of the rectrices defines it. Perhaps the birds lose the characters during the first part of the moult which starts on their breeding grounds. The ratio of 12 immature *parasitus* to 107 adults and 25 juveniles suggests that either not all second year *parasitus* return to southern Africa, or that some obtain the yellow bill earlier than others and are then indistinguishable from adults. Further study is required.

Adult nominate *migrans* may be told in the field by their pale grey crowns which contrast sharply with the darker colours below and behind. Before late November any juvenile kite in southern Africa is nominate *migrans*, and thereafter worn juveniles are of this race and fresh ones are of the indigenous *parasitus*.

While nominate *migrans* is more gregarious in southern Africa than is *parasitus*, singletons and pairs may often be found and likewise great flocks of the latter (*e.g.*, Jensen (1972)). The presence of a flock or a singleton does not determine which race is present. Nominate *migrans*, as in Senegal (Moreau (1972)), is less inclined to frequent human settlements than *parasitus*, but the latter, which is the only race to breed here, sometimes does so in very remote areas where it has to forage far from habitations.

ACKNOWLEDGEMENTS

I am obliged for facilities for study to M. P. Stuart Irwin, Keeper of Ornithology at the National Museum of Rhodesia, Bulawayo, to Dr. A. C. Kemp of the Transvaal Museum, Pretoria, to C. D. Quickelberge of the East London Museum, and to G. Bell-Cross, Curator of the Queen Victoria Museum, Salisbury. I am indebted for data *in litt.* to Professor G. J. Broekhuysen, of the University of Cape Town, in respect of his 1971 paper, to H. D. Jackson, Curator of the Umtali Museum, and to Dr. A. C. Kemp. I am obliged to my colleague at the Durban Museum, E. L. Button, for elucidating the records in Button and Clancey (1972) and for other records.

SUMMARY

Records of localities and dates of occurrence of the Black Kite *Milvus migrans migrans* in southern Africa are reviewed. This highly migratory subspecies is found to be a regular visitor from the Palaearctic from early October to late March, ranging south to

30°S, the valley of the Orange River, and occasionally still further south in the Cape. It appears first in the east, and in response to midsummer rain, if it falls, the birds move westwards into desert country in November or December. Northward departure is protracted and probably starts in January.

Attention is drawn to the probability that the Siberian *M.m.lineatus* occurs in small numbers in the east.

Adult *M.m.migrans* complete their annual postnuptial moult here. Active moult is found in October, November and December, with the odd bird not quite finished by early January. Only one juvenile, a February bird, was found to have started its postjuvenal contour moult. Adult *M.m.parasitus* may start the postnuptial moult in December and all specimens are in active moult in January and February, and most in March when the moult is completed. The total length of the primaries of one wing of *parasitus* is *c.*2 335mm and these are grown in descending sequence over a period of about 10 weeks which gives the very fast average rate of growth of 33,3mm per day per wing.

An examination of over 200 specimens shows that the range of measurements and colour variation is very great and with much overlap, and does not support the view that nominate *migrans* and *parasitus* are not conspecific. On average, females have greater culmen and hind-claw lengths than males and weigh more. The culmen and hind-claw continue to grow for the best part of a year after fledging, since the averages of their lengths are always lower in first-year birds. The only certain way to separate juveniles of the two races is on the state of wear of the plumage: nominate *migrans* always show some degree of wear and *parasitus* are not free-flying until late November, when they appear in very fresh plumage. At least some second-year *parasitus* have black bills.

Field characters are reviewed. The markedly pale head of adult *M.m.migrans* is supported as a valid character, as is the markedly fresh plumage of juvenile *parasitus* in December and January. Reliance cannot be placed on the blackness of the bill, the depth of the tail-fork or the reddishness of the plumage, as these vary both individually and by age class. There seem to be no constant behavioural characters, such as degree of gregariousness or addiction to human habitation, though, of course, *parasitus* breeds in southern Africa and nominate *migrans* does not.

REFERENCES

BENSON, C. W., BROOKE, R. K., DOWSETT, R. J., and IRWIN, M. P. S. 1971. *The Birds of Zambia*. Collins, London.

BRANDT, H. D. and MALHERBE, A. P. 1967. "A revised list of the Birds of Potchefstroom", *S.Afr.Avif.Ser.*, no. li.

BRITTON, P. L. and DOWSETT, R. J. 1969. "More birds weights from Zambia" *Ostrich*, vol. xl, pp. 55-60.

BROEKHUYSEN, G. J. 1971. "Third report on bird migration in southern Africa", *Ostrich*, vol. xliii, pp. 41-64.

BROOKE, R. K., GROBLER, J. H., IRWIN, M. P. S., and STEYN, P. 1972. "A study of the migratory eagles *Aquila nipalensis* and *A.pomarina* (Aves: Accipitridae) in southern Africa, with comparative notes on other large raptors", *Occ.Pap.Natn.Mus.Rhod.*, ser. B, vol. v, 2, pp. 61-114.

BROWN, L. H. and AMADON, D. 1968. *Eagles, Hawks and Falcons of the World*, vol. i. Country Life Books, London.

BUTTON, E. L., and CLANCEY, P. A. 1972. "Some interesting records of wintering palaearctic raptors from the northern Cape", *Durban Mus. Novit.*, vol. ix, pp. 201-207.

CHAPIN, J. P. 1932. "The Birds of the Belgian Congo", part i, *Bull.Amer.Mus. Nat.Hist.*, no. lxv.

CLANCEY, P. A. 1955. "The European race of the Black Kite and the European Sand-martin in Natal", *Ostrich*, vol. xxvi, pp. 136-137.

CLANCEY, P. A. 1965. "The Black Kite in the south-eastern Transvaal", *Ostrich*, vol. xxxvi, p. 36.

DEMENT'EV, G. P. and GLADKOV, N. A. 1966. *Birds of the Soviet Union*, vol. i. Israel Program Scientific Translations, Jerusalem.

FRIEDMANN, H. 1930. "Birds collected by the Childs Frick Expedition to Ethiopia and Kenya Colony", part i, *U.S. Natn.Mus.Bull.*, no. 153.

GLUTZ VON BLOTZHEIM, U. N., BAUER, K. M. and BEZZEL, E. 1971. *Handbuch der Vögel mitteleuropas*, vol. iv. Akademische Verlagsgesellschaft, Frankfurt am Main.

GRANT, C. H. B. and MACKWORTH-PRAED, C. W. 1933. "Description of a new subspecies of kite", *Bull.Brit.Orn.Club*, vol. liv, p. 23.

GURNEY, J. H. 1872. *Notes on the Birds of Damaraland*. van Voorst, London.

HOESCH, W. and NIETHAMMER, G., 1940. "Die Vögelwelt Deutsch-Südwestafrikas", *Journ.f. Orn.*, sonderheft.

JENSEN, R. A. C. 1972. "The Steppe Eagle *Aquila nipalensis* and other termite-eating raptors in South West Africa", *Madoqua*, vol. v, pp. 73-76.

MOREAU, R. E. 1972. *The Palaearctic-African bird migration systems*, Academic Press, London.

OATLEY, T. B. and PINNELL, N. R. 1968. "The birds of Winterskloof, Natal", *S.Afr.Avif.Ser.*, no. lviii.

PINTO, A. A. DA ROSA 1970. "Um catálogo das aves do Distrito da Huila", *Mem.Trab.Invest.Cien.Angola*, no. vi.

PROZESKY, O. P. M. 1963. "Ornithological results of the Transvaal Museum Namib expedition May, 1959, and the subsequent trip to Sandwich Harbour during January, 1960", *Ostrich*, vol. xxxiv, pp. 78-91.

ROBERTS, A. 1940. *The Birds of South Africa*. H. F. & G. Witherby, London.

RUDEBECK, G. 1963. "Birds of Prey (Falconiformes)", *S.Afr.Anim.Life*, vol. ix, pp. 418-453.

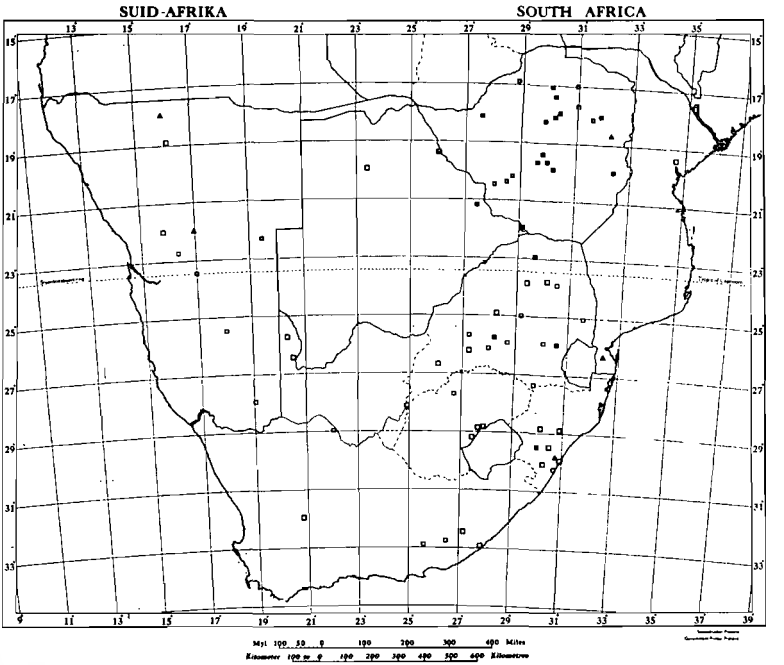
SCLATER, W. L. 1924. *Systema Avium Aethiopicarum*, part i. Taylor & Francis, London.

TREE, A. J. 1973. In "New distributional data: 4", *Ostrich*, vol. xliv, p. 126.

VAN DER WESTHUIZEN, P. M. 1967. "Black Kites and Woolly-necked Storks in South West Africa", *Ostrich*, vol. xxxviii, p. 203.

VAURIE, C. 1965. *The Birds of the Palearctic Fauna*, vol. ii (Non Passeriformes). H. F. & G. Witherby, London.

MAP 1



Distribution of records of *Milvus migrans migrans* in southern Africa.

KEY

■ = specimens personally examined.

▲ = specimens reported in the literature.

□ = visual records.

TABLE I

Dated records, excluding visual ones from Rhodesia, of *Milvus migrans migrans* in southern Africa.

Date	*Place*	*No.*	*Age*	*Collected or visually recorded*	*Source*
October					
4/61	Carolina, Tvl	1	—	V	J. de V. Little
6/63	Salisbury, Rhod.	1	juv.	C	N.M.B.
7/61	Somabula, Rhod.	1	ad.	C.	N.M.B.
7/62	Nagapande, Rhod.	1	ad.	C.	N.M.B.
10/54	Skukuza, Tvl	1	—	V	F. C. Bromley
10/62	Nagapande	2	juv.	C	N.M.B.
11/63	Gatooma, Rhod.	1	juv.	C	N.M.B.
13/53	Gravelotte, Tvl	1	—	V	F. C. Bromley
14/62	Nagapande	1	juv.	C	N.M.B.
15/55	Johannesburg, Tvl	12	—	V	G. Patten
15/64	Dargle, Natal	2	ad.	C	D.M.
15/67	Winterskloof, Natal	7	—	V	Oatley & Pinnell, (1968)

TABLE 1 (continued)

Date	*Place*	*No.*	*Age*	*Collected or visually recorded*	*Source*
16/64	Dargle	1	ad.	C	D.M.
18/57	Hartley, Rhod.	1	juv.	C	N.M.B.
19/57	Jukskei R., Tvl	1	—	V	J. de V. Little
19/64	Potchefstroom, Tvl	—	—	V	G.J.B.
19/69	Pienaarsrivier, Tvl	6	—	V	A. C. Kemp
20/56	Hartebeestpoort, Tvl	many	—	V	J. de V. Little
20/65	Tuli, Rhod.	1	juv.	C	N.M.B.
21/62	Volksrust, Tvl	2	—	V	J. de V. Little
22/56	Bronkhorstspruit, Tvl	1	—	V	J. de V. Little
23/55	Louis Trichardt, Tvl	1	—	V	R. Reed
23/69	Salisbury	1	juv.	C	Q.V.M.
24/63	Scottburgh, Natal	1000+	—	V	D. McCulloch
24/70	Gwelo, Rhod.	1	ad.	C	Q.V.M.
26/64	Marble Hall, Tvl	—	—	V	G.J.B.
26/72	Louis Trichardt	1	—	V	R.K.B.
27/56	Johannesburg	—	—	V	G.J.B.
27/57	Carolina	1	—	V	J. de V. Little
30/61	Salisbury	1	ad.	C	N.M.B.
30/63	Salisbury	1	ad.	C	N.M.B.
—/53	Potchefstroom	—	—	V	Brandt & Malherbe (1967)
November					
1/72	Kranskop, Natal	1	—	V	R.K.B.
3/64	Roedtan, Tvl	4	—	V	R.K.B.
3/65	Makwiro, Rhod.	1	ad.	C	N.M.B.
3/72	Umkomaas R. near Ixopo, Natal	several	—	V	R.K.B.
5/63	Marandellas, Rhod.	1	juv.	C	N.M.B.
8/67	Bulawayo, Rhod.	1	juv.	C	N.M.B.
9/63	Sinoia, Rhod.	1	ad.	C	N.M.B.
10/64	Salisbury	1	juv.	C	N.M.B.
10/72	32km S. of Cathcart C.P.	2	ad.	V	R.K.B.
11/47	Bulawayo	1	ad.	C	N.M.B.
11/53	Johannesburg	1	—	V	R. Reed
11/66	Winterskloof	9	—	V	Oatley & Pinnell (1968)
12/52	Johannesburg	1	—	V	R. Reed
12/55	Ogies, Tvl	3	—	V	F. C. Bromley
12/72	40km SW of Krugersdorp, Tvl	1	—	V	R.K.B.
13/51	Daisyfield, Rhod.	1	ad.	C	N.M.B.
13/54	Sandspruit, Tvl	*c.*500	—	V	G.J.B.
13/63	Fraserburg Dist., C.P.	1	—	V	Broekhuysen (1971)
13 and 14/54	Pietersburg, Tvl	500+	—	V	Rudebeck (1963)
14/54	Sandspruit	*c.*500	—	V	G.J.B.
14/64	Dieprivier, Tvl	*c.*30	—	V	R.K.B.
16/—	Ondongua, S.W.A.	1	juv.	C	Hoesch & Niethammer (1940)
16/57	Selukwe, Rhod.	1	ad.	C	N.M.B.
17/54	Sandspruit	—	—	V	G.J.B.
17/72	Tzaneen, Tvl	12	—	V	R.K.B.
19/57	Selukwe	1	juv.	C	N.M.B.
20/72	Inyazura, Rhod.	1	ad.	C	H. D. Jackson

TABLE 1 (continued)

Date	*Place*	*No.*	*Age*	*Collected or visually recorded*	*Source*
21/53	Johannesburg	1	—	V	R. Reed
21/55	Umvukwes, Rhod.	1	ad.	C	N.M.B.
23/62	Salisbury	1	juv.	C	N.M.B.
23/66	Selous, Rhod.	1	juv.	C	N.M.B.
23/72	Bulawayo	2	ad.	C	N.M.B.
24/54	Selukwe T.T.L.	2	juv.	C	N.M.B.
24/56	Bapsfontein, Tvl	many	—	V	J. de V. Little
25/56	Pienaarsrivier	*c.*40	—	V	G.J.B.
27/55	Barberton, Tvl	1	—	V	— Exall
27/58	Sanyati, Rhod.	1	juv.	C	N.M.B.
28/52	Bulawayo	1	juv.	C	N.M.B.
—/53	Mangwe, Rhod.	2	juv.	C	N.M.B.
—/54	Potchefstroom	—	—	V	Brandt & Malherbe (1967)
December					
1/55	Selukwe	1	ad.	C	N.M.B.
1/63	Badplaas, Tvl	200+	1 ad.	C	D.M.
2/47	Cyrene, Rhod.	1	ad.	C	N.M.B.
2/64	Salisbury	1	ad.	C	N.M.B.
5/63	Sinoia	1	ad.	C	N.M.B.
12/72	Bulawayo	1	juv.	C	N.M.B.
16/55	Soutpansberg, Tvl	*c.*55	—	V	G.J.B.
20/71	Salisbury	1	juv.	C	N.M.B.
22/26	Okahandja, S.W.A.	1	—	C	Hoesch & Niethammer (1940)
25/56	Pienaarsrivier	*c.*40	—	V	G.J.B.
26/51	Valley of 1 000 Hills, Natal	200+	—	C	Clancey (1955)
30/55	Bulawayo	1	ad.	C	N.M.B.
31/71	E. of Adelaide, C.P.	1	—	V	Tree (1973)
January					
1/72	S. of Cradock, C.P.	5	—	V	A. C. Kemp
11/42	Kerris West, S.W.A.	1	ad.	C	E.L.M.
11-13/67	Etosha, S.W.A.	1 000+	—	V	Van der Westhuizen (1967)
14/31	Soutpansberg	1	juv.	C	T.M.P.
14/38	Birchenough Bridge, Rhod.	1	ad.	C	T.M.P.
14/54	Francistown, Botsw.	1	ad.	C	N.M.B.
17/67	Balule, Tvl	*c.*100	—	V	A. C. Kemp
19/71	Karibib, S.W.A.	*c.*600	—	V	Jensen (1972)
21/60	Okahandja	*c.*500	—	V	Prozesky (1963)
22/72	Louis Trichardt	1	ad.	C	D.M.
23/72	Kalahari Gemsbok National Park	5	—	V	E. L. Button
24/49	Bulawayo	1	ad.	C	N.M.B.
25/70	Rustenburg, Tvl	3	—	V	A. C. Kemp
26/72	Kalahari Gemsbok National Park	4	—	V	E. L. Button
29/70	Rustenburg	7	—	V	A. C. Kemp

Date	*Place*	*No.*	*Age*	*Collected or visually recorded*	*Source*
February					
6/70	Klerksdorp, Tvl — Kimberley, C.P.	25	—	V	A. C. Kemp
6/70	Prieska, C.P. — Upington, C.P.	530	—	V	A. C. Kemp
7/55	Pietersburg	1	—	V	R. Reed
7/61	Mangula, Rhod.	1	juv.	C	N.M.B.
7/70	Upington — Keetmanshoop, S.W.A.	71	—	V	A. C. Kemp
7/70	Asab, S.W.A.	2	—	V	A. C. Kemp
8/55	Harmonie, O.F.S.	1	—	V	F. C. Bromley
8/70	Mariental, S.W.A. — Windhoek, S.W.A.	33	—	V	A. C. Kemp
9/70	100km SW of Windhoek	*c.*200	—	V	A. C. Kemp
10/55	Odendaalsrus, O.F.S.	3	—	V	F. C. Bromley
12/53	Macheke, Rhod.	1	ad.	C	N.M.B.
13/73	Francistown	1	—	V	E. L. Button
14/73	Maun, Botsw.	1	—	V	E. L. Button
19/70	Ruwa, Rhod.	1	ad.	C	Q.V.M.
20/55	Rustenburg	1	—	V	R. Reed
23/70	N. of Okahandja	5	—	V	A. C. Kemp
March					
5/63	Salisbury	1	juv.	C	N.M.B.
17/54	Klerksdorp	1	—	V	F. C. Bromley
23/12	Pretoria, Tvl	1	ad.	C	T.M.P.
28/64	Tamafupi, Botsw.	1	juv.	C	N.M.B.
April					
2/56	Ermelo, Tvl	—	—	—	G.J.B.

Abbreviations

Botsw. =Botswana
C =collected
C.P. =Cape Province
D.M. =Durban Museum
E.L.M. =East London Museum
G.J.B. =working papers for Broekhuysen (1971)
N.M.B. =National Museum of Rhodesia (Bulawayo)
O.F.S. =Orange Free State
Q.V.M. =Queen Victoria Museum (Salisbury)
Rhod. =Rhodesia
R.K.B. =author
S.W.A. =South West Africa
T.M.P. =Transvaal Museum (Pretoria)
Tvl =Transvaal
V =visually recorded

TABLE II

Mensural data on *Milvus migrans* subspp. in southern Africa.

Wing	*Culmen*	*Hind claw*	*Tail fork*	*Weight*	*Source*
A. *M.m.migrans* adults					
♂♂ 420-500 av. (13) 455	24-29 av. (13) 25,5	19-22 av. (13) 21,1	14-37 av. (11) 26,3	450, 640, 680	R.K.B.
417-452			25-30	660-850 av. (14) 733	Brown & Amadon (1968)
430-460 av. (22) 445					Vaurie (1965)
435-475 av. (23) 454				630-928 av. (16) 807	Glutz *et al.* (1971)
410-490 av. (45) 436				680	Dement'ev & Gladkov (1966)
♀♀ 430-480 av. (17) 456	23-28 av. (18) 26,4	18-24 av. (18) 22,0	10-52 av. (14) 24,9	770	R.K.B.
430-465			20-40 av. 32,5	750-1076 av. (7) 884	Brown & Amadon (1968)
440-475 av. (23) 460					Vaurie (1965)
434-480 av. (11) 454				750-941 av. (14) 850	Glutz *et al.* (1971)
437-505 av. (44) 465					Dement'ev & Gladkov (1966)
overall 420-500 av. (36) 456			10-52 av. (30) 26,3		R.K.B.
	22-28 av. 25,3				Glutz *et al.* (1971)
B. *M.m.migrans* juveniles					
♂♂ 390-465 av. (12) 437	22-28 av. (12) 24,8	18-22 av. (12) 20,2	12-40 av. (12) 20,5	610, 620	R.K.B.
♀♀ 420-460 av. (14) 440	23-29 av. (14) 25,2	19-24 av. (14) 21,4	11-30 av. (10) 18,4	680	R.K.B.
oo				610, 660	R.K.B.
overall 390-465 av. (29) 439			11-40 av. (24) 19,1		R.K.B.
C. *M.m.parasitus* adults					
♂♂ 385-460 av. (47) 422	22-26 av. (46) 24,3	17-22 av. (45) 19,3	25-59 av. (44) 44,7	570, 760	R.K.B.
415-425				567-650	Brown & Amadon (1968)
390-425					Chapin (1932)
♀♀ 380-455 av. (43) 427	22-27 av. (41) 25,0	17-22 av. (41) 19,9	26-58 av. (38) 45,2	710, 720, 750	R.K.B.
425-450				617-682	Brown & Amadon (1968)
415-446					Chapin (1932)
overall 380-460 av. (107) 425			25-68 av. (98) 43,6		R.K.B.
395-454					Grant & Mackworth-Praed (1933)
D. *M.m.parasitus* immatures					
overall 385-450 av. (12) 418	22-26 av. (9) 24,0	18-21 av. (12) 20,0	18-34 av. (9) 25,9		R.K.B.
E. *M.m.parasitus* juveniles					
♂♂ 400-450 av. (11) 414	22-26 av. (9) 23,1	17-20 av. (11) 18,7	19-35 av. (10) 27,3		R.K.B.
409-426 av. (6) 420	23,5-24,5 av. (6) 23,9				Friedmann (1930)
♀♀ 400-425 av. (10) 410	23-25 av. (8) 23,5	18-21 av. (8) 19,0	15-34 av. (9) 25,6		R.K.B.
overall 390-450 av. (25) 412			15-35 av. (23) 25,9		R.K.B.