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APPENDIX 1

Palaearctic migrants recorded from the middle and lower Jubba valley 18–28 March and 5–12 November 1987. Species previously unrecorded from the Jubba valley according to Ash & Miskell (1983) are indicated by an asterisk.

Black Stork *Ciconia nigra 1 Fanoole rice scheme 5 Nov. Only the second record for Somalia.

Shoveler *Anas clypeata 2 Jamaame 9 Nov.

Garganey *A. querquedula* small parties in March on *dhesheegs*, dams and irrigation from Mareerey north to Lake Radiile; max. *c.* 80 Radiile. Small parties Nov Jamaame and Lake Waamo.

Eurasian Marsh Harrier *Circus aeruginosus*, Pallid Harrier *C. macrourus*, Montagu's Harrier *C. pygargus* occasional singles of all three harrier species, both seasons, from Jamaame area north to Shoonto.

Booted Eagle *Hieraaetus pennatus* 2 Fanoole barrage 20 Mar; 1 Jamaame 11 Nov.

Honey Buzzard *Pernis apivorus 1 in trees along river at Jilib 6 Nov. No previous record for Somalia.

Osprey *Pandion haliaetus* 1 Jamaame 9 Nov.

Lesser Kestrel *F. naumanni 1 Fanoole barrage 6 Nov was the only record.

Hobby *Falco subbuteo 1 Kamsuma 7 Nov was the only record.

Caspian Plover ***Charadrius asiaticus*** recorded Mareerey and Fanoole barrage in March, with a flock of *c*. 400 Lake Radiile 22 Mar; a small party Kismaayo 11 Nov.

Little Ringed Plover ***C. dubius*** occasional in March, with ones and twos along silty river edges. In November, small parties up to 20 common on muddy pans and edges of *dhesheegs*.

Ringed Plover ***C. hiaticula*** in March common along river with *c*. 200 Fanoole barrage; common other wetlands with 100+ Shoonto desheeg. Common in November on floods and rice schemes with hundreds at Mogambo.

Spotted Redshank** ***Tringa erythropus 10+ Shoonto *dhesheeg* 21 Mar and *c*. 10 Lake Radiile 22 Mar.

Wood Sandpiper ***T. glareola*** very abundant and widespread both seasons on wetlands and irrigation; the most numerous wader on rice schemes and natural floods. Thousands in November at Fanoole and Mogambo rice schemes and at Lake Waamo.

Greenshank ***T. nebularia*** widespread in small numbers both seasons. Singles along the river in March.

Green Sandpiper ***T. ochropus*** singles Mareerey in March; 1 Jilib and several Mogambo rice scheme in November.

Marsh Sandpiper ***T. stagnatilis*** Common and widespread on wetlands and irrigation; max. in March *c*. 100 Lake Radiile; in November hundreds at Mogambo rice scheme.

Terek Sandpiper ***Xenus cinereus*** 2 Jamaame 9 Nov and 2 Jilib 11 Nov, on small pans.

Common Sandpiper ***Actitis hypoleucos*** very common and widespread in small numbers both seasons. In ones and twos along the river in March.

Common Snipe ***Gallinago gallinago*** uncommon in March. Small numbers in November around Jamaame and on the rice schemes, but scores present Lake Waamo.

Great Snipe** ***G. media 5+ Lake Waamo 10 Nov along 1 km of shore. No previous record for Somalia.

Curlew Sandpiper ***Calidris ferruginea*** common both seasons in small parties on muddy pans and *dhesheegs*.

Little Stint ***C. minuta*** widespread and abundant on muddy pans and dhesheegs. In March, max. *c*. 400 at Shoonto. Hundreds in November on rice irrigation and at Lake Waamo.

Temminck's Stint ***C. temminckii*** in March, up to 3 together along silty river edges Jilib and Bu'aale; also 6+ Shoonto dhesheeg and 3 Lake Radiile. In November, 2 Jamaame on 9th, 2 Lake Waamo on 10th and 1 Jilib on 11th.

Black-tailed Godwit ***Limosa limosa*** scarce; 2 Fanoole rice scheme 27 Mar; 1 Lake Waamo 10 Nov.

Ruff ***Philomachus pugnax*** small numbers in March on wetlands Fanoole barrage–Bu'aale and 1000+ Fanoole rice scheme. In November, widespread and abundant in lower part of valley with thousands Mogambo and 1000+ Lake Waamo.

Whiskered Tern** ***Chlidonias hybridus a few non-breeding plumaged birds Mareerey factory dams 19 Mar and Fanoole barrage 20 Mar. Two non-breeding plumaged birds

Jamaame 9 Nov. Very possibly Palaearctic in origin.

White-winged Black Tern *C. leucopterus* small numbers March, Mareerey–Bu'aale, max. 70+ Shoonto; a few hundreds in November Fanoole and Mogambo rice schemes.

Gull-billed Tern *Gelochelidon nilotica* local and in small numbers; a few Fanoole and Shoonto in March and Jamaame area in November.

Caspian Tern *Sterna caspia* near coast seen upstream to Gobwein.

Eurasian Cuckoo *Cuculus canorus frequent in November; ones and twos seen Jilib, Mogambo, Kamsuma and Gobwein.

Eurasian Bee-eater *Merops apiaster* 2 together on wires along Jilib–Fanoole barrage road, 6 Nov.

Blue-cheeked Bee-eater *M. persicus* common both seasons in open country on the floodplain, especially on wires along canals. Scores along Jilib–Fanoole barrage road in November, with parties constantly moving south.

Eurasian Roller *Coracias garrulus* in March 1 Mogambo on 24th was the only record. In November, uncommon; up to three together around Jilib.

Eurasian Swallow *Hirundo rustica* common and widespread on floodplain. Scores and hundreds in November, but small numbers in March.

Eurasian Sand Martin *Riparia riparia* 1 Jilib March was the only record.

Eurasian Golden Oriole *Oriolus oriolus* in March, 1 flying north Fanoole barrage on 20th and 2 in bush near Bu'aale on 21st. In November, 1 along river at Jilib on 5th and 3 on 6th; 2 in *Acacia* woodland Gobwein on 11th.

Rufous Bush Chat *Cercotrichas galactotes* widespread and common in March in dry bush and thicket peripheral to floodplain, where it was the most numerous passerine migrant; especially common on red soil near coast; occasionally seen on floodplain but not noted near the river. None seen in November.

Sprosser *Luscinia luscinia* a few in November (5th, 6th and 12th) in thicket near the river at Jilib; also 30+ around Fanoole barrage on 7th and one near Jamaame on 9th. Some of these birds were in song.

Nightingale *L. megarhynchos* in March, a few in residual green scrub patches at Kamsuma, single birds by river at Jilib and Fanoole barrage and 20+ in woodland edge thicket at Shoonto. In November, very common on the floodplain from Jamaame area northwards, especially in *Acacia nilotica* thickets, with smaller numbers in peripheral bushland also; scores around Fanoole barrage; many in song.

Eurasian Rock Thrush *Monticola saxatilis* scarce; 1 Mareerey 24 Mar; 1 Jilib 7 Nov.

Isabelline Wheatear *Oenanthe isabellina* very common in March and November on flat dusty plains around Jilib and nearer the coast; occasional further north.

Northern Wheatear *O. oenanthe* 1 at Jilib on 28th, probably on passage, was the only March record. Frequent and widespread in November, mainly on floodplain cultivation.

Pied Wheatear *O. pleschanka* common and widespread in open bush and cultivation, on floodplain and peripheral areas; from Lake Waamo and Jamaame northwards, but none seen on coast. More numerous in March than November.

Basra Reed Warbler *Acrocephalus griseldis 1 along ditch on Mogambo rice scheme 7 Nov was the only record.

Marsh Warbler *A. palustris in November, 2 Jilib on 5th, 2 Fanoole on 7th, 2–3 after rain Mogambo rice scheme on 7th, 1 Jamaame on 8th, 1 Kamsuma on 9th; generally scarce.

Sedge Warbler *A. scheoenobaenus singing Mareerey factory dams 24 Mar; also seen Fanoole rice scheme 27 Mar.

Upcher's Warbler *Hippolais languida in March, the commonest migrant warbler; widespread throughout dry bush and *Acacia tortilis* woodland outside the floodplain; commonest near coast where many in song in red soil woodland thicket. In November, 1 Gobwein on 11th was the only record.

Olivaceous Warbler *H. pallida uncommon. In March, single birds singing and presumably wintering in floodplain thicket near Jilib and Jamaame. In November, 1 Fanoole barrage, 1 Jamaame and 1 Kamsuma, again all on floodplain.

River Warbler *Locustella fluviatilis 1 in *Acacia nilotica* thicket and rank grass by river at Jilib 12 Nov. Good views obtained. No previous record for Somalia.

Whitethroat *Sylvia communis a presumed passage bird Fanoole barrage 21 Mar.

Barred Warbler *S. nisoria* at least 10 in *Salvadora persica* thicket in *Acacia tortilis* woodland at Gobwein 11 Nov; probably many more since only a small part of the habitat was covered.

Willow Warbler *Phylloscopus trochilus 2 in scrub along river bank at Fanoole barrage, together with a Whitethroat, on 21 Mar were presumably on passage. No other records.

Spotted Flycatcher *Muscicapa striata* very few in March, in riverine thicket and *Acacia* woodland; some of these were completing moult and presumably wintering. Common and widespread in November south to the coast, mostly on the floodplain.

Red-throated Pipit *Anthus cervinus scarce; 1 Shoonto 22 Mar, 2 Lake Waamo 10 Nov and 2 Jilib 11 Nov.

White Wagtail *Motacilla alba* 1 Jilib on 19th was the only March record. Increasingly common during the November week in villages and near coast.

Grey Wagtail *M. cinerea* frequent in November in villages, usually by water; mostly singly, but 4 together Jamaame on 8th.

Yellow Wagtail *M. flava* common both seasons on floodplain near water and with domestic stock; hundreds Lake Waamo in November. Birds racially assigned were mostly *flava* and *beema*.

Red-backed Shrike *Lanius collurio* frequent and widespread in November, in ones and twos on the floodplain.

Red-tailed Shrike *L. isabellinus* a male of the race *speculigerus* at Jilib 19 Mar was the only record.

EASTERN RED-FOOTED FALCONS *FALCO AMURENSIS* AND RED-FOOTED FALCON *F. VESPERTINUS* IN SOMALIA AND ETHIOPIA

J.S. Ash & J.E. Miskell

We follow Stresemann & Amadon (1979) in regarding the Eastern Red-footed or Amur Falcon *Falco amurensis* as being distinct from the Red-footed Falcon *F. vespertinus*. This policy has been followed previously by some authors, for example White (1965), without comment, and Moreau (1972), who added that they were allopatric and that the differences between the two were greater than would normally be regarded as subspecific, and that there are no reports of interbreeding. The Amur Falcon, as we prefer to call it, breeds from Lake Baikal eastwards to the Pacific and southwards to northern China (Moreau 1972), and overwinters in east tropical Africa south to Cape Province and west to northern Namibia (Brown *et al.* 1982). *F. vespertinus* breeds westwards from Lake Baikal, mostly between 50° and 60°E across Asia north of the Caspian and Black Seas into western Europe.

STATUS IN ETHIOPIA AND SOMALIA

Ethiopia

Urban & Brown (1971) describe *vespertinus* as a passage migrant in Western Ethiopia in September–October and March–April, possibly frequent, and *amurensis* as a passage migrant, possibly in October and March, in northeast Ethiopia. In an exhaustive search of the literature we were able to trace only a single record of *F. vespertinus* and not one of *amurensis* in the whole of Ethiopia, and JSA failed to see either species during wide travels in the country in 1969–1977. In the Sudan adjoining Western Ethiopia there are no records east of the Nile valley (Nikolaus 1987). Vittery (1975, 1983) recorded a male flying north at Lake Langano (7°35N, 38°45E) in the Rift Valley on 26 April 1975, but the observation is unsupported by details of identification. Later in the same year, G. Nikolaus (*in litt.*) reported a bird from the Afdera River (9°32N, 41°00E), also in the Rift Valley, on 29 September to 1 October 1975 which he considered to be this species, but his description is not entirely convincing.

Somalia

There are no records of *vespertinus* and only one old record, of two *amurensis*, collected at Obbia (5°21N, 48°32E) in January 1931 (Moltoni 1935, 1936). However, on 24 November 1978 there were two *amurensis* all day, joined by seven more in the evening, on the coast at Gezira (1°56N, 45°11E). On 13 April 1979 we encountered quite large numbers between Balad (2°21N, 45°11E) and Jiohar (2°47N, 45°30E), also in southern Somalia, associated with an immense passage of Eurasian Rollers *Coracias garrulus* (Ash & Miskell 1980). We made five separate observations on this day, as follows:

a. 13 km north of Balad: *c.* 100 small falcons comprising 50 male and 30 female amurensis, *c.* 10 Lesser Kestrels *F. naumanni*, 5 Kestrels *F. tinnunculus* and 5 Hobbies *F. subbuteo*, with *c.* 100 Eurasian Rollers feeding on termites.
b. 30 km south of Jiohar: several small parties of small falcons, mostly *amurensis*, flying ENE with Eurasian Rollers.

c. 24 km south of Jiohar: 20 *amurensis* flying NE.

d. 14 km south of Jiohar: 15 *amurensis* catching termites.

e. 11 km south of Jiohar: 25 *amurensis* flying NE at dusk.

In the same area where the birds were seen in the spring of 1979 at least ten were watched on 17 April 1981 at 11 km south of Balad. Shortly afterwards, three falcons, almost certainly *amurensis*, accompanying a group of raptors which consisted of 1 *subbuteo*, 25 *tinnunculus* and 5 Swallow-tailed Kites *Chelictinia riocourii* were feeding aerially over open ground on 28 April 1981 near Bergadid (5°04N, 45°20E) in the west of the country close to the Ethiopian border.

MIGRATION OF *FALCON AMURENSIS*

Moreau (1972) described the migration as "the most extraordinary of all those under discussion", and Brown & Amadon (1968) remarked that in its journey of 6000–7000 miles it "possible performs the most remarkable migration known in any bird of prey." The present indications are that the main bulk of Amur Falcons leave their breeding quarters, between Lake Baikal and Korea, pass through Assam south of the Himalayas and leave western India between 14° and 16°N in the area of Goa on a long flight, of at least 3000 km across the Indian Ocean, in the north-east monsoon between November and January.

Apparent arrival localities along the east African seaboard range from Obbia in the north at *c.* 5°N to Pemba Island at 5°S. Inland movements, such as the large southerly movement in January at Dodoma (6°11S, 35°45E) in Tanzania (Britton 1980) suggest arrival of birds at some point north of 5°S. Records of single immature birds near Aden on 25 November 1984 (Ash in prep.) and at Muscat, also on 25 November (year not given, Meinertzhagen (1954)), although being further north, still fit in well with the timing of this westerly movement.

As far as is known the world population, estimated by Moreau (1972) as possibly numbering 4.5 million, overwinters in Africa, and if as seems likely after crossing the Indian Ocean they pass over the African coast between 5°N and 5°S it is remarkable that there are only four records of presumed new arrivals on the coast (at Obbia and Gezira in Somalia, Bamburi (4°00S, 39°43E) in Kenya, and Pemba (5°10S, 39°48E) in Tanzania). This strongly suggests that birds are passing over unseen high overhead, many probably at night, and continuing inland. From a total of over 70 records that we have traced in Somalia, Uganda, Kenya and Tanzania, 38 can be dated to the immigration period in November–January, but only five of them refer to more than 100 birds, the highest being 1000+ (once). Thus this large mass of birds is passing through virtually unseen. In their final winter quarters further south 5000, and even up to 100 000, have been seen together (Moreau 1972). These observations strongly suggest that Amur Falcons not only cross the Indian Ocean in an uninterrupted flight, but that many of them continue non-stop as far as Malawi and Zambia.

Their late arrival in November–January results from the timing of their trans-oceanic flight to coincide with the N.E. monsoon, and practically all Amur Falcons are absent from East Africa after January. The few records there in February are from southern Tanzania and presumably, like some of the January records, are birds within the northern limit of their final winter range.

Return passage takes place more rapidly, in March and April, and observations in Africa fall within the same area as the autumn birds, except that there are a few more records to the north and west. The reverse migration takes place in similar conditions to those in autumn, except that the following wind is now from the S.W. monsoon. There is no reason to assume the "massive descent" expected by Moreau (1972) or to suppose that the absence of records on the Indian seaboard in spring is any more unexpected than are the few records on the African coast in autumn. Nevertheless, the route back from eastern Africa in spring is still not known.

The extraordinary record by Meinertzhagen (1954) of 100 Amur Falcons, of which he shot a pair, near Mecca on 6 April 1948, is difficult to understand. Moreau (1972) suggested that the falcons may have been "seduced" into being diverted off-course by the presence of breeding locusts in the Red Sea area, although it is difficult to understand how their influence might have been exerted over a distance of many hundreds of kilometres from the most northerly record of *amurensis* in Africa at Obbia.

We have discussed elsewhere (Ash & Miskell 1980) the migration of Eurasian Rollers with which the falcons were associated on 13 April 1979, and whose onward passage is not understood either. Several possibilities exist which might equally well apply to Amur Falcons:

a. the birds may have been heading towards the coast along which they might proceed to a short sea-crossing at Cape Guardafui.
b. the birds may have been heading for a direct long-distance crossing of the Indian Ocean (although this seems unlikely at this latitude before the S.W. monsoon is established).
c. they may have been diverted from their original track towards the large rainstorms on 13 April where there would be insects in the upwelling air ahead of the rain.

Amur Falcons deposit large reserves of pre-migratory fat (Moreau 1972) and are thus able to travel great distances non-stop. They are also aerial feeders, as are the rollers, so can exploit any available food sources, particularly airborne locusts and termites, whilst on migration.

We suspect that the main exodus of falcons in spring may leave Africa from the same area at which they arrived four to five months earlier, at very high altitude, not necessarily on a narrow front, and perhaps mainly to the south of Somalia. Further south in April the westerly wind will be firmly established, but possibly some birds find they are ahead of the wind-change zone and become 'trapped' by the easterly head winds further north, and thus continue overland in a north-easterly direction, rather than face a long oversea flight in a head wind. This might account for the birds in western Arabia, and possibly even for those found in Somalia. Whichever is the case, it is indeed remarkable that a migration which must involve millions of birds is so poorly understood.

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Postscript: Since the above was written it has been learned that Douthwaite & Miskell (in prep.) are reporting the first occurrence of *Falco vespertinus* in Somalia.

MADAGASCAR PRATINCOLES *GLAREOLA OCULARIS* AND OTHER PRATINCOLES IN SOMALIA.

J.S. Ash and J.E. Miskell

Britton's (1977) review of the status of the Madagascar Pratincole *Glareola ocularis* in Africa showed that the pattern of its migrations and breeding cycle are now well understood, and that a part of the Kenya coast is an important area for non-breeding birds in April–August. He also gave two dated non-breeding records for Somalia, from which he deduced that there might be an "off-season area" in that country. Some personal observations are presented to show that he was correct in this supposition, and we also quote some other earlier records.

OBSERVATIONS

Except for two records, most of the earlier Madagascar Pratincoles prior to 1979 in Somalia, for which there are nine references in the literature in the period 1923–1971, refer to collected birds (Table 1). Unfortunately there is little information on the actual numbers present at the time of collection, so mostly it is impossible to know whether they are merely isolated records of single birds, or whether they were collected from flocks. The only record of large numbers in this period is the 500 recorded on the Jubba River by Moltoni (1936b). In 1979, large numbers of *G. ocularis* were seen in Somalia, when a flock of 3000 was counted on 25 and 28 May near Jiohar on the Webi Shabelle. We found these birds in mid-afternoon resting on patches of exposed mud in a large area of flooded land. The diagnostic characters of identification were clearly seen in close views, and no Common Pratincoles *G. pratincola* could be seen with them. Three observers separately estimated their numbers, by counting birds in one batch of 100 and then applying this to the whole flock. Our individual totals were 2700, 3000 and 3500. When followed by a more thorough count our final figure of 3000 was arrived at.

OFF-SEASON RANGE

Except for the undated 1929 record (Moltoni 1935, 1936a), all the other records fall between 25 May (in two years) and 4 September (Table 1), while extreme dates cited by Britton for Kenya are 4 April and 30 September. Earlier dates in spring and later dates in autumn are to be expected in Kenya, so that the respective differences of 51 and 26 days may suggest a rather leisurely movement between the Jubba and Shebelle areas and the Kenya coast. The single record from Ethiopia on 29 October (Ash 1977), falls well outside the above off-season dates, at a time of the year when *G. ocularis* should be breeding in Madagascar. Perhaps it can be explained as a displaced bird following a 'reverse migration', for it was in exactly the opposite direction to which it should have been in relation to the off-season area in Somalia. Smaller numbers of birds were seen in 1980, but no special searches were made, and all observations resulted from chance finds in the large area in which the birds occurred. However, up to 3000 birds were seen again in the mid-Shabelle valley in 1981.

Table 1. *Records of* Glareola ocularis *in Somalia*

Locality	Co-ordinates	Dates	N	Authority
Giumbo (Jumba)	0°15S, 42°38E	1923	?	Moltoni 1936a
Mogadishu area	2°02N, 45°21E	1929	1	Moltoni 1935, 1936a
Belet Amin (Beled Amiin)	0°12N, 42°47E	Jun 1934	500+	Moltoni 1936a, 1936b
Belet Amin	0°12N, 42°47E	30 Jun 1934	1	Moltoni 1936b
Torda	0°05S, 42°44E	Jul 1934	1	Moltoni 1936a, 1936b
Jiohar (Jowhar)	2°47N, 45°30E	25 May 1939	1	Moltoni 1941
Jiohar	2°47N, 45°30E	3 Jun 1939	1	Moltoni 1941
Kurtonware (Kurtunwaarey)	1°37N, 44°20E	14 Aug 1959	1	Berlioz & Roche 1963
Giamama (Jamaame)	0°04N, 42°45E	4 Sep 1964	1	Roche 1975
Goluen (Golweyn)	1°40N, 44°35E	24 Aug 1971	?	R.G. Allan (pers. comm.)
9 km S of Jiohar	2°42N, 45°27E	25 May 1979	3000	JSA, JEM
9 km S of Jiohar	2°42N, 45°27E	28 May 1979	3000	JSA, JEM
16 km N of Afgoi	2°17N, 45°05E	19 Jun 1979	4	JSA, JEM
14 km S of Afgoi	2°04N, 45°14E	1 Jul 1979	400	JSA, JEM
20 km S of Uanle Uen	2°28N, 44°59E	3 Jul 1979	2	JSA
Uarmahan (War Maxan)	2°24N, 45°01E	4 Jul 1979	1	JSA
Uarmahan (War Maxan)	2°24N, 45°01E	5 Jul 1979	25	JSA
30 km S of Uanle Uen	2°23N, 45°01E	26 Jun 1980	10	JSA
Uarmahan to near Mogadishu		7 Jul–4 Aug 1980	10+	JSA
Shalambot/Dannow area	1°42N, 44°42S– 1°44N, 44°37E	13 Aug 1980	20+	JSA
Near Uarmahan	2°24N, 45°01E	6 Jul 1981	20+	JSA
Near Uarmahan	2°24N, 45°01E	7 Jul 1981	3000	JSA
Kurtonware	1°37N, 44°20E	20–22 Jul 1981	100s	JSA
Kurtonware	1°37N, 44°20E	3 Aug 1981	many	JSA

Clearly southern Somalia is an important off-season area for this species. Probably the majority of birds spend most of the non-breeding season in Somalia, and it is very likely these birds which, whilst on southward passage, augment the Kenya coast population in August and September. At this time, from mid-August onwards, numbers on the Kenyan coast increase from *c.* 800 to up to 9000 (Britton 1977, 1980). From May to August huge areas of favourable habitat exist in Somalia along the Jubba and Shabelle valleys. Both areas are poorly known ornithologically and in particular a large area along the lower Shabelle is virtually inaccessible and has never been other than casually explored for birds. From July onwards, after the cessation of the big rains (the *gu* season), the marshes and flood plains dry up rapidly, and would become increasingly unfavourable for *G. ocularis*.

As in Kenya, *G. pratincola* also occurs in Somalia in the same general area as *ocularis*, except that it is in smaller numbers and *pratincola* alone occurs in the north-west (Archer

& Godman 1937, Clarke 1984). Although present in most months, and breeding in June and July, their dates of occurrence also can coincide with those of *ocularis*, so that all pratincole identifications need to be checked carefully. The records of *pratincola* in southern Somalia from Kismayu (0°22S, 42°32E) in July 1901, recorded in Hilgert (1908), Moltoni (1936a) and Neumann (1920), presumably all refer to Erlanger's (1904–1907) records. To these we can add 26 records of our own of up to 100 birds over a wide area south of 3°N between 2 April 1979 and 9 December 1981 (*vide* the 'Checklist'—Ash & Miskell 1983). From the north-west, the original two September records by Archer & Godman (1937), have been increased by three more by Clarke (1984) in August and September in 1956 and 1958.

Two records of single Black-winged Pratincoles *G. nordmanni* from Hargeisa (9°33N, 44°04E) and Tug Wajaleh (9°37N, 43°17E) in September 1920 (Archer & Godman 1937) are the only records for this species in Somalia.

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CORRECTIONS

In the paper 'On the breeding behaviour of three montane sunbirds *Nectarinia* spp. in northern Malawi' by Dr Françoise Dowsett-Lemaire (*Scopus* 11: 79–86), a number of mistakes were made in the typesetting and editorial stages, for which I apologize. The corrections are as follows:

p. 82, line 10: replace 'with' by 'without'

p. 83, after line 3 a whole paragraph has been omitted:

> Bronze Sunbirds have loud calls *pe puaa, pe piu* (Fig. 2) that are used in territorial advertisement. Song consists of a musical and fast warble, heard only at short range, uttered when males chase and display near females, and also between females in territorial disputes. I saw up to three females singing together in an upright posture after unsuccessful chasing.

p. 84, line 7: replace 'alteration' by 'alternation'

p. 84, Discussion, third paragraph.: *N. afra* raises 'two or three' broods, not 'single' broods.

Ed.

RECENT COUNTS OF WATTLED CRANES [1]*BUGERANUS CARUNCULATUS* ON THE KAFUE FLATS, ZAMBIA—NOVEMBER 1987

G.W. Howard

The population of Wattled Cranes *Bugeranus carunculatus* on the Kafue Flats in southern Zambia has attracted attention over the last 15 years because of the possible effects of the Kafue Hydroelectric Scheme (Douthwaite 1974, Konrad 1980, Howard & Aspinwall 1984, Urban 1988). An aerial census of the Kafue lechwe antelope *Kobus leche kafuensis* from 11 to 13 November 1987 afforded an opportunity to count some parts of the Kafue Flats' population of Wattled Cranes in a way that was comparable with the most recent published estimate of Howard & Aspinwall (1984).

METHODS AND RESULTS

The Kafue Flats is a major wetland of Zambia consisting of the floodplain of the Kafue River between 15 and 16°S and 26 and 28°E. The floodplain is approximately 250 km long and more than 60 km across at its widest point (Howard 1985) and its central area (Fig. 1) contains parts of Lochinvar and Blue Lagoon National Parks. This central area of the Flats is the main refuge of many floodplain animals and is the least disturbed part of the wetland. The major concentration of Wattled Cranes of the Kafue Flats is known to occupy this central area (Douthwaite 1974, Konrad 1980).

The stratified random sampling technique used for the aerial census of the lechwe was described by Howard & Jeffery (1984) and was essentially the same as that reported by Howard & Aspinwall (1984). Wattled Cranes were counted and recorded when they were detected in the lechwe-counting transects (200 m wide, 200 feet (*c.* 70 m) above ground) in four (of the six) strata involved in the 1987 count (see Fig. 1). Group sizes were also recorded of those birds seen inside the transects.

The numbers of birds recorded in the four strata are shown in Table 1 together with the computed estimates of Wattled Cranes for these strata. These give a total of 369 birds counted and an estimate for the sampled area of 2508 Wattled Cranes.

Table 1. *Numbers counted and population estimates of Wattled Cranes in the sampled areas of the Kafue Flats, 11–13 November 1987*

Stratum*	%Stratum sampled	Cranes counted	Estimates**
1	8.8	72	818
2	15.6	131	840
3	13.3	53	398
4	25.0	113	452
Totals		369	2508

* Fig. 1; **Estimated population = $\frac{\text{birds counted}}{\text{\% stratum sampled}}$

[1]Called *Grus carunculatus* in *Birds of East Africa*

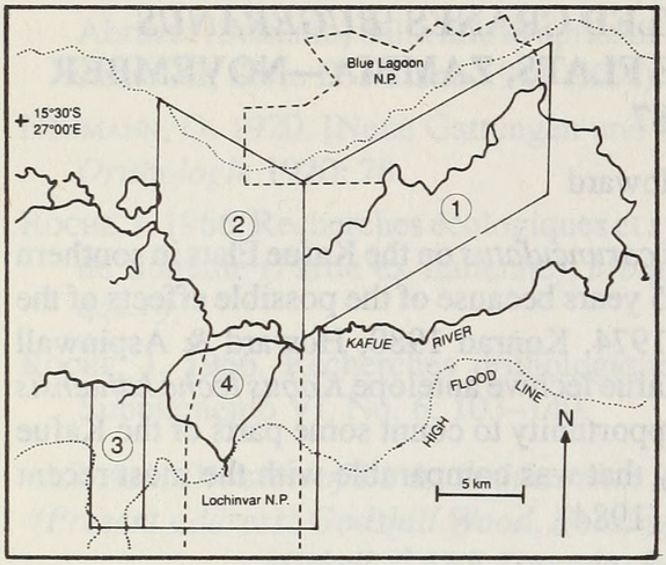

Fig. 1. *The central part of the Kafue Flats showing the strata sampled in November 1987*

Group sizes of birds in the transects are presented in Table 2. The numbers of groups in the strata and the mean group sizes per stratum are shown in Table 3. Stratum 2 had mainly pairs of Wattled Cranes with three groups of three birds and one group of 38 inside the transects. The other large group 37 was in the western end of Stratum 4 (Fig. 1); this stratum had the largest number of groups exceeding three birds.

Table 2. *Frequencies of recorded group sizes of Wattled Cranes on the Kafue Flats, November 1987*

Group size	Frequency of observation	Sum of birds in group size	
1	0	0	
2	67	134	
3	9	27	
4	2	8	
5	0	0	
6	2	12	
11	1	11	
13	3	26	
15	1	15	
18	1	18	200
19	1	19	
24	1	24	
37	1	37	
38	1	38	
		369	

Table 3. *Numbers of Wattled Cranes observed in each stratum with mean group size*

Stratum	No. of groups	Mean group size
1	17	4.2
2	46	2.8
3	11	4.8
4	15	7.5
Totals	89	4.1

DISCUSSION

The area sampled in these four strata represents approximately two-thirds of the area counted in 1982 by the same technique and counter (Fig. 1, cf. Howard & Aspinwall 1984, Fig.2). However, the area censused in 1987 was the portion occupied by approximately 90 per cent of the Wattled Cranes *counted* in 1982. At first sight, therefore, there appears to be a drop in the estimated population of Wattled Cranes in the sampled area of this central part of the Kafue Flats between 1982 and 1987 (90 per cent of 3282 cf. 2402—an apparent decline of 19 per cent in five years). But there are two significant factors to be considered in comparing these two estimates: the time of the year in which counts were made and the composition of the counted groups.

The 1982 census was carried out in late May while the 1987 count was made in early November. In this respect the two estimates are not strictly comparable as we know that the *distribution* of Wattled Cranes on the Kafue Flats changes during the year (Douthwaite 1974).

Reference to Table 2 (and Table 3 of Howard & Aspinwall 1984) shows that the numbers of birds counted in the two surveys is about the same in the small groups (group sizes 1 to 4), totalling 153 in 1982 and 169 in 1987). The major differences between the counts for the two estimates are the large groups of Cranes (four groups over 50 in number, totalling 496 birds) which were present in May 1982 but were absent from the sampled transects in November 1987. It is suggested that these large groups may have left the sampled area by November 1987—either for another part of the Kafue Flats or for the postulated migration to the Makgadikgadi Pans in Botswana where there is an accumulation of Wattled Cranes during the wet season (Collar & Stuart 1985, Urban 1985). It is essential to an understanding of the conservation status and the population dynamics of this population of Wattled Cranes that the movement or dispersal of these large groups is studied further.

The Cranes that occurred in pairs or threes were likely to have been mated pairs so their distribution among the strata may be useful in locating the breeding (or post-breeding) sites of these birds. The strata 2 and 3 were the areas of major accumulation of pairs with some being recorded from the other two strata as well. Breeding is likely to have been completed by November and the chicks ready to leave or already gone from their parents (Douthwaite 1974, Collar & Stuart 1985). The pairs are thus likely to represent some of the resident breeding birds (Konrad 1980).

The accuracy of these estimates is difficult to assess and no attempt has been made to calculate errors of variances for this population (see also Howard & Aspinwall 1987). The combination of relatively sedentary small groups of birds (pairs and threes) with the flocks of tens to hundreds renders this stratified system of random sampling not especially appropriate for this population of Cranes. The sampling proportions within strata (Fig.1) are adequate for lechwe but may not be the most appropriate for Wattled Cranes. The size of the transects seem sensible for small groups of birds but do not always allow representation of the widely scattered large flocks. While it is realized that a new sampling programme should be developed especially for the Cranes, the data available as a by-product of the lechwe census are nevertheless of use for comparison and should be continued in the future. There is need for a more comprehensive survey method to cover a larger area of the Kafue Flats, to observe the remainder of breeding birds, to monitor the movements of the larger flocks and to assess the significance of the many semi-resident pairs of birds scattered on small wetlands (such as *dambos*) throughout much of southern, western and northern Zambia.

The counts recorded here tell us that the status of the small groups of birds in the Wattled Crane population of the central Kafue Flats remains little changed over the five years from 1982 to 1987. The same data pose questions about the larger flocks and highlight areas for further research on this important wetland bird. These recent counts also show no evidence of any effect on Crane population of the new (10 years old) flooding regime of the Flats brought about by the operation of the Kafue Hydroelectric Scheme.

ACKNOWLEDGEMENTS

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INTERSPECIFIC COMPETITION FOR NEST CAVITIES BY INTRODUCED LOVEBIRDS *AGAPORNIS* SP. AT LAKE NAIVASHA, KENYA

J.J. Thompson and W.K. Karanja

Hybrid Fischer's x Yellow-collared Lovebirds *Agapornis fischeri* x *personata* were introduced to Lake Naivasha, Kenya in the late 1950s by private aviary owners. The birds' ability to breed in captivity forced the owners to release them into the wild and, in 1986, their numbers were estimated at just under 6000 (Thompson, in prep.). Hybrid lovebirds have been released elsewhere in Kenya (Cunningham-van Someren 1975) and are now found in Nairobi, Kiserian, the Ngong Hills, Meru, Embu, Nakuru, Molo, Kisumu and parts of the Kenya coast (G.R. Cunningham-van Someren, pers. comm.). Due to this wide distribution, Lake Naivasha was chosen as a convenient site at which to study competitive interspecific interactions between lovebirds and other cavity-nesting species.

Competition for nesting cavities among hole-nesting birds has been recorded both in natural avian communities and between introduced and native species. The introduction into North America of the European Starling *Sturnus vulgaris* and the House Sparrow *Passer domesticus* has forced Eastern Bluebirds *Sialia sialis* to nest almost exclusively in nest-boxes provided by man (Gowaty 1985). Woodpeckers, such as the Northern Flicker *Colaptes auratus* and the Red-headed Woodpecker *Melanerpes erythrocephalus* have also probably been adversely affected (Short 1979). Von Haartman (1957) was among the first to suggest that hole-nesting birds (his study only covered passerines in temperate regions) are limited by the availability of nest sites, and he placed more importance on these than on food availability as an ecological limiting factor determining the maximum number of nesting pairs.

Evidence of competition for nest holes among birds comes from both behavioural and experimental data. Interspecifically directed aggression among hole-nesting birds has been commonly noted (von Haartman 1957, Orians & Willson 1964, Welty 1964, Armstrong 1965, Short 1979, 1982) as being caused by competition for a limited supply of suitable holes or cavities. The Eurasian Wryneck *Jynx torquilla*, for example, will even empty out the nesting material and eggs of another bird (von Haartman 1957). Evidence also includes the densities of hole-nesting birds increasing with the provision of nest boxes (Welty 1964, von Haartman 1957) and nesting pairs, when removed from their hole, immediately being replaced by, until then, non-breeding individuals. Brush (1983), however, found competition between hole-nesters to be unimportant since cavities were not fully utilized and did not limit breeding despite extensive habitat and nesting season overlap. He concluded, though, that interference competition may be more crucial in situations where nest sites are in short supply.

Lovebirds have previously been noted as occupying and probably breeding in other species' nests (Moreau 1948), including the Rufous-tailed Weaver *Histurgops ruficauda* and old swift's nests (Forshaw 1981), and a barbet's nesting hole (Mackworth-Praed & Grant 1952). Whether their competition involved usurpation of the former species was not mentioned. To determine the extent to which the introduced lovebirds have interfered with the success of resident hole-nesting birds, an attempt was made to answer four questions: 1. What is the overlap between lovebirds and other hole-nesters in the preferred nest-/ roost-hole type? 2. How aggressive are lovebirds towards other species? 3. Are lovebirds capable of usurping other hole-nesters from their holes? 4. Are some hole-nesting species absent from the Lake Naivasha forest where they have commonly been recorded in the past?

METHODS

Lake Naivasha lies in the Kenyan Rift Valley between latitudes 0°50S and 0°40S and longitudes 36°15E and 36°25E at an altitude of about 1890 m. Unlike most other nearby Rift Valley lakes, which are strongly alkaline, Lake Naivasha is fresh. The climate of the area is warm and semi-arid receiving a total average annual rainfall of some 630 mm. The study area included the strip of fever tree Acacia xanthophloea woodland which immediately surrounds the lake, an area of approximately 1790 ha. Outside the forested area, the rising land abruptly gives way to semi-arid Tarchonanthus camphoratus bushland.

During this study 16 species of cavity-nesters representing nine families were seen. These were the Grey Woodpecker *Mesopicos goertae*, Nubian Woodpecker *Campethera nubica*, Bearded Woodpecker *Thripias namaquus*, Cardinal Woodpecker *Dendropicos fuscescens*, Red-throated Wryneck *Jynx ruficollis*, Pearl-spotted Owlet *Glaucidium perlatum*, Woodland Kingfisher *Halcyon senegalensis*, Lilac-breasted Roller *Coracias caudata*, Hoopoe *Upupa epops*, Green Wood Hoopoe *Phoeniculus purpureus*, Grey Hornbill *Tockus nasutus*, Red-fronted Barbet *Lybius diadematus*, White-bellied Tit *Parus albiventris*, Blue-eared Glossy Starling *Lamprotornis chalybaeus*, Rüppell's Long-tailed Glossy Starling *L. purpuropterus* and the Superb Starling *Spreo superbus*.

Virtually the only tree available for nest cavity excavation is the fever tree. It is a flat-topped, fast-growing species up to 24 m high (Government Printer 1936) with a short life expectancy of about 40 years (J. Hayes, pers. comm.). A comparison of aerial photographs from 1969 and 1984 shows that the extent of fever tree distribution and overall maturity of the forest is increasing, probably due to a government ban on tree felling.

In order to identify occupied roosting or nest holes, daily watches were kept on likely cavities during the last hour of daylight. Information was recorded on the occupying species, height above ground level (estimated visually) and cavity type. A list of interspecific encounters between lovebirds and other species was compiled to determine any dominance hierarchy. The contestants in each encounter were judged 'winners' or 'losers', the 'winner' always being the aggressor while the 'looser' being the bird driven away or forced to retreat. Observations were recorded from all times of the day.

RESULTS AND DISCUSSION

Cavity types fell into three well defined categories: firstly, many hole-nesters used the end of a broken branch or a crevice along its length to nest in, excavating the central rotten wood to form a cavity; secondly, a tree-knot or small lateral outgrowth sometimes forms, allowing entry by birds into the main trunk; lastly, holes excavated and occupied by woodpeckers (almost always in dead wood) or taken over by other hole-nesting species.

A total of 94 cavities occupied by birds was positively identified, 57 of which were used by lovebirds. Of these 57, 58 per cent were of the broken branch type, 14 per cent of the tree-knot type and 28 per cent old woodpecker holes. Average heights above ground level for the three cavity types were 6.2, 7.3 and 6.2 m respectively. Many other holes that were watched were either unoccupied or used by tree mice *Apodemus* sp.

The remaining species for which cavities were located are listed below with the number of cavities observed, cavity type and average height above ground level.

Pearl-spotted Owlet—one cavity in an abandoned woodpecker hole; 5 m.
Woodland Kingfisher—two cavities, both in woodpecker holes; 7 m.
Lilac-breasted Roller—two cavities, both in woodpecker holes; 15.5 m.
Hoopoe—one cavity in a tree-knot; 8 m.
Green Wood Hoopoe—three cavities, one in a broken branch, one in a tree-knot and one in a woodpecker hole; 6.6 m.
Red-fronted Barbet—one cavity in an abandoned woodpecker hole; 4 m.
Grey Woodpecker—13 holes located, all conventional woodpecker holes; 5 m.
Nubian Woodpecker—one hole, conventional woodpecker type; 2 m.
Bearded Woodpecker—four holes, conventional woodpecker type; 10 m.
Cardinal Woodpecker—two holes, one conventional, the other in a cavity at the junction of a dead branch and the tree trunk; 5 m.
Blue-eared Glossy Starling—three cavities, one in each type; 4 m.
Superb Starling—two cavities, one in a broken branch and one in a tree-knot; 8.5 m.

There was no obvious preference by lovebirds for any particular cavity type or height above ground level used. They have been described as indiscriminate cavity-nesters (Moreau 1948) and therefore all cavity nesting species are exposed to competition for nest sites with lovebirds. The occurrence of many apparently unoccupied holes does not necessarily imply an overabundance of them. They may be occupied by a variety of organisms from small mammals to insects or be unsuitable for occupation due to the presence of invertebrates, including parasites, after previous use by birds (Short 1979).

Except in maize *Zea mays* fields—maize forms a significant proportion of their diet at Naivasha—lovebirds were seen to aggress on another bird species only once. This occurred between a Grey Woodpecker and a group of lovebirds using holes 20 cm apart on the same branch. Individual lovebirds were seen twice to approach the woodpeckers' hole and peer into it while the woodpecker retreated inside. Another Grey Woodpecker was perched on a branch near the hole but with the arrival of a lovebird there, flew to an adjacent tree trunk 2 m away. At one time nine lovebirds were perched on a branch a metre above the woodpecker hole. Although perhaps not a clear case of aggression, the woodpecker appeared to be intimidated by the lovebirds' presence and certainly did not retaliate by attacking.

At Naivasha, lovebirds are a comparatively timid species and were observed as clear 'losers' in encounters with Lilac-breasted Rollers three times, a Green Wood Hoopoe once, a Drongo *Dicrurus adsimilis* once, a Red-fronted Barbet once, a Grey Woodpecker once, a Blue-eared Glossy Starling once, a Superb Starling once and a Grey-backed Fiscal

Lanius excubitorius once. However, it is their flocking behaviour which, at least in part, compensates for their lack of aggressiveness. Dilger (1960) concluded that although nest cavity defence is apparently non-existent in *A. fischeri* and *A. personata*, it may be adequately compensated for by increased mobbing activity. Although Dilger performed his experiments under laboratory conditions, lovebirds at Naivasha did become more aggressive when supported by other individuals, as described above in the encounter with the Grey Woodpecker. Furthermore, according to a local resident, a pair of Lilac-breasted Rollers which had nested regularly on his land, was forced to leave due to the sheer numbers of lovebirds. While a very aggressive species, Lilac-breasted Rollers are shy at the nest and desert easily (Mackworth-Praed & Grant 1962). High lovebird densities may also cause desertion by increased aggressive activity of the defending species and the consequent attraction of predators (Short 1982).

The only situation where lovebirds were consistently overtly aggressive towards other species was in maize fields. Orians & Willson (1964) reported a similar behavioural reversal between Red-winged Blackbirds *Agelaius phoeniceus* and Yellow-headed Blackbirds *Xanthocephalus xanthocephalus* in North America between feeding grounds and breeding territories. They argued that selection should favour heightened aggression in habits where each respective species is better adapted since the more suitable the habitat, the greater the benefits of fighting for it. Certainly lovebirds are better equipped to open maize ears but the other maize pests, such as weavers Ploceidae and mousebirds Coliidae, may also have learned to allow lovebirds first access, enabling a more efficient exploitation of the food source. As such, this reversal in aggressiveness may also be due to a reduction in aggression of other species usually dominant over lovebirds. A learned component is implied, given the relatively short time for selection to act since the introduction of lovebirds to the area.

While they are probably not capable of hole usurpation by sheer physical means, lovebirds may exert a competitive threat for hole possession by more indirect methods. During the day they will investigate and modify the cavities of other hole-nesters. For example, lovebirds were observed bringing to a Green Wood Hoopoe's nest, acacia twigs (which lovebirds use in the construction of their own nests) which the wood hoopoes removed on their return to roost. Similar behaviour has been observed in the Tityras *Tityra semifasciata* and *T. inquisitor* by Skutch (1969 quoted by Short 1979). They are successful in usurping woodpeckers by filling their holes with leaves and debris so the woodpeckers eventually tire of removing it and abandon the nest. Lovebirds were also seen to enter and peck away at the entrance of an old woodpecker hole taken over by a Pearl-spotted Owlet. Alteration of the entrance hole by usurping species has also been noted before (Short 1979, Lanning & Shiflett 1983).

Lovebirds are persistent in their efforts at nest usurpation. Three lovebirds were seen investigating a Red-fronted Barbet's hole—one actually entering for some minutes. On the return of the barbet they were forced to leave by its aggressive behaviour but four months later, lovebirds were still investigating the hole. Such persistence may eventually cause a harassed bird to give up its hole. However, Lanning & Shiflett (1983) have concluded in their study on Thick-billed Parrots *Rhynchopsitta pachyrhyncha* that investigation of cavities may occur for reasons other than their usurpation. This possibly explains the long time period over which the lovebirds has been investigating the barbet's hole without usurping it. Nevertheless, it is probably this tendency towards hole investigation which attracts aggression from other hole-nesters. Woodpeckers, for example, are able to 'recognize' potential nest competitors and will readily attack them even when there is no direct threat to the nesting hole (Short 1979).

Lovebirds may indirectly prevent woodpeckers from excavating new holes due to the lovebird's habit of burrowing down and nesting in the central core of dead branches. By taking up much of the branches length as an entrance tunnel and nest cavity, woodpeckers are prevented from excavating a hole, especially if mobbed by the inhabiting lovebirds. Old woodpecker holes are used by many other species of hole-nesters so that the lovebirds are also preventing the excavation of potential homes for a variety of species.

Lovebirds permanently occupy their various cavities throughout the year, unlike some other hole-nesters. This and the substantial modification of the nesting cavity prevents sequential use of the hole by several hole-nesters in the same season—an adaptation suggested to be important for the reduction of aggression and nest interference (Brush 1983). Woodpeckers are particularly vulnerable because of their use of several alternative holes, which are vulnerable to usurpation by lovebirds (L.L. Short, pers. comm.). Alternate holes are especially important for fledgling woodpeckers and the risk of predation is increased without them. Furthermore, the majority of woodpecker holes at Naivasha are excavated in dead wood thus increasing the risk of usurpation since the entrance hole can be enlarged more easily than if it were excavated in live wood (Short 1979).

All hole-nesting species previously recorded at Lake Naivasha were seen but some were less common than expected. These were the Cardinal Woodpecker seen four times and the Red-fronted Barbet seen three times. Both are similar in size to lovebirds and hence most likely to draw the greatest degree of competition (Short 1979). Furthermore, the Cardinal Woodpecker was the only woodpecker seen to sometimes roost in holes similar to those used by lovebirds. It is possible that the densities of all hole-nesters have declined but no data are available on their densities before the introduction of lovebirds.

Lovebirds have successfully established themselves at Naivasha and it is hard to believe that other hole-nesters have not suffered as a result. Slobodkin (1961) has argued that for an invading species to establish itself, its ecological niche must have been previously unoccupied or inefficiently exploited and that either situation is less likely in a complex community. Since lovebirds have indeed established themselves in a complex community where every niche is likely to have been utilized, an element of competition at the expense of other species is implied.

It is likely that the increasing Naivasha and Kenyan lovebird populations will have a serious effect on indigenous cavity-nesters. This, and their status as a pest of maize (Thompson, in prep.) and their great adaptability to new habitats conferred to them by being hybrids, make them a bird worthy of monitoring in the future.

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