

## **A survey for the Critically Endangered Liben Lark *Heteromiraфра archeri* in Somaliland, north-western Somalia**

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### **SUMMARY**

This survey suggests that the Critically Endangered Archer's Lark (now Liben Lark) *Heteromiraфра archeri*, at the time thought to be endemic to north-western Somalia and known with certainty only from its type locality, the Tog Wajaale Plains, is likely to be extinct there. These grasslands were surveyed intensively for three days in May 2010 at a time when other lark species were in full display and song, and failed to turn up any records of the species. These grasslands on the Somalia/Ethiopia frontier have been greatly altered by human activities, especially failed, large-scale agricultural projects, to the point that they are probably no longer be suitable for the species. Our findings formed part of a larger project on the taxon, which shows that it is conspecific with the Ethiopian endemic Liben Lark *H. sidamoensis* (now *H. archeri*) and which has now been confirmed to occur about 50 km from its type locality in neighbouring Ethiopia, near the town of Jijiga (Spottiswoode *et al.* 2013).

### **INTRODUCTION**

Prior to recent work reported in Spottiswoode *et al.* (2013), Archer's Lark *Heteromiraфра archeri* (now Liben Lark; hereafter *H. archeri*, to avoid confusion associated with name changes) was known only from 18 specimens collected by Archer on the Tog Wajaale Plain, Somaliland, north-western Somalia, between Sep 1918 and Jun 1922, where he described it as "quite numerous" (Clark 1920, Archer & Godman 1961). Since then, the only report of it has been an unpublished sighting in 1955 by John Williams in "fairly open rocky country with scattered and sparse bush and limited grass cover", 15-40 km north-west of Boorama, c. 100 km north-west of the Tog Wajaale Plain (J. G. Williams in litt. 1984 in Collar and Stuart 1985). Subsequent searches of this area have failed to reveal any sign of it, and taken together with the atypical habitat and complete lack of supporting evidence, this record has been dismissed (e.g. J. Miskell in litt. 2013). At the type locality, the Tog Wajaale Plain, fifteen visits to between 1970 and 2008 failed to turn up any birds and reported widespread habitat disturbance within its range (BirdLife International 2010).

In this study our aim was to conduct an intensive survey across the Tog Wajaale Plains in order (i) to attempt to find *H. archeri*, and (ii) to characterise the habitat following methods employed on the Liben and Jijiga Plains (Spottiswoode *et al.* 2009, Donald *et al.* 2010, Spottiswoode *et al.* 2013), such as to allow comparison with vegetation known to support *Heteromiraфра* larks in southern and north-eastern Ethiopia respectively.

### **STUDY SITE AND METHODS**

The Tog Wajaale Plains (c. 9°40'N, 43°21'E) are situated along the Somaliland/Ethiopia frontier in north-western Somalia. They cover the region between the Wajaale River that forms the Somalia/Ethiopia border and two conspicuous hills to the north, Jifa Medir (9°42'47"N 43°16'44"E) in the north-west and Jifa Uri (9°43'19"N 43°23'30"E) in the north-east, located c. 11 km and 16 km north of Wajaale River respectively. The area between these hills and the Wajaale River is approximately 250 km<sup>2</sup>. The plains lie between 1525 m and 1640 m altitude.

Three days were spent on the Tog Wajaale Plains in May 2010. On 19 May we covered as much of the areas as possible, mostly driving along vehicle tracks and stopping to walk wherever habitat looked suitable for *Heteromirafr* larks, based on our experience on the Liben Plains and South African montane grasslands, i.e. relatively pristine, open grassland. We visited Jifa Medir, Jifa Uri and the Wajaale River, and as much area as possible in between, travelling c. 70 km in distance in order to identify the best areas for further survey. The mornings (sunrise to 10:30 am) of 29 and 30 May were spent walking straight-line transects through the least transformed grasslands in search of *H. archeri* and to conduct vegetation structure surveys, walking a total of 4.90 km and 5.25 km on the two days, respectively. During the rest of these days, further explorations were made across c. 20 km of area not previously covered, to search the area as comprehensively as possible. During this time some basic interviews were made with local farmers and villagers as to previous agricultural activity in the area. While walking straight-line transects, we took one of two strategies: (i) slow, constant walking and listening for displaying larks, or (ii) slow, constant walking and listening for displaying larks but pausing to make vegetation surveys every 250 m along the transect line (following Spottiswoode *et al.* 2009 and Donald *et al.* 2010). The timing of our visit was when the greatest display activity of *H. archeri* was expected, immediately prior to breeding (Archer & Godman 1961). All lark species present (Singing Bush Lark *Mirafr* *cantillans*, Somali Short-toed Lark *Calandrella somalica* and Thekla Lark *Galerida theklae*), were in full display and song during the time. All other bird species observed were noted.

## RESULTS

### Indicence of *H. archeri*

During our visit, no *H. archeri* were found. A total of 46 bird species was recorded (see Appendix 1) including species typical of the Liben Plain in Ethiopia, such as Kori Bustard *Ardeotis kori*, White-bellied Bustard *Eupodotis senegalensis*, Black-winged Lapwing *Vanellus melanopterus*, Somali Courser *Cursorius somalensis*, Somali Fiscal *Lanius somalicus*, Somali Crow *Corvus edithae*, Somali Short-toed Lark, Ethiopian Swallow *Hirundo aethiopica*, Speke's Weaver *Ploceus spekei* and Plain-backed Pipit *Anthus leucophrys* (Spottiswoode *et al.* 2010).

### Vegetation

We conducted vegetation surveys at 41 sample points spread at 250 m intervals along six transect lines. Data are presented in Appendix 2.

These observations are supported by basic analyses of the quantitative data we collected on transects (summarised in Table 1). Again, we emphasise that we surveyed the Wajaale Plain in 2010,

which was an exceptionally wet year. This suggests that comparisons with the other two locations from which *Heteromirafra* larks have been recorded (the Jijiga and Liben Plains), surveyed in the same month the following year, should be treated with caution. With these caveats in mind, Kruskal-Wallis rank sum tests revealed significant differences between the three sites for all the variables we recorded (all  $P < 0.001$ ). Notable differences between the Tog Wajaale Plain and the two other sites were as follows: of the three sites, the Tog Wajaale Plain had the lowest density of cowpats (which could either reflect lower grazing pressure, or decreased visibility owing to longer grass and increased decomposition arising from recent heavy rains) and had much the lowest proportion cover of bare ground and very short grass. Correspondingly, it had the highest proportion cover of the two longer grass categories. It also had the highest density of bushes. Two conspicuous features of the Liben Plain, the presence of giant fennel *Ferrula communis* plants and large circular open areas formed by nests of the harvester ant *Messor cephalotes*, were absent from both the Tog Wajaale and Jijiga Plains.

**Table 1.** Comparison of vegetation and land use traits between the three sites from which *Heteromirafra* larks have been or are currently known in the Horn of Africa, as counted along transects at 250 m intervals, following Spottiswoode *et al.* 2009 and Donald *et al.* 2010. Within a 25 m radius of a central point, trees were counted. Within each of two sub-plots of 5 m radius, the number of bushes and cowpats were counted, the proportion cover of bare ground was estimated, and the percentage contribution to grass cover of each of four categories of grass height was estimated. Data are medians (ranges). Please see main text for cautionary comments.

	<b>Tog Wajaale Plain (May 2010)</b>	<b>Jijiga Plain (May 2011)</b>	<b>Liben Plain (May 2011)</b>
N sampling points	40	72	205
Trees	0 (0)	0 (0–1)	0 (0–76)
Bushes	0.2 (0–1.2) *	0 (0–7.5)	0 (0–30)
Cowpats	0 (0–1.9)	1 (0–3)	2 (0–26)
Bare ground (%)	10 (0–90)	57.5 (2.5–100)	55 (5–95)
Grass < 5 cm (%)	50 (5–100)	95 (0–100)	65 (0–97.5)
Grass 5–15 cm (%)	28.8 (0–80)	2.5 (0–22.5)	32.5 (2.5–100)
Grass 15–40 cm (%)	15.0 (0–45)	0 (0–7.5)	0 (0–30)
Grass > 40 cm (%)	0 (0–50)	0 (0)	0 (0–10)

Although it was beyond our capability to do a comprehensive vegetation survey, almost all the plant species that we encountered and were able to identify are associated with soil disturbance. In particular, the plains were extensively invaded by the American weed *Parthenium hysterophorus*, a well-established and economically deleterious invasive species in north-eastern Africa (Nigatu *et al.* 2010; McConnachie *et al.* 2011) as it is elsewhere in Africa, Asia and Australia. In some of our transects, this weed was dominant in thick, waist-high patches, while in others the seedlings were only germinating and could easily be under-recorded among the grasses. Other conspicuous invasive weed species recorded were *Solanum elaeagnifolium*, *Hibiscus trionum*, *Datura stramonium* and *Flaveria bidentis*. A number of grasses were unidentified but common grasses we encountered, that occur predominantly in disturbed areas elsewhere in Africa, were *Tragus berteronianus*, *Aristida*

*congesta* and *Chloris pycnothrix* (Van Oudtshoorn 2012). Both isolated bushes and large clumps of *Acacia etbaica*, which was dominant in the surrounding area, are invading the plains, especially on disturbed soil.

\* On the Tog Wajaale Plain the number of bushes was instead counted per 25 m radius plot in the field, but was converted here to being expressed per unit area represented by a 5 m radius plot.

### **Human transformation**

Based on interviews conducted of five people living on the Tog Wajaale Plains and our own observations, all areas of the plain have been heavily disturbed. Large-scale agricultural schemes have focussed on ploughing in the area since the 1950s (Ash & Miskell 1998). Extensive areas were ploughed by tractor and planted with wheat, sorghum and maize. Currently, large areas are under cultivation of millet and maize, and several hundred cattle and some goats, sheep and camels were observed grazing the plains. According to one interviewee, no area of natural, undisturbed grassland remained on the plains; the entire area had been converted to croplands at some stage. This accorded with our observations.

### **CONCLUSIONS**

Taken together with previous efforts (BirdLife International 2010), these findings lead us to conclude that *H. archeri* is likely to be extinct on the Tog Wajaale Plains and in Somaliland as a whole, probably due to large scale habitat transformation. Fortunately a new population of *H. archeri* has been found in the Jijiga area of Ethiopia and is now known to belong to the same taxon as the birds collected by Archer on the Tog Wajaale Plain (Spottiswoode *et al.* 2013). Moreover, both populations appear to be conspecific with the Liben Lark (Spottiswoode *et al.* 2013). While this at least means that the taxon is not extinct, it is still known only from two very small and isolated populations where intensive human land-use is causing habitat degradation, putting it at great risk of extinction. The spread of the alien invasive plant *Parthenium* needs to be monitored closely as it is invading large areas of the remaining grasslands at the Tog Wajaale Plain, and if it spreads to the species' last remaining populations on the Jijiga and Liben Plains, may compound the severe threats (overgrazing, bush encroachment and agricultural expansion) that it is already facing. Early detection of the *Parthenium* and developing effective methods to control it may play an important role in the future conservation of the species.

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**APPENDIX 1**

An annotated list of the birds recorded on the Wajaale Plains on 19, 29 and 30 May 2010.

<b>English Name</b>	<b>Scientific Name</b>	<b>Notes</b>
Yellow-necked Spurfowl	<i>Pternistis leucoscepus</i>	Seen on one day
Egyptian Goose	<i>Alopochen aegyptiaca</i>	Seen each day
Abdim's Stork	<i>Ciconia abdimii</i>	A flock of 21 on one day
	<i>Threskiornis</i>	
African Sacred Ibis	<i>aethiopicus</i>	Nesting at Tug Wajaale
African Spoonbill	<i>Platalea alba</i>	Two at a wetland
Western Cattle Egret	<i>Bubulcus ibis</i>	Nesting at Tug Wajaale
Black-headed Heron	<i>Ardea melanocephala</i>	Nesting at Tug Wajaale
Black-winged Kite	<i>Elanus caeruleus</i>	Just one
	<i>Milvus migrans</i>	
Black Kite	<i>parasiticus</i>	Several over Tug Wajaale town
Tawny Eagle	<i>Aquila rapax</i>	One seen
Kori Bustard	<i>Ardeotis kori</i>	A couple seen in the north
White-bellied Bustard	<i>Eupodotis senegalensis</i>	Heard and seen on all days
Spur-winged Lapwing	<i>Vanellus spinosus</i>	Seen at wetlands
Black-winged Lapwing	<i>Vanellus melanopterus</i>	Quite numerous
Crowned Lapwing	<i>Vanellus coronatus</i>	Quite numerous
Kittlitz's Plover	<i>Charadrius pecuarius</i>	Two seen
Caspian Plover	<i>Charadrius asiaticus</i>	One bird in non-breeding plumage
Somali Courser	<i>Cursorius somalensis</i>	Small numbers seen
Dideric Cuckoo	<i>Chrysococcyx caprius</i>	One
Blue-naped Mousebird	<i>Urocolius macrourus</i>	Seen in bushy areas on the north of the plain
European Roller	<i>Coracias garrulus</i>	Two on our first visit
Red-backed Shrike	<i>Lanius collurio</i>	One seen
		Quite numerous. Recently fledged nestlings seen.
Somali Fiscal	<i>Lanius somalicus</i>	
Cape Crow	<i>Corvus capensis</i>	Common
Pied Crow	<i>Corvus albus</i>	Fairly common
		Several seen. One hybrid with Pied Crow seen.
Somali Crow	<i>Corvus edithae</i>	
Singing Bush Lark	<i>Mirafra cantillans</i>	Common and in full display
Somali Short-toed Lark	<i>Calandrella somalica</i>	Common and in full display
Thekla Lark	<i>Galerida theklae</i>	Fairly numerous
Chestnut-backed Sparrow-Lark	<i>Eremopterix leucotis</i>	Common
Barn Swallow	<i>Hirundo rustica</i>	Three seen
Ethiopian Swallow	<i>Hirundo aethiopica</i>	Quite numerous
Zitting Cisticola	<i>Cisticola juncidis</i>	A few seen, the first record for Somaliland.
Wattled Starling	<i>Creatophora cinerea</i>	One seen
Red-breasted Wheatear	<i>Oenanthe bottae</i>	One seen, the first record for Somaliland
Swainson's Sparrow	<i>Passer swainsonii</i>	Common
White-headed Buffalo Weaver	<i>Dinemellia dinemelli</i>	Seen in more bushy areas
Speke's Weaver	<i>Ploceus spekei</i>	A few small colonies seen

Chestnut Weaver	<i>Ploceus rubiginosus</i>	Only breeding male seen
Red-billed Quelea	<i>Quelea quelea</i>	Fairly numerous
Northern Red Bishop	<i>Euplectes franciscanus</i>	One breeding-plumage male
Cut-throat Finch	<i>Amadina fasciata</i>	Several sightings
African Silverbill	<i>Euodice cantans</i>	A flock of c. 10 seen
Straw-tailed Whydah	<i>Vidua fischeri</i>	One male in breeding plumage
African Pipit	<i>Anthus cinnamomeus</i>	Common
Plain-backed Pipit	<i>Anthus leucophrys</i>	Four seen

## APPENDIX 2

Vegetation structure data collected at the 42 sample points located at 250 m intervals along six transect lines. Methods follow Spottiswoode *et al.* 2009 and Donald *et al.* 2010. Briefly, number of trees, fennel plants and ant nests (both of which were absent from the Wajaale Plains), cattle or human paths, cattle, huts, bushes (woody shrubs) and cowpats were counted within a 25 m radius of the central point given. Then, the proportion coverage of bare earth, *Parthenium* weeds (not quantified on the Liben Plain), and grass of four height categories was estimated by eye in each of two subplots of 5 m radius within the main 25 m plot. Transect 2, point 10 was in a maize field and is excluded from analyses.

Transect	Point	Lat (°N)	Lon (°E)									Sub-plot A						Sub-plot B					
				Trees	Fennel	Ant nests	Paths	Cattle	Huts	Bushes	Cowpats	% bare	% weeds	Grass <5	Grass 5-15	Grass 15-40	Grass >40	% bare	% weeds	Grass <5	Grass 5-15	Grass 15-40	Grass >40
1	1	9.63408	43.34856	0	0	0	0	0	0	24	1	0	10	75	5	20	0	0	40	30	50	20	0
1	2	9.63586	43.34718	0	0	0	0	0	0	6	0	20	20	40	10	50	0	20	-	70	10	20	0
1	3	9.63764	43.34579	0	0	0	0	0	0	9	0	30	0	90	10	0	0	10	0	80	0	20	0
1	4	9.63940	43.34438	0	0	0	0	0	0	7	0	0	30	60	10	20	10	10	20	70	10	20	0
1	5	9.64118	43.34300	0	0	0	0	0	0	16	0	20	10	50	10	10	30	10	0	50	10	30	10
1	6	9.64297	43.34162	0	0	0	0	0	0	3	0	0	30	50	40	10	0	10	10	70	10	20	0
1	7	9.64475	43.34022	0	0	0	1	0	0	12	1	10	0	90	0	10	0	20	0	70	0	30	0
1	8	9.64654	43.33883	0	0	0	0	0	0	2	1	10	30	60	10	30	0	10	10	80	10	10	0
1	9	9.64832	43.33744	0	0	0	0	0	0	6	2	10	10	80	10	10	0	10	10	80	10	10	0
2	1	9.64330	43.33365	0	0	0	0	0	0	5	3	10	20	50	10	20	20	0	10	40	10	40	10
2	2	9.64172	43.33203	0	0	0	0	0	0	3	6	20	10	50	10	40	0	10	20	40	10	50	0
2	3	9.64019	43.33037	0	0	0	0	0	0	3	0	10	10	60	10	30	0	10	20	50	30	20	0
2	4	9.63868	43.32868	0	0	0	0	0	0	3	0	10	0	90	10	0	0	20	10	50	0	50	0
2	5	9.63714	43.32702	0	0	0	1	0	0	1	0	10	10	20	70	10	0	10	10	50	30	20	0
2	6	9.63555	43.32541	0	0	0	1	0	0	8	1	10	10	80	0	10	10	10	20	50	0	10	40
2	7	9.63414	43.32364	0	0	0	1	0	0	3	0	80	90	50	0	0	50	80	90	50	0	0	50
2	8	9.63264	43.32193	0	0	0	0	0	0	8	0	10	20	70	10	20	0	0	20	40	50	10	0
2	9	9.63106	43.32031	0	0	0	0	0	0	2	0	10	30	40	50	10	0	0	30	20	80	0	0
2	10	9.62944	43.31875	0	0	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-



3	1	9.62673	43.33573	0	0	0	0	0	0	5	0	10	10	70	20	10	0	10	0	30	60	10	0
3	2	9.62526	43.33400	0	0	0	0	0	0	5	0	10	20	20	60	10	10	10	10	10	60	20	10
3	3	9.62377	43.33230	0	0	0	0	0	0	15	3	90	10	-	-	-	-	90	10	100	0	0	0
3	4	9.62232	43.33057	0	0	0	0	0	0	3	1	20	20	30	50	20	0	20	10	50	30	20	0
4	1	9.62627	43.33147	0	0	0	0	0	0	4	0	0	10	10	60	30	0	0	20	10	50	20	20
4	2	9.62830	43.33245	0	0	0	0	0	0	6	0	20	-	50	30	20	0	10	0	0	80	20	0
4	3	9.63037	43.33337	0	0	0	0	0	0	5	0	10	20	20	60	20	0	10	10	10	80	10	0
4	4	9.63240	43.33432	0	0	0	0	0	0	4	0	10	30	30	20	30	20	10	0	30	10	50	10
4	5	9.63445	43.33526	0	0	0	0	0	0	6	0	0	50	0	40	60	0	10	20	10	60	20	10
4	6	9.63648	43.33622	0	0	0	0	0	0	3	0	20	0	70	0	30	0	30	0	50	0	30	20
4	7	9.63852	43.33717	0	0	0	0	0	0	2	0	50	20	0	50	50	0	30	0	60	10	30	0
5	1	9.66328	43.33155	0	0	0	0	0	0	31	0	30	20	10	80	10	0	10	10	10	80	10	0
5	2	9.66458	43.32970	0	0	0	0	0	0	22	0	20	10	60	0	0	40	30	20	30	60	0	10
5	3	9.66594	43.32788	0	0	0	0	0	0	26	2	30	10	70	10	10	10	20	30	50	30	20	0
5	4	9.66723	43.32602	0	0	0	1	0	0	27	2	20	20	40	40	20	0	10	20	20	60	10	10
5	5	9.66861	43.32421	0	0	0	0	0	0	18	0	60	10	100	0	0	0	50	40	50	50	0	0
5	6	9.67000	43.32244	0	0	0	0	0	0	6	0	40	10	50	50	0	0	40	10	50	50	0	0
6	1	9.67163	43.33174	0	0	0	0	0	0	30	0	60	30	50	50	0	0	60	30	50	50	0	0
6	2	9.66940	43.33206	0	0	0	0	0	0	15	1	10	20	10	80	10	0	10	30	10	80	10	0
6	3	9.66727	43.33281	0	0	0	0	0	0	12	0	10	20	30	60	0	10	10	30	10	70	10	10
6	4	9.66504	43.33317	0	0	0	0	0	0	16	0	10	0	90	0	0	10	10	20	10	60	20	10
6	5	9.66288	43.33377	0	0	0	0	0	0	14	1	10	10	40	40	20	0	10	20	10	60	30	0