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Distribution and conservation status of Cyrenaica Partridge *Alectoris [barbara] barbata*

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SUMMARY.—The subspecies of Barbary Partridge *Alectoris barbata* confined to north-east Libya and adjacent Egypt, *A. b. barbata*, has recently been posited to merit species rank, with the additional suggestion that it might be among the Western Palearctic's most threatened avian taxa. As a first step to assessing its conservation status, we review the distribution and habitat of *A. b. barbata* by collating all records and information available to us, including published literature, unpublished observations and museum holdings, adding evidence to the taxonomic issue by measuring 12 previously uninspected specimens. We identify and map 53 localities, with most (and all recent) records coming from the Jebel Akhdar massif, an area of relatively lush uplands in north-west Cyrenaica, Libya. We trace no certain record from Egypt since 1964. Hunting is blamed for widespread declines in populations but habitat degradation away from the Jebel Akhdar may have caused a considerable range contraction. A systematic survey of the Jebel Akhdar is needed to determine the species' conservation status. We agree that Cyrenaica Partridge *A. barbata* is a species, and add new data on its bolder flank stripes and longer tail.

The Barbary Partridge *Alectoris barbata* is principally a North African species (with some evidently introduced insular European populations) comprising four subspecies, the easternmost of which, *barbata*, ranging through north-eastern Libya (Cyrenaica) into western Egypt, has intermittently been recognised as a strongly distinctive form, and recently as a species. Its taxonomic history has involved a surprising degree of divergence in opinion and indeed insight. In his original description, Reichenow (1896) considered it 'a noteworthy partridge', yet Salvadori & Festa (1916)—also describing it as a new species, unaware of Reichenow's account—diagnosed it on just a single character. Hartert (1921–22) thought it 'notably distinct' and 'the most strikingly different of the birds peculiar to Cyrenaica' (Hartert 1923); but he still placed it as a subspecies of *A. barbata*. Ghigi (1921, 1923) demurred, citing multiple points of divergence in plumage. Peters (1934) ignored this and followed Hartert's trinomial arrangement. Although Stanford (1954) expressly went to Cyrenaica to collect specimens of *barbata*, he remained curiously silent on its taxonomic status. In this he was followed by Vaurie (1965), Cramp & Simmons (1980), Crowe *et al.* (1986), McGowan (1994), Beaman & Madge (1998) and Madge *et al.* (2002). Most unfortunately, particularly for a work scrutinising the world's avifauna for taxa unjustly lumped as subspecies, del Hoyo & Collar (2014) described variation in *A. barbata* as 'largely clinal', with an illustration of *A. b. spatzi* that erroneously depicted it as intermediate in plumage (as it is in geography) between *A. b. barbata* and *A. b. barbata*.

The credit for reassessing the taxonomic status of *A. b. barbata* belongs to Spanò *et al.* (2013) and Ebels & Essaker (2022). The former itemised the plumage differences, made the first measurements (from 24 specimens) and sampled mtDNA from four *barbata* specimens (and two specimens of *barbata/spatzi*) in Turin, finding that the tail of *barbata* is

longer than in *A. b. barbara*, and the genetic distance between them is 6%. Ebels & Essaker (2022) established seven points of morphological divergence between *barbata* and *barbata* and, via G. Sangster, compared the control region sequences (242 bp) of four *barbata*, six *barbara*, and 237 other *Alectoris* specimens covering all species in the genus. They reported a mean genetic divergence of 4.3% (3.9–4.8%) between *barbata* and *barbara*, considerably greater than the mean intraspecific variation found in all other *Alectoris* species. On the basis of this accumulated evidence, recognition of *barbata* as a species is at hand and, given that Ebels & Essaker (2022) expressed serious concern about its welfare, a review of the conservation status of the form has a new urgency. We therefore here attempt to assemble as much relevant information as possible preliminary to any formal status review. In so doing, we take the opportunity to supply a few further data in support of the taxonomic distinctiveness of the form.

Methods

Distribution and habitat assessment.—We compiled a list of localities drawn from the published literature, museum holdings and personal observations from which to create a distribution map. Names are spelt as much as possible in accordance with modern orthography, with original usage in the literature in brackets. MSNM = Museo Civico di Storia Naturale in Milano; MZUT = Museo Regionale di Scienze Naturali di Torino; NHMUK = Natural History Museum, Tring; SMF = Senckenberg Naturmuseum, Frankfurt am Main. We also compiled as much information as we could find on the habitat used by the bird across its range in Cyrenaica. We use the results of these assessments as the basis for the contemplation of the species' conservation status in the Discussion.

Taxonomy.—Two of us (NJC & AJB) inspected and measured 12 specimens (five males, seven females) of *A. barbara barbata* and 20 randomly selected but evenly sexed specimens (i.e. ten males and ten females) of *A. b. spatzi* or *A. b. barbara* × *spatzi* intergrades (the latter being paler and sandier than the former), all from Algeria and Tunisia plus one from 'Tripolitania' (western Libya), and all held in NHMUK. Measurements, using digital callipers accurate to two decimal places, were taken of bill (tip to skull), wing (curved), tail (tip to point of insertion) and the widest point of a black bar on the mid-flank (crudely but consistently selected by eye). This material is entirely separate from that examined and measured by Spanò *et al.* (2013). We interrogated biometric traits using Welch's unpaired t-tests, applying a Bonferroni correction where the threshold for statistical significance is set at $p < 0.05/n_v$.

Results

Distribution.—We collated a total of 53 localities, of which most ($n = 50$) are in Libya, where some geographically adjacent records had to be synthesised into single sites for mapping purposes. Records span 'Marble Arch', Libya, in the west, to Mersa Matruh, Egypt, 830 km to the east, although 'Marble Arch' may not be a reliable locality (see Note 1 below), in which case the westernmost site would lie considerably further east. All recent (post-2000) records ($n = 29$) were concentrated in Libya's Jebel Akhdar (Fig. 1), the low mountainous plateau rising to 900 m and receiving some 600 mm of rainfall a year that dominates the north-western Cyrenaica peninsula. Nevertheless, the historical record from Bir Habas (site 26 on Fig. 1) is 100 km inland, inviting the consideration that small populations may remain more widely spread but undetected in regions adjacent to the Jebel Akhdar. However, in eastern Libya from Bumbah (site 48 on the Gulf of Bumbah [Bomba]) eastwards into Egypt the few records indicate that the advancing Sahara has left the species

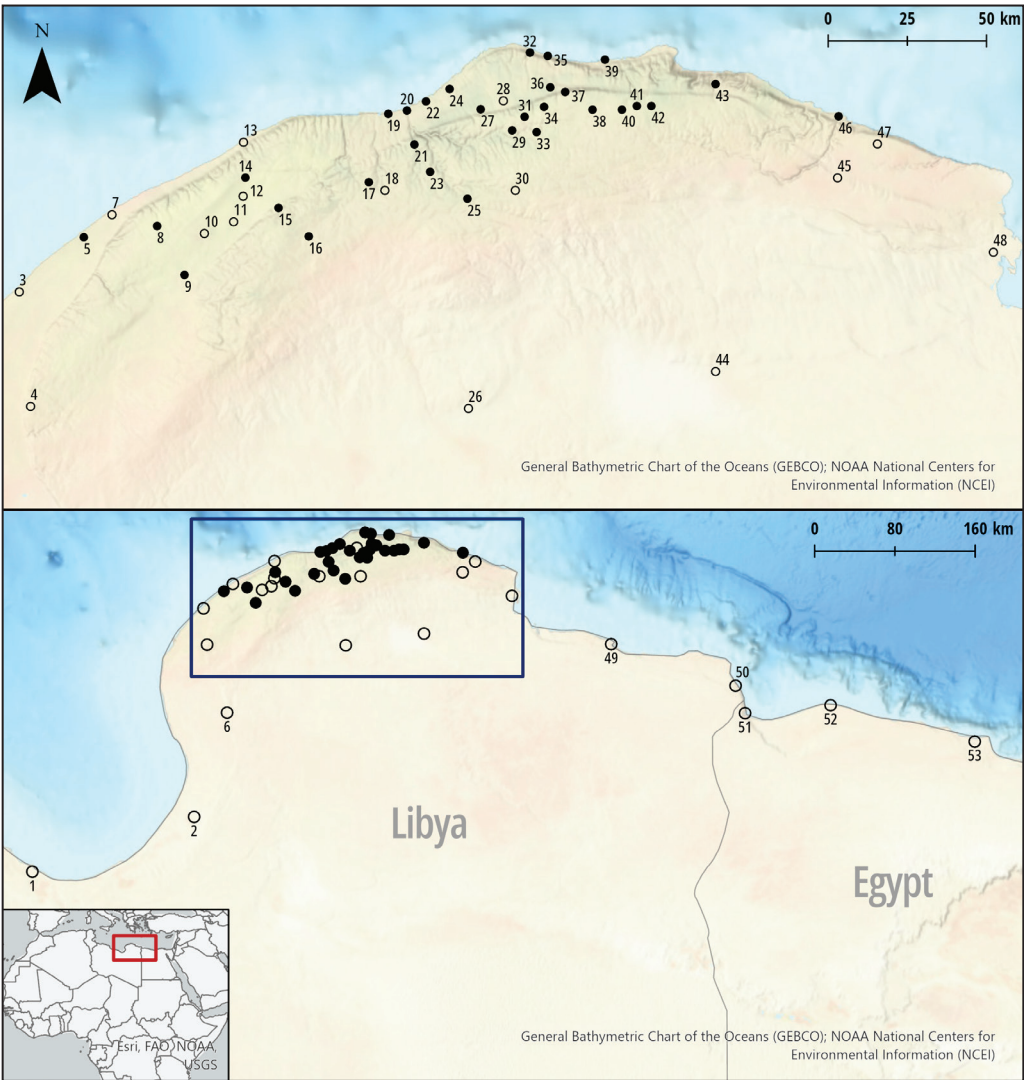


Figure 1. Records of Cyrenaica Partridge *Alectoris [barbara] barbata* based on localities identified in this paper. Filled circles = localities with records post 2000; empty circles = records pre-2000. Numbers correspond with those in superscript against place names in bold in the Results.

with a linear distribution, doubtless now heavily fragmented, extending for a remarkable 500 km.

Three localities—Ajdabiya, Tobruk and Bardiya—were mentioned by Toschi (1947) in a sentence outlining the species’ range, and are accepted here despite the lack of specific accompanying evidence. The four specimens comprising the type series of *Caccabis callolaema* (a junior synonym of *barbata*) were purchased from an army officer who said they were collected ‘south of Benghazi’ (Salvadori & Festa 1916), but as *barbata* seemed to be ‘absent from the Benghazi plain’ Ghigi (1921) suggested that they were more probably taken on the higher ground east of Benghazi towards Ar Rajmah. Meanwhile Hartert (1923), apparently because he (also) did not find birds to the south, ventured that these specimens were taken at Daryana, between Benghazi and Tobra to the north-east. We do not take a view on the position of the type locality and in any case, given its vagueness, do not map it.

A series of epistolary notes written in time of war at various places in eastern Cyrenaica, from 'somewhere on the coast east of Tobruk' (i.e. Libya) through Salum to Sidi Barrani, contained a record of a pair in a bushed wadi (locality unspecified) about 8 km from the coast, with the comment 'Seems to be very rare' (Tomlinson 1943). This is either the penultimate record of the species in Egypt or refers to a second locality in easternmost Libya.

In the list that follows, names in bold with a superscript number correspond to the numbered points on the map in Fig. 1. 'JY' indicates a personal observation by the second author, often with other observers (see Acknowledgements).

Libya. — ¹**Marble Arch**, March–May 1952 (Stanford 1954; see Note 1 below); ²**Ajdabiya**, undated (Toschi 1947); ³**Daryana** (Driana), April 1922 (Hartert 1923; specimen in NHMUK); ⁴**Ar Rajmah** (Er Regima), 23 March 1926 (two specimens in NHMUK); ⁵**Sebkhet al Kouz** (El Kouz), 2005 (Azafzaf *et al.* 2005), 4 February 2011 (Ebels & Essaker 2022); ⁶**Furti ash Shalizinah** (Sheleidima), early 1920s (Hartert 1923); ⁷**Tocra** (Tokra), early 1920s (Hartert 1923); ^{8–12}**Al-Marj** and environs, including El Garig (El Garin by error in Toschi 1969), Zorda woods, April–May 1922 (Ghigi 1921, 1923, Hartert 1923, Festa 1925a; specimens in MZUT) and 'Barce' (Barca), 29 March 1952 (Stanford 1954), also 25 July 1993 (Ebels & Essaker 2022), May 2020 and August 2023 (JY); ^{13–14}**Tolmeita** (Tolmeta) and environs, 2 April 1926 (specimen in NHMUK), July 2012 (JY); ¹⁵**Lestata**, October 2011 and July 2012 (JY); ¹⁶**Taknis**, spring 2022 (S. Essaker *in litt.* 2023); north of ¹⁷**Al Bayyadah**, in a peach farm, summer 2022 (S. Essaker *in litt.* 2023); ¹⁸**Sidi Abdallah** (evidently no longer extant or with that name), 15 May 1922 (Festa 1925a,b; mapped from latter paper); ¹⁹**near Al Ugla**, August 2017 (JY); ²⁰**Jarjarumah**, October 2017, May and October 2021 (JY); ²¹**Wadi Kuf** (Cuf), 20 January 1939 (Toschi 1947), July 2013 (JY); ²²**Ain Azarga** and environs (including Ain Shgiga), October and December 2010, July and September 2011, June and August 2018, March, April and August 2022 (JY); ²³**Zawiat Argoub**, July 2018 (JY); ²⁴**Al Hanyah**, July 2020, April 2021 (JY); ²⁵**Alwet Masanah**, October 2012 (JY), repeated observations in farmland, 2015–20 (S. Essaker *in litt.* 2023); ²⁶**Bir Habas**, presumably in the decade before 1952 (Stanford 1954; coordinates from Tawadros 2011); ²⁷**Al Wasita**, October 2013, July 2014, November 2021 (JY); ²⁸**Carmusa track**, 16 April 1952 (Stanford 1954, specimen in NHMUK; [see Note 2 below]); ²⁹**south of Omar Al-Mukhtar University**, September 2017 (JY); ³⁰**Suluntah** (Slonta), 11 April 1952 (Stanford 1954; specimen in NHMUK), 16 April 1963 (Steinbacher 1965; specimen in SMF); ³¹**Al-Bayda**, recently (Ebels & Essaker 2022); ³²**west of Briknot**, October 2012, September 2017, June 2019 (JY); ³³**south of Al-Bayda**, August 2011, May 2012, August 2019, July 2021 (JY); ³⁴**Wrdama**, May 2015, August 2019 (JY); ³⁵**near Briknot**, December 2010 (JY); ³⁶**Mansura**, May 2012, June 2013 (JY); ³⁷**Cyrene** and near Shahat, 1910s (Ghigi 1921, 1923), January 1939 (Toschi 1947), 22 April 1952 (Stanford 1954; specimen in NHMUK) and recently (Ebels & Essaker 2022; JY); ³⁸**south of Shahat**, July 2018, August 2020 (JY); ³⁹**Apollonia** (now Susah), January 2010 (Isenmann *et al.* 2016); ^{40–41}**two sites east of Labraq**, May and June 2021, October 2022 (JY); ⁴²**Al Labraq–Al Gubba road**, August 2011 (JY); ⁴³**Ain Dbosiah**, August 2020 (JY); ⁴⁴**Mechili** (Zavia Mechili/Zauia Mechili in Festa 1925a,b), early 1920s (Hartert 1923), including Wadi Rambla / Rhamla / Ramla (<https://www.mindat.org/feature-83501.html>) where Festa (1925a,b; see also map in latter paper) found a covey; ⁴⁵**Sidi Garbaa**, January 1922 (Festa 1925a; specimen in MZUT; position based on https://it.wikipedia.org/wiki/Paolo_Stiz and map in Festa 1925b); ⁴⁶**Derna** hinterland including Wadi Derna and hills, December 1921–February 1922 (Festa 1925a, specimens in MSNM, MZUT), January 2010 (Isenmann *et al.* 2016); ⁴⁷**El Fetejah**, January 1922 (record and map in Festa 1925b); ⁴⁸**Bumbah**, July 1993 (Meininger *et al.* 1994); ⁴⁹**Tobruk**, undated (Toschi 1947); ⁵⁰**Bardia**, undated (Toschi 1947).

Egypt.—⁵¹**Salum**, undated (Meinertzhagen 1930) and by local Bedouin report still present in the 1980s (Goodman & Meininger 1989); ⁵²**Sidi Barrani**, undated (Meinertzhagen 1930); ⁵³**Mersa Matruh**, undated (Meinertzhagen 1930) and 24 April 1964 (Goodman & Meininger 1989). Ebels & Essaker (2022) wrote that the species ‘might still occur in the extensive Siwa oasis’, but the use of ‘still’ was intended to indicate a possible extant population in Egypt, not to imply a previous record at the site.

Note 1. Stanford reported a pair of partridges in this area on the coast road west of the now destroyed ‘Marble Arch’ (near Ras Lanuf), but we hesitantly query whether this observation refers unequivocally to *A. barbata*. Toschi (1947) once encountered unspecified partridges ‘almost continuously’ adjacent to the Gulf of Sirt, and speculated whether the two taxa might have met and produced an intermediate form there (an idea suggesting he was comfortable with the notion that *barbata* penetrated some distance along that coast). Stanford may have had better identification skills than Toschi, but on the evidence we have mustered his record at the ‘Marble Arch’ is so far (140 km) from the next most westerly site, and in such seemingly extreme habitat for this taxon (see below), that we flag it as an issue in need of consideration.

Note 2. ‘Carmusa track’ is hard to trace with confidence, and our search uncovered two possible localities. The first (32°58’N, 22°54’E) features in the military campaigns in the Second World War (e.g. Auchinleck 1948). However, the date of the specimen in NHMUK falls between the collection dates of specimens from Sulunah and Cyrene, and we therefore accept the second locality, which lies geographically between these two, as the far more likely candidate.

Habitat.—*Alectoris barbata* is a bird of relatively open stony and rocky country with herb-rich meadows, scrub, bushes, brushwood, and scattered trees and copses. In this it is like other *Alectoris* partridges (Rock Partridge *A. graeca*, for example, favours meadows and shrubs but avoids continuous tree cover: Anile *et al.* 2021), and the various published pieces of information on habitat use suggest nothing unexpected. Ghigi (1921) considered *barbata* especially to favour Phoenician juniper *Juniperus phoenicea* and mastic *Pistacia lentiscus*, ‘the only truly abundant brushwood in Cyrenaica’. On a coastal plain Hartert (1923) found it amidst mastic, thick bushes of *Rhus oxyacantha* (= tripartite sumac *Searsia tripartita*), a few buckthorn trees *Ziziphus* and ‘*Periploea laevigata*’ (*P. angustifolia*), but he also mentioned ‘bush country’ and, on the plateau, ‘woods’. Toschi (1947) characterised its habitat as *Phlomis* bushes (*P. floccosa*), junipers, archaeological ruins and cultivated fields. Steinbacher (1965) simply mentioned ‘bush forest’. Ghigi (1921) gave 100–300 m as the typical elevation, but Meinertzhagen (1930) reported it at sea level at Salum, claiming that shot birds even fell into the sea, while Hartert (1923), who clearly also found it at sea level, recorded it ‘higher up on the mountains’. Moreover, it occurs in cultivated areas (JY pers. obs.).

However, this partridge also has a presence in predominantly arid steppe in the lower-lying pre-desert region well to the south of the Jebel Akhdar (Festa 1925a, Toschi 1947; e.g. localities 26 and 44 on Fig. 1). Notably at three sites where the species was recorded, Furti ash Shalizinah (Sheleidima) (Hartert 1923), Bir Habas (Stanford 1954) and Mechili (Festa 1925a,b), African Houbaras *Chlamydotis undulata*—well known as inhabitants of semi-desert (Collar 1996)—were present in the adjacent open plains. Moreover, Stanford (1954) saw a pair of partridges (albeit possibly not *barbata*: Note 1 above) in ‘very open stony desert’ on the coast road west of the ‘Marble Arch’. However, the birds’ occupation of such areas is doubtless conditional on the proximity and interdigitation of bush and tree cover in wadis: this was seemingly the case at Mechili, where the covey Festa (1925b) found was in a wadi (Rhamla) whose sides were partly wooded with carob *Ceratonia siliqua*, mastic, olive *Olea*



Figures 2–5. (Upper/right) male Barbary Partridge *Alectoris barbara barbara*, NHMUK 1965.M.1902, (lower/left) male Cyrenaica Partridge *A. [b.] barbata* NHMUK 1965.M.1904 (Alex J. Berryman, © Trustees of the Natural History Museum, London)

TABLE 1
Morphometrics of *Alectoris barbara* comparing nominate *barbara* and birds labelled as *barbara/spatzi* (see text) with *barbata*. Values in bold represent the mean of each character with standard deviation; values in parentheses are the range. All measurements are in mm. [†]denotes statistical significance using Welch’s unpaired t-tests at the threshold $p<0.05$; *denotes statistical significance using the same test but at a threshold applying a Bonferroni correction. ¹sample size = 4; ²sample size = 11; ³sample includes two unsexed specimens.

Character	<i>barbata</i>			<i>barbara/spatzi</i>		
	males (<i>n</i> = 5)	females (<i>n</i> = 7)	combined (<i>n</i> = 12)	males (<i>n</i> = 10)	females (<i>n</i> = 8)	combined (<i>n</i> = 20) ³
Bill	23.33 ± 1.07[†] 21.8–24.2	22.56 ± 1.09 21.1–24.0	22.84 ± 1.10 21.1–24.2	23.17 ± 0.77² 21.8–24.3	22.42 ± 0.67 21.0–23.3	22.96 ± 0.91 21.0–24.3
Wing	159.6 ± 2.51 157–162	158.0 ± 3.21 153–162	158.7 ± 2.93 153–162	157.9 ± 2.80 155–164	150.5 ± 4.04 146–158	154.7 ± 4.78 146–164
Tail	116.4 ± 6.66[†] 108–126	115.4 ± 8.46* 104–130	115.8 ± 7.44* 104–130	107.4 ± 4.06[†] 101–115	102.4 ± 7.35* 90–111	105.8 ± 6.17* 90–115
Bar on mid-flank	3.90 ± 0.53* 3.2–4.6	3.87 ± 0.63* 2.6–4.7	3.88 ± 0.57* 2.6–4.7	2.11 ± 0.29* 1.8–2.6	1.99 ± 0.36* 1.5–2.5	2.05 ± 0.31* 1.5–2.6

and buckthorn *Ziziphus*, and at ‘Sheleidima’, where *Ziziphus* bushes grew in riverbeds in otherwise ‘very open country’ (Hartert 1923).

Taxonomy.—We found that *A. b. barbata* consistently differs from *A. b. barbara* × *spatzi* by most of the characters identified in Ebels & Essaker (2022). We here particularly stress its

much bolder, broader flank stripes (Figs. 2–3, Table 1; width of black stripe 90% greater) and longer tail in both sexes (Fig. 4). We disagree with a point made in both Spanò *et al.* (2013) and Ebels & Essaker (2022) that the supercilium does not reach the collar in *barbata* but does so in *barbara*; we find it typically does in both.

Because Spanò *et al.* (2013) sampled a molecular marker with a high mutation rate, and sequenced only a short fragment due to the age of the specimen material available to them, we suggest further molecular work to confirm the position of *barbata* in relation to other forms.

Discussion

Conservation status.—In their own review of the threats facing Cyrenaica Partridge, Ebels & Essaker (2022) concerningly posited that *barbata* ‘may be severely threatened and one of the most endangered taxa/species in the [Western Palearctic]’. This conclusion was based (a) on their own evidence, with Salem Essaker sensing that, despite remaining common in ‘valleys and forests’, the partridge had declined in numbers, and (b) on information contributed to them by NB, who considered the species ‘very common’ until 2011 but who thereafter felt that a troubling habit of indiscriminate shooting of birds had spread west from the Egyptian border. Present-day hunting pressure in eastern Libya, especially targeted at waterbirds, doves and raptors, remains alarmingly high (see Brochet *et al.* 2016), but at least in the Jebel Akhdar the species may have been spared locally, as coveys favour cultivated properties that are not freely accessible to hunters. Moreover, Libyan hunters seldom make use of dogs (which greatly improve success in partridge hunting), while trapping is no longer a widespread practice (JY pers. obs.).

Nevertheless, the possible overhunting of the partridge has been a constant source of anxiety for the past 100 years. Ghigi (1921) wrote that ‘locals catch many of them with snares, and many officers keep them in their rooms’, while Hartert (1923) found that they are ‘shot in spring despite game law protection’, adding that ‘newly built main roads’ would soon make birds scarcer. From the mid-20th century ‘intense hunting and poaching’ were suspected of producing a reduction in the species (Toschi 1969), and by the mid-2000s *barbata* was reportedly absent from ‘many parts of Cyrenaica where it was a popular game bird only 45 years [previously]’ (Gaskell 2005). Because of this and what NB reported to them, Ebels & Essaker (2022) suggested that the species may now be confined to the Jebel Akhdar, ‘in the suburbs of Al-Marj, Al-Bayda, Shahat and Derna’.

Our own collation of data also finds recent Libyan records only from the Jebel Akhdar, although in localities more numerous and widespread than the four areas identified above. However, the extent to which the absence of recent records away from the Jebel Akhdar reflects a genuine range contraction rather than a decline in recent observer coverage is unclear. Survey effort in the wider range of the species certainly appears to have been very limited. Nevertheless, we need to consider that habitat degradation may have been a less obtrusive but no less impactful threat than hunting, particularly in the drier, more open areas that broadly buffer the Jebel Akhdar. Records of *barbata* in such areas have been made in wadis and other wetter areas of higher biomass, where overgrazing and ongoing desertification have consistently been identified as posing a danger to the region’s rangelands (e.g. Gebril & Saeid 2012, El-Barasi *et al.* 2013, Al-bukhari *et al.* 2018).

In Egypt, *barbata* may already be extinct, an outcome presumably driven by the same pressures that are thought to be affecting it in Libya. More than 90 years ago Meinertzhagen (1930) judged the species ‘almost extinct... except in one or two favoured wadis’ and ‘so scarce that it should be protected until further notice’, while more recently Crowe *et al.* (1986) considered it ‘probably extinct due to heavy hunting pressure’. However, given

the extremely narrow distribution of the species hugging the coastline east of the Gulf of Bumbah, with two observers (Meinertzhagen 1930, Tomlinson 1943) commenting on its rarity and confinement to wadis, it seems very likely that the species was corralled into relict pockets of unconnected habitat, where even light hunting pressure (but also stochastic events like overgrazing, fire and flood) might have been sufficient to extirpate populations over time.

What clearly emerges from this fog of uncertainty is that the obvious stronghold of the species is the Jebel Akhdar, an area of approximately 5,000 km². Naturally the greater number of records there—involving 35 (two-thirds) of the global total of 53 mapped—must in large part reflect the greater attraction it has to ornithologists, but it seems wholly likely also to reflect the more extensive suitable habitat, offering greater cover in its broken ground and more diverse vegetation. Toschi (1947) emphasised that the species is ‘always commoner’ in the Jebel Akhdar than elsewhere in its range, and indeed this relatively sheltered and less huntable landscape might be expected to promote greater productivity than other areas and habitats. These facts and speculations combine to indicate that a systematic survey of the massif, probably using broadcast recordings (as in Anile *et al.* 2021), is now the most pressing need to determine the conservation status of the Cyrenaica Partridge. However, targeted spot-checks in wadis away from the Jebel Akhdar would help establish the degree of range contraction, while enquiries and questionnaires could gauge the severity of recent and current hunting pressures on the species. Although on the balance of evidence we are inclined to think that the species is not as seriously at risk as Ebels & Essaker (2022) fear, we fully share their sense that it is urgent to establish a firmer basis for identifying options for the future management of the species.

Taxonomy.—We follow Spanò *et al.* (2013) and Ebels & Essaker (2022) in suggesting *A. barbata* merits treatment as a species. However, in place of their ‘Cyrenaic Partridge’ we suggest Cyrenaica Partridge for the common English name, as the word ‘Cyrenaic’ is predominantly associated with a hedonistic school of philosophy founded in Cyrene by a pupil of Socrates.

Analysis of vocalisations might help gauge taxonomic status (Collar & Donald 2023), but vocal differentiation among *Alectoris* partridges seems weak (e.g. Hartert 1923, Meinertzhagen 1930). A study of Red-legged *A. rufa* and Rock Partridges identified certain distinguishing characters, although not sufficiently strong to inhibit hybridisation (Ceugniet *et al.* 1999, Ceugniet & Aubin 2001). However, these two taxa continue to be regarded as species, and by the same token if *A. barbata* and *A. barbata* interbreed over a short distance, as Toschi (1947) speculated, this would not reverse the taxonomic status we endorse here.

As a final consideration, after Hartert (1923) mentioned that some birds seemed to have picked up colour from red soil areas near Al Marj, Stanford (1954) pointed out that two birds ‘in the more open hinterland of the Gebel [Jebel Akhdar]’ are paler than other specimens, which he related ‘to more open country rather than to soil colour’ as one of the paler birds was from a red soil area. Hunters have told JY that birds from the desert edge (see Habitat above) are different from those on the Jebel Akhdar. Whether this perception also involves greater pallor in the birds is currently being investigated, but it seems very likely.

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