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Status and distribution of the Grey-olive Greenbul *Phyllastrephus cerviniventris* in Kenya, with notes on habitat requirements and breeding seasonality

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Summary

Historically, the Grey-olive Greenbul *Phyllastrephus cerviniventris* has been a rather poorly known bird in Kenya. Recent reports, however, show it to be more widely distributed and locally abundant than published accounts suggest, and to occupy a slightly broader ecological niche. Observations confirm the species is closely associated with evergreen forest growing in locations where the water table intersects the ground surface, and suggest this association with high groundwater may be related to foraging preferences. Reports of nesting and/or fledged young indicate the species breeds during both the "short" (October-December) and "long" (Mar-June) rains.

Keywords Grey-olive Greenbul, Kenya, distribution range, groundwater

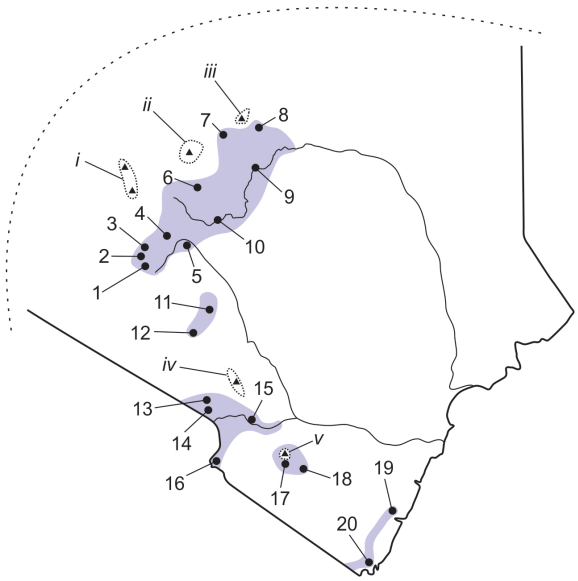
Status and distribution

Known locations

In Kenya, the Grey-olive Greenbul has been described as "poorly recorded", with a distribution both "inadequately known" (Lewis & Pomeroy 1986) and "curiously fragmented" (Britton 1980). Based primarily on pre-1980 field observations, it is best known from the Taveta and Oloitokitok (also referred to as Lolterish) areas in the south of the country and the Kiambu/Thika area immediately to the northeast of Nairobi (Fig. 1), and these locations are widely cited (Britton 1980, Keith *et al.* 1992, Lewis & Pomeroy 1989, Zimmerman *et al*. 1996). Comparatively recent (>1996) field observations by experienced observers, as well as audio recordings and photographs, confirm its continuing presence in these areas. Around Thika it is regularly reported from the Chania River valley and associated tributaries (RS-c 1994, audio recording XC344744 @ www.xeno-canto.org) as well as from Ol Donyo Sabuk National Park (audio recording ML69672951 at www.macaulaylibrary.org), while it is also often found in remnant stream-side forest in Kiambu (photograph ML48020211 at www.macaulaylibrary.org). To the south, it has recently been audio recorded in riverine forest near Oloitokitok (XC375390), and there have been several observations since 1999 from similar habitat in the Kimana area immediately to the north (B. Finch, pers. comm.). Further observations from the Taveta area concern sight records at Kitovu Forest only as recently as 1991 (Checklists #6527767; P. Bono, and #23196968; H. Laidlaw at www.eBird.org), though there is no reason to believe the species has been extirpated from this little watched area in the years since.

Less well recognized locations also include the Tsavo River/Mzima Springs area (Keith *et al.* 1992), Bura in the Taita Hills (Britton 1980, Lewis & Pomeroy 1989), as well

as Meru town, Tharaka, and coastal sites of Rabai and Shimoni (Britton 1980, Keith *et al.* 1992). In the Taita and nearby Sagalla Hills, its continued presence is confirmed by observations in riverine forest in 1996 (Brooks *et al*. 1998), while field observations several kilometres downstream of Mzima Springs in June 2008 confirm its continued presence in the Tsavo River drainage (B. Finch, pers. comm.). Brooks *et al*. (1998) also refer to an overlooked 1917 specimen from Tsavo, which may in fact comprise the earliest documented presence in southern Kenya.



	Location	Elevation (m)
1	Nairobi National Park	1550
2	Loresho, Nairobi	1800
3	Kiambu	1690
4	Thika	1350-1475
5	Ol Doinyo Sabuk NP	1430
6	Kianyaga/Embu	1500
7	Meru	1650
8	Meru National Park	750
9	Tana River, Tharaka Dist.	470
10	Kamburu, Tana River	980
11	Makueni Hills	1550
12	Sultan Hamud Hills	1300-1500
13	Kimana	1220
14	Lolterish/Oloitokitok	ca. 1550
15	Mzima Springs & Tsavo River	690
16	Kitovu Forest, Taveta	725
17	Bura & Ronge, Taita Hills	1120-1500
18	Sagalla Hill	1200-1500
19	Rabai Dist.	ca. 150
20	Shimoni	20

Figure 1. Map of central-southeast Kenya showing known Grey-olive Greenbul *Phyllastrephus cerviniventris* sites (numbered black dots) within a broader approximated Kenyan range (grey shading). Mountain massifs mapped for reference include: *i*-Aberdares, *ii*-Mt. Kenya, *iii*-Nyambeni Hills, *iv*-Chyulu Hills and *v*-Taita Hills. Drainages (from north to south) include the Tana River, Athi/Galana River and Tsavo River.

Historical presence in Tharaka, is supported by a number of specimens collected in 1912 by Edgar Mearns (Mallalieu 2001, D. Turner, pers. comm.), one of which comprised the type specimen of the subspecies, *P. c. lonnbergi* (Mearns 1914), which is not currently recognized. The location tag for this specimen (No. 244837 @ USNM) is labeled "above the falls on Government Trail, Upper Tana River", and likely refers to a set of falls 27 km north of Muumoni Hill on the southeast boundary of current day Tharaka-Nithi County. Occurrence at Meru town, referenced by Britton (1980), is possibly based on the unpublished notes of Mr D.I.M. Wallace, who reported the species there in 1953, while presence on the coast (including purported breeding) was thought to be probable by Britton (1980), but has not been repeated by others (Stevenson & Fanshawe 2002, Zimmerman *et al.* 1996). While these latter locations are the only historical sites lacking subsequent records, they are rarely surveyed for this shy species, and continued presence is probable given that suitable habitat remains in several areas.

New locations

In addition to the above well- and lesser-known localities, new sites have been found since the mid 1990s. Grey-olive Greenbuls have been observed on the southern slopes of Mt Kenya in the Kianyaga area (RS-c 2002), and records that have only recently come to light report occurrence nearby at Embu in the 1970s (Burrell 1999). To the north they have also been captured and ringed 40 km east of Meru town and 40 km north of the site of the Tharaka records in Meru National Park (Jackson 2000, Mallalieu 2001). Along the middle reaches of the Tana River to the south, it was reliably observed in riparian forest at the outflow Kamburu Dam in May 2007 (B. Finch, pers. comm.), as well as from the adjacent Mwea National Reserve in November 2008 (eBird Checklist #32909409; L. Graf). Elsewhere to the south of the central Kenyan highlands, this greenbul was documented from hill country at Sultan Hamud in January 2011 (XC72994) and in Makueni County in September 2017 (ML68477871).

Most surprising, however, is the apparently widespread occurrence of the Grey-olive Greenbul in Nairobi. Following its discovery in the National Park in 1997 (Jackson 1997), it has been found further west in the Ololua Forest (F. Reid, pers. comm.), as well as at the Arboretum in central Nairobi (Harvey 1997, Nalianya 2000), and a handful of other locations across the northern parts of the city up to an elevation of 1800 m at Loresho and Rosslyn (XC72993, ML71054421). It is unclear whether these urban and suburban observations reflect a recent expansion into the city or merely increasing field knowledge among observers.

Species ecology

Habitat requirements and habits

Grey-olive Greenbuls in Kenya have been reported to occupy altitudes of 500–1500 m in areas with 250–1000 mm of rainfall annually (Lewis & Pomeroy 1986). Based on presence in the Loresho area of Nairobi, this altitudinal range can be extended upwards to 1800 m, while presence in the wet areas of Embu and Meru, extends the occupied rainfall regime upwards to almost 1500 mm annually (Brown & Britton 1980). Elsewhere, within its African distribution, similar altitudinal ranges of 400–1900 m are provided by Keith *et al*. (1992) and Fishpool & Tobias (2017), while presence around Amani in northern Tanzania suggests a climate with almost 2000 mm of annual rainfall is acceptable for this species (Britton 1980, Brown & Britton 1980).

Forested waterside habitats and, in particular, permanently flowing streams and rivers, are well known to be favoured by Grey-olive Greenbuls both within Kenya and elsewhere in its African range (Keith *et al*. 1992, Zimmerman *et al*. 1996). Of the sites where it occurs in Kenya, many are also characterized by steep ground, including gullies, steep valleys and gorges, which are often as damp as streamside habitats due to groundwater seepage. Less clearly identified is that foraging substrates favoured by this greenbul are also typically moist or wet, which may be an important habitat requirement for this partly terrestrial species. Field observations in Kenya and elsewhere appear to bear this out. For example, at Kiambu it is regularly seen foraging around the base of waterfalls within forest (F. Ng'weno, pers. comm.), or at Thika and Sultan Hamud where it is known to forage from similarly moist substrates such as exposed root masses, boulders, or mud banks at the water's edge (Nalianya 2000, JB, pers. obs., B. Finch, pers. comm.). To the south of Kenya, in Zambia, logs that have fallen over streams or ravines are especially favoured (Keith *et al*. 1992).

Breeding seasonality

Despite its resident status, the Grey-olive Greenbul was not recorded as breeding in Kenya until 1976, when adults and an unspecified number of fledged young were observed at Thika in December of that year (Lewis & Pomeroy 1986). Four subsequent field observations show additional breeding phenology for this species: an adult photographed feeding two young nestlings (< 6 days old) in Kiambu on 21 November 2010 (P. L'Hoir, pers. comm.), a recently fledged, but almost independent juvenile captured by a Little Sparrowhawk *Accipiter minullus* in Loresho on 1 February 2012 (JB, pers. obs.), adults observed feeding recently fledged young in Kiambu on 17 July 2013 (F. Ng'weno, pers. comm.), and a pair photographed building a nest in Karura Forest on 7 June 2014 (S. Carter, pers. comm.).

In the central highlands at least, these combined observations point to nest initiation during both the short (November–December) and long (April–June) rains, with young typically fledging as the wet seasons transition to dry (December–January or June–July). From recorded nesting dates outside Kenya, it appears this reproductive cycle may be initiated 1–2 months later than birds in the core of the species' range to the south. In Zambia, nesting is reported in September–November and in Malawi in August–November, with an apparent absence of nesting records in December or June–July (Fishpool & Tobias 2017).

Conclusions

As the Grey-olive Greenbul has become better known in Kenya, it has been found more widely than was previously known and is not uncommon in some areas. Based on current knowledge, the status and distribution of this species in Kenya can be summarized as follows:

> "Widespread, but often local east of the Rift Valley in central, southern and coastal Kenya, inhabiting evergreen forest understorey along streams, in ravines, gorges and steep valleys with abundant groundwater seepage. Fairly common to uncommon from 700–1800 m in the central highlands in areas with some relief and moderate rainfall, favouring the many drainages flowing south and east from the Aberdare Mountains, Mount Kenya and Nyambeni Hills. Similarly not uncommon from 1000–1500 m in isolated highlands southwards including at Sultan Hamud, Makueni County, the Taita and Sagalla Hills, as well as on the northern slopes of Mt. Kilimanjaro. Much less widespread in southern arid areas below 1000 m, where apparently associated with only the spring-fed Tsavo River and groundwater forest at Taveta. Scattered and poorly defined presence in the humid coastal hinterlands from the Rabai area southwards."

While the habits and foraging ecology of the Grey-olive Greenbul are well recorded in the literature, the observation that year-round moist or wet habitat features are an important requirement for foraging has not been previously established. This requirement almost certainly explains the association with surface groundwater, which typically provides moisture throughout the year (unlike seasonal rainfall), and accounts for the species' "curiously fragmented" distribution, as noted by Britton (1980). It may also shed some light on how it coexists with the congeneric Terrestrial Brownbul *Phyllastrephus terrestris* and Placid Greenbul *Phyllastrephus placidus*, in limited areas of sympatry such as in Meru National Park or Nairobi.

In light of this review, dedicated searches should reveal the presence of this shy greenbul in forested environments elsewhere in central and southern Kenya, particularly where there is steep terrain characterized by surface-exposure of the water table and groundwater seepage. It should be sought in the little visited hill country of the Kitui area, at Mt Kasigau, Ol Donyo Orok and Umani Springs in the foothills of the Chyulu Hills.

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