Notes on the behaviour, plumage and distribution of the White-tailed Swallow *Hirundo megaensis*

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Summary. The White-tailed Swallow *Hirundo megaensis* is a threatened and poorly known bird endemic to southern Ethiopia, where it is restricted to a small area of *Acacia* savanna. Despite the paucity of previous nest records, we found 67 nests in the years 2010–14, commonly in village huts lived in by people, and report the first confirmation of nesting (two certain records) in termite mounds. Its nests are small mud cups lined with grass and animal hair, fixed to roof joists and similar to those of its sister species, the Pearl-breasted Swallow *H. dimidiata* of southern Africa, although it appears to lay larger clutches (3–4 pure white eggs) and breed less frequently, producing one brood in each of its two rain-driven breeding seasons (April–June and October–November). The same nests are reportedly used in these two seasons, presumably by the same pairs. Incubation lasts 16–17 days, with some broods showing clearly smaller chicks and hence presumably asynchronous hatching. Study of nestlings in the hand and museum skins confirmed that juveniles can be determined by their shorter tails, browner heads and frequently also wings, and reduced white in the tail. Although birds are typically seen singly or in pairs, flocks of up to 50, sometimes mixed with other hirundines, can occur. The breeding range appears to be almost identical to that of the Ethiopian Bush-crow *Zavattariornis stresemanni* but regular sightings of White-tailed Swallows since 2005 at the Liben Plain, 120 km to the east of the core area, suggest that the birds are frequent visitors there.

The White-tailed Swallow *Hirundo megaensis* is a globally threatened (Vulnerable) species restricted to *c*.5,500 km^2 of *Acacia–Commiphora* savanna woodland around the towns of Yabello and Mega in southern Ethiopia (Benson 1942, Collar & Stuart 1985), with a few recent sightings from other places, notably the Liben Plain 120 km to the east (Gabremichael *et al*. 2009, BirdLife International 2015a). This tiny range largely overlaps with that of the Ethiopian Bush-crow *Zavattariornis stresemanni* (Endangered), which appears to be limited largely by climate (Donald *et al.* 2012, Birdlife International 2015b). The White-tailed Swallow is extremely closely related to the Pearl-breasted Swallow *H. dimidiata* of southern Africa, differing in mtDNA by only 0.7%, less than the genetic distance between many of the subspecies of Barn Swallow *H. rustica* (Dor *et al.* 2010).

The White-tailed Swallow was first described to science as recently as 1942, and it was not until 1996 that its nest was documented (Holtam 1998). Despite, or perhaps because of, its highly restricted distribution, the White-tailed Swallow has remained understudied, with scant information accumulating on its abundance, behaviour and habitat preferences (Ash & Gullick 1989, Syvertsen & Dellelegn 1991, Mellanby *et al*. 2008). Over the past ten years we have made numerous visits to the Yabello–Mega region to develop project work on the Ethiopian Bush-crow, and between 2010 and 2014 we found a total of 67 nests of White-tailed Swallow (2 in 2010, 11 in 2011, 9 in 2012, 11 in 2013 and 34 in 2014: Fig. 1). Additionally, we have examined nine study skins kept at the Natural History Museum, Tring, UK (NHMUK) and one at the Zoological Research Museum Alexander Koenig, Bonn, Germany (ZFMK). Here we document these findings.

Nest locations

Given that the Pearl-breasted Swallow breeds in mud huts, wells, animal burrows, buildings, bridges and rock faces (Maclean 1993, Harrison *et al.* 1997), it might have been expected that White-tailed Swallows would utilise a similar breadth of locations. Benson (1946) had suspected breeding took place in termite mounds, but Holtam (1998) found two nests with chicks in village huts in May, and a third in a deep well in September. In October 2000 a further four nests were reported in culverts under the main (Addis Ababa–Nairobi) road that bisects the species' range, and in October 2001 two pairs were seen frequenting a termite mound, one bird carrying food (Ash & Atkins 2010). However, the observer has clarified that the birds seen at the culvert may not have been the builders of the nests seen, and that the birds seen at the termite mound may simply have been feeding there (N. Borrow *in litt*. 2008).

Village huts

Traditional Borana huts probably provide the most important nesting sites for the White-tailed Swallow. All but two of our 67 recent nests were built in traditional Borana domestic huts or their associated store huts, with one nest in 2010 found in a termite mound converted into a bread oven (see below) and one in 2013 against wooden beams in an isolated concrete building next to a water storage tank (Fig. 2).

Borana huts are typically small, circular and constructed with wattle-and-daub style mud walls, a single doorway, and a low-pitched conical thatched roof supported by vertical beams and circular thatched joists (Fig. 3). They are 2–6 m in diameter, and 3–5 m in height; domestic huts are generally larger than store huts. Doors (not always present) vary from a loose assembly of large sticks which roughly fill the opening to occasional solid structures with a frame. In all but the last case, access holes large enough for the adult swallows remain even when the door is closed. Occupied huts are usually solid and complete, whilst huts used for storing grain or housing animals are built to the same design but often with only partial daubing or thatching and looser doors, allowing easier access but less protection from the weather. Both constructions are numerous within villages, store huts accounting for 20–30% of the total number of buildings.

White-tailed Swallow nests are cups constructed from mud, typical of the genus *Hirundo*. The depth varies from 60 to 160 mm ($n = 28$) (Fig. 4), possibly related to the age of the nest (see below). Nests in huts were fixed to the circular joists of the roof construction, at heights of 2.5–4.5 m ($n = 28$), normally built within a few joists of the top of the hut. It appears that White-tailed Swallows show a preference for nesting in huts occupied by people (31 nests in 2014), with only a few records from store huts (three in 2014). In contrast, of ten Ethiopian Swallow *H. aethiopica* nests found during the same search in 2014, only two were within occupied huts and eight within store huts, a statistically significant difference ($\chi^2_1 = 20.8$, $P < 0.0001$). This is consistent with observations of Ethiopian Swallow nests from previous years (KG, TT).

Within the core range at the right time of year (see below) one can walk into a village and ask for 'mana raaree' (swallow nests) and be led straight to one, or at least directed to the next village where one can be found. On the edges of the range, however, for example the three villages where nests were found west of Yabello in 2014, people showed little awareness of the birds and frequently only the owners of the hut that actually contained the nest were conscious of the birds' presence. This is intriguing, as the Borana do not distinguish between species of swallow, 'raaree' being their term for any hirundines or bats, but perhaps it is simply because other species nest less frequently in village huts. The same search effort in 2014 yielded only ten nests of Ethiopian Swallow, suggesting a lower density

of birds, while Lesser Striped Swallows *Cecropis abyssinica*, which are common across the region, seem to nest only on concrete structures—local clinics, schools or culverts under the road— and in caves (AJB, KG, TT pers. obs.). Indeed, in the same region west of Yabello, we were regularly pointed towards road culverts when asking for 'raaree', only to find *Cecropis* nests with their distinctive funnel entrance (Winkler & Sheldon 1993).

There is much variation in local people's responses to swallow nests in their huts. Those who identify them as swallows view the nest as a sign of good luck, while those who mistake them for bats say they destroy the nests because the droppings can cause blindness. These attitudes can be split even within a village, with one lady telling AJB that she had kept the nest despite what her neighbours said, and was glad when the birds produced chicks.

Termite mounds

It is almost 70 years since Benson (1946) suggested that the White-tailed Swallow might nest in termite mounds, but little evidence for this ever accumulated. Birds have been seen frequenting them (Collar & Stuart 1985, Borrow 2001), but we can report only three occasions where nests have been suspected or found within them. On 14 November 2007 a pair of swallows was seen entering a 40-cm-wide west-facing ground-level cavity in a 3-m-tall termite mound south of Dubluk, the birds each time remaining inside for over a minute; to avoid disturbance no attempt was made to investigate further (B., W. & S. Oosterbaan *in litt*. 2010). On 20 November 2008 a nest was found stuck to the side of a large hole at the base of a broken-off termite mound on Soda Plain; it was not possible to see whether the nest was active (S. Rooke *in litt*. 2008; Fig. 5). On 3 June 2010, in a village near to Dida Hara, an active nest was found inside an old termite mound which had previously been used as a bread oven by the villagers. The entrance to the mound was about 0.75 m wide at the base, 0.9 m in height, and shaped like a truncated triangle. The cavity inside was roughly 1×1×1 m, with a circular base and a domed roof. The nest was fixed to the roof of the dome (Fig. 6).

Nesting in termite mounds, which are presumably ancestral nesting sites for the species, is thus proven, but given the relative difficulty of locating these nests (unlike nests in huts, they are not noticed by local people) it is impossible to judge whether nesting in huts or termite mounds is more frequent. However, the abundance of huts across the species' range, the lack of occupation of termite mounds searched in 2014 in areas where the birds were nesting in huts, and the apparently low frequency of suitably sized cavities within termite mounds combine to suggest that hut nesting is much commoner.

Total White-tailed Swallow nest records now number 72: 62 in village huts, five in store huts, three in termite mounds, one in a remote water storage building and one in a well. Our nest records come from across the core of the bird's range (Fig. 1), but there are still none from the Liben Plain. Visitors who locate further nests, particularly any in termite mounds, are encouraged to send us details, including photographs and if possible GPS co-ordinates; any records away from the core range around Yabello and Mega will also be welcome.

Observations at the nest

In 2014 a detailed study of White-tailed Swallow nesting behaviour was conducted by AJB, JD, GD and MA, and the observations described here relate solely to the 23 nests involved. The 11 other nests found in 2014 were either inactive (five) or inaccessible (six—too high to inspect safely or further entry to hut refused). In the case of inactive nests, the lining, presence of old eggs, and frequently the visiting or proximity of adult birds made us confident that each belonged to White-tailed Swallows. The nests were lined with grass and animal hair and the eggs were pure white, as in the Pearl-breasted (Schmidt 1959) and Pied-winged Swallows *Hirundo leucosoma* (Fry *et al.* 1992). This allows easy distinction from

Ethiopian Swallow nests, whose eggs are speckled chestnut (Grant & Lewis 1984) (Fig. 7). In only one instance were a few feathers found in a White-tailed Swallow nest, whereas they are observed occasionally in nests of Pearl-breasted Swallow (Maclean 1993), and all ten Ethiopian Swallow nests found in 2014 were lined with chicken feathers. Clutch size was three in nine nests and four in ten (the four others were only seen at the chick stage: two with four small chicks, one with two large chicks, and one with one large and one dead chick). The clutch size appears to be larger than in Pearl-breasted Swallow, for which two or three eggs are common but four is unusual (Fry *et al.* 1992, Maclean 1993).

The incubation period was 16–17 days (n = 5), as in Pearl-breasted Swallow (Schmidt 1959). In at least five nests, which were seen within the first two days after hatching, one chick had clearly hatched a day or two after the others, while in a further nine nests (first seen slightly later) the same notably small chick remained the runt throughout development, and often fledged a day or two later, if at all. This matches the asynchrony reported in Pearl-breasted Swallows (Schmidt 1959, Turner 2004). In the remaining nine broods no asynchrony was evident, suggesting that either it does not always occur or some catch-up growth can redress a size difference. This asynchrony and its absence were observed in both three- and four-egg broods, suggesting that it is unconnected to clutch size.

Breeding season

The main breeding season of White-tailed Swallows is April–June (Turner 2004), and the 23 active nests under study were found from early April through to late May 2014, following the start of the rainy season in March (JD, GD). When re-checked in June, none of these nests was active, suggesting that the birds do not lay a second brood. Several broods were found in early June in previous years (2010, 2011 and 2013), presumably because the rainy season started slightly later (in 2013 it began in early April). In contrast, three of the ten Ethiopian Swallow nests were active again in June 2014, all three having been among the earliest Ethiopian Swallow nests to fledge their first brood, although none earlier than the first White-tailed Swallow nest to fledge. In addition, one White-tailed Swallow nest had been lined with feathers and contained an Ethiopian Swallow brood. Intriguingly, this nest was in a hut which, although occupied, was in severe disrepair and intermediate in construction between the domestic huts favoured by White-tailed Swallows and the store huts favoured by Ethiopian Swallows.

In addition to the November 2007 and 2008 records (see above), two active White-tailed Swallow nests were found on 17 November 2012 at Derito, two in October 2013 near Dida Tuyura and Dadim, and three in October 2014 at Areri, Elwayaa and Dida Yabello (Fig. 1). The three 2014 nests were all seen with eggs or chicks. These breeding attempts are presumably a response to the smaller rainy season which occurs at this time of year (EWNHS 2001), and their distribution across different years and much of the range suggests that there is a second breeding season, although whether individual birds breed in both is still unknown. However, two of the three October 2014 breeding attempts were in nests that had also been used in May 2014, and the third was in a nest found in May which was not active but did have two adult birds visiting, and which the villagers reported had been used during the previous rains. This suggests that the same pairs were using the same nests in each of the two breeding seasons.

None of our 23 White-tailed Swallow nests was found to produce a second brood, whilst three of our ten Ethiopian Swallow nests did. It would appear, therefore, that some change in environmental conditions curtailed the White-tailed Swallow's breeding window without affecting that of the Ethiopian Swallow. This could be due to a difference in food sources. An alternative explanation is that as temperatures rise from the wet season into the dry season, the White-tailed Swallow reaches the upper limit of its physiological capacity to

breed, a possibility supported by the close match of the White-tailed Swallow's range to a modelled climate envelope (Bladon *et al*. in prep.).

In contrast to the White-tailed Swallow's single brood per breeding season, the Pearl-breasted Swallow has two or even three (Schmidt 1959). Lindén (1988) found that in Great Tits *Parus major* the success of a second brood is negatively affected by the size of the first, favouring first brood reduction. The observed larger clutches of White-tailed compared to Pearl-breasted Swallow (Fry *et al.* 1992, Maclean 1993) might therefore be expected if White-tailed Swallow is only able to breed once per season, compared to the Pearl-breasted Swallow's twice (Schmidt 1959). McGillivray (1983) noted that in House Sparrows *Passer domesticus* clutch size also increases when the adults' probability of survival until the next breeding attempt (which is a function of time between broods) is reduced. The time between the White-tailed Swallow's April and October breeding seasons is greater than that between the Pearl-breasted Swallow's first and second broods within a season, so again the larger clutch size in White-tailed Swallow might be expected.

Nest re-use

The same nests appear to be used over several years. A number of villagers in April and May 2014 told us that the birds had nested in their huts previously. Three were reportedly new nests, two of which we saw in the process of construction, but another nest was two years old, two were three years old, and one was reported to be five years old (Fig. 4). Additionally one nest, active in both April and October 2014, was again found active in April 2015 (Simon Busuttil pers. comm.). The re-use of old nests is known in Barn and Pearl-breasted Swallows (Møller 1990, Turner 2004), and evidence of this in White-tailed Swallows is further supported by the fact that active nests become blackened with carbon deposits from the hut fire, often with a noticeably lighter, and therefore presumably newer, layer or two of mud at the top of the nest (Fig. 4). The colour variation and presence or absence of blackening at these nests suggests that nests in huts with fires visibly darken, and this should allow at least crude age estimation.

Nest re-use between seasons is perhaps a strategy to compress the breeding cycle. If the birds are limited to a shortened breeding season following each rains with only time to produce one brood, then the saving of two to four weeks spent building the nest (Schmidt 1959, Turner 2004) might significantly increase the chances of success. Alternatively, it may allow the birds to breed even if there is a shortage of mud following a poor rainy season. The simple grass and hair lining found in White-tailed Swallow nests, and the preference for occupied huts with smoking fires, is perhaps a strategy to reduce parasite build-up between years which would otherwise hinder the re-use of old nests (Møller 1990). The implication of this is that one or both members of the pair return to the same nest in subsequent breeding attempts, but the degree of nest-site fidelity in White-tailed Swallows is a subject for further research.

Behaviour around the nest

White-tailed Swallows appear to be well habituated to humans. They pay little attention to people going in and out of nest huts, and will even squeeze through a partially covered door to enter a hut full of people. Feeding rates by the pair can reach four or five times per minute, although occasionally the nest is not visited for up to half an hour (broods aged 8–14 days, AJB pers. obs.). When resting, the adult birds often perch on the *Acacia* fences constructed by the villagers as cattle corrals, favouring those closest to their nest hut. Juveniles also frequent them after fledging, whilst they are still being fed by their parents (Fig. 8). Several villagers reported that the young birds continued to sleep in the nest for up to six nights after

fledging, although this was clearly not a rule as at least four broods did not return after fledging.

While attending the nest, the male occasionally gives a burry, hard but quiet *tetch*, apparently as a kind of contact call. On one occasion, at the nest in the old bread oven in 2010, a brisk, anxious, slightly sparrow-like *tsswis* was repeated rapidly but irregularly by the male when a dog went near to the entrance to the cavity; this was evidently an alarm call. These two calls appear to be the first reported for the species.

Sex identification and juvenile plumage

Tail colour

As originally established by Benson (1942), males can be told from females by the greater extent and brighter colour of the white on their tails. The amount of white in the tail is shaped by the extension of greyish-black fringes on individual rectrices (Fig. 9). However, in the field, individuals with less conspicuously white tails may also be juveniles. Late-stage nestlings and recently fledged juveniles were found to have broad greyish-black fringes to their rectrices, producing a much darker overall appearance of their tails even than females. In particular, the innermost tail feathers (R1) are completely greyish-black without any white. The other five pairs of rectrices have substantial white on their inner vanes while their outer vanes and tips are greyish-black. On the outermost rectrix (R6) the white is reduced to a smaller spot on the inner vane (Fig. 9). This can make the separation of juvenile White-tailed and Ethiopian Swallows in flight difficult.

Young birds studied in 2014 showed a marked difference in the development of white in the tail from day 16 onwards, and this was also noticeable in the juvenile skins. This could be individual variation, but might also reflect the sex of the birds.

Tail length

Sexes and age classes differ in tail length (Turner & Rose 1989) and furcation. In adult males in NHMUK, the tails are longer than in adult females (mean = 60.4 and 53.5 mm, n = 4 and 1 respectively) owing to the extension of the outer rectrices, which leads to more pronounced furcation (mean = 23.1 and 14.0 mm). Pearl-breasted Swallows show a similar sex difference in tail length (Benson 1949) and range of lengths (Maclean 1993). Size differences between the sexes are visible in the field, with male outer rectrices protruding beyond the tips of the folded wing while in females these are shorter than the wing-tips (Fig. 10). Tails of juveniles are even shorter than those of females (46.3mm, n = 3) but do not seem to differ between the sexes.

General coloration

While the different tail patterns are visible at reasonable distances in flying birds, we found it nearly impossible to distinguish the sexes by overall coloration. Redman *et al.* (2009) stated that females are duller than males, a fact we could confirm only under exceptionally favourable conditions, e.g. when pairs are seen at close range sitting next to each other (Fig. 10). It is too slight a difference to be useful in the field.

On the other hand, juveniles can be told from adults in the field by their dull brownish head colour clearly contrasting with the glossy bluish-black of the back (Fig. 11), such that birds could be mistaken for Grey-rumped Swallows *Pseudhirundo griseopyga*. As with the tail coloration, there is marked individual variation in the extent of the gloss in juveniles, in particular in the wings, which might be related to sex. In adults the head is the same glossy bluish-black as the back and wings. Thus we can confirm ‘immature browner’ (Redman *et al.* 2009), but only with regard to the head and wings, as other differences in plumage gloss are hardly visible in the field.

Sociability

The White-tailed Swallow is most frequently observed alone or in pairs, although groups of up to eight have previously been reported (Ash & Atkins 2009). While nesting, pairs are easy to come by around the nest site, the frequency of visits suggesting they forage mostly around the village and its associated livestock. Elsewhere, single birds and pairs may be encountered at any time, but like the Pearl-breasted Swallow they are inconspicuous (Schmidt 1959), and typically disappear as quickly as they appear. They favour open grassland and less dense *Acacia* woodland, particularly areas frequented by cattle herds or wild grazers. They are seen less commonly over *Commiphora*-dominated bushland, and do not occur amongst the denser broad-leaved *Combretum–Terminalia* woodland, which contrasts with the broader range of habitats reported for the Pearl-breasted Swallow (Turner 2004, Mellanby *et al.* 2008).

A number of sightings have also been made of larger, probably post-breeding flocks, which seem to contain a high proportion of immatures, and presumably occur in response to insect swarms on which the birds forage. Two favoured sites are the Borana cattle ranch at Dida Tuyura, 15 km north-east of Yabello, and the Soda Plain immediately north of the Mega massif (Fig. 12). Both sites offer an open landscape with larger *Acacia* trees and frequent grazing herds. Flocks of up to 10–20 White-tailed Swallows were seen at both of these sites on a number of occasions in the last hour or so before sundown during May and June 2013 and 2014. On one evening a mixed flock of White-tailed, Ethiopian and Barn Swallows was seen at Dida Tuyura. These birds fed over open ground at 3–15 m, with up to 20 birds at a time resting in the shade of the canopy of a couple of large trees. The numbers of each species were impossible to determine, but the total number of birds was at least 50. A similar, though smaller, mixed flock was also seen on the morning of 14 April 2014 on Dida Yabello plain.

However, flocking in these and other locations is not confined to evenings. A large flock of around 50 White-tailed Swallows, conceivably more, was present on a hot sunny afternoon on 3 June 2010 on the Soda Plain, hawking insects 5–20 m above the ground and perching temporarily in the shaded outer subcanopy of a couple of trees, on the opposite side from the sun. The trees held up to 10 birds at any point, a high proportion of them juveniles. On the morning of 17 November 2012, another flock of around 50 White-tailed Swallows was seen perhaps 30 m high over open grassland on the main road south of Dubluk, shortly before the village of Madacho. Within ten minutes they had all disappeared.

Further sightings from the Liben Plain

The occurrence of the White-tailed Swallow on the Liben Plain, south-east of the town of Negele, was first reported by Gabremichael *et al.* (2009) (Fig. 12). Since then, a number of other records have been made, summarised here. A bird was seen on a transect across the western end of the Liben Plain on 23 May 2009 (M. Gabremichael pers. comm.). In February 2010, MW observed birds in an area of cleared scrub and ungrazed grassland in the south-east scrub/grass ecotone of the Liben Plain, and at least five birds were seen at the same site on 5 June 2010 (MW, PFD, NJC). A single bird was seen a few miles north of Negele on the road to Kibre Mengist, again in 2010 (S. Rooke pers. comm.). On 22 November 2012, PFD, YD and REG had two sightings of a single bird on opposite sides of the Liben Plain. On 3 July 2013, YD observed two birds in the south-east of the plain, close to the area where they were seen in 2010. Finally a bird was reported in the area on 3 December 2014 (E. Williams in *Bull. ABC* 22: 104). Birds have also been seen on one occasion just west of the town of Wachile and at nearby Melka Guba (M. Gabremichael pers. comm.), halfway along the road from Mega to Negele.

The frequency of sightings from the Liben Plain, covering all but one year from 2005 to 2014 and across eight months (October–February and May–July), show that the species occurs regularly in the area. It is unclear, however, whether these birds represent a resident breeding population (seven immatures were seen on 31 October 2006: Gabremichael *et al.* 2009) or if there is some movement between the core range and the Plain. Solitary sightings from beyond other range edges at Sarite Plain (Syvertsen & Dellelegn 1991), Larva Plain (Ash & Atkins 2009) and near Moyale (Thouless 1996) suggest that some wandering occurs, which is perhaps unsurprising for a hirundine (Fig. 12). The records from Wachile may be the first evidence of birds moving between Yabello/Mega and Negele, or an indication that in fact the species is found continuously between the two sites but remains undetected owing to a low density of birds and the lack of search time invested. Observers in these areas are encouraged to be vigilant, and again to send us any records with as much supporting information as possible.

Conservation

Traditional Borana huts clearly provide an important nesting site for the White-tailed Swallow, which appears not to utilise larger, more modern buildings, unlike the Pearl-breasted Swallow (Maclean 1993). This may be due to displacement by larger hirundines (Harrison *et al*. 1997), but it certainly cannot be attributed to a lack of tolerance of human disturbance, which may affect other species (Turner & Rose 1989). Across the range the maintenance of traditional houses, with thatched roofs and loose door assemblages, is clearly important for breeding success. Community engagement is also important with respect to recognition of the birds. Mistaken identification of the birds as bats can lead to nest destruction, so initiatives by the national park authority to raise awareness of the birds may serve to assist conservation efforts.

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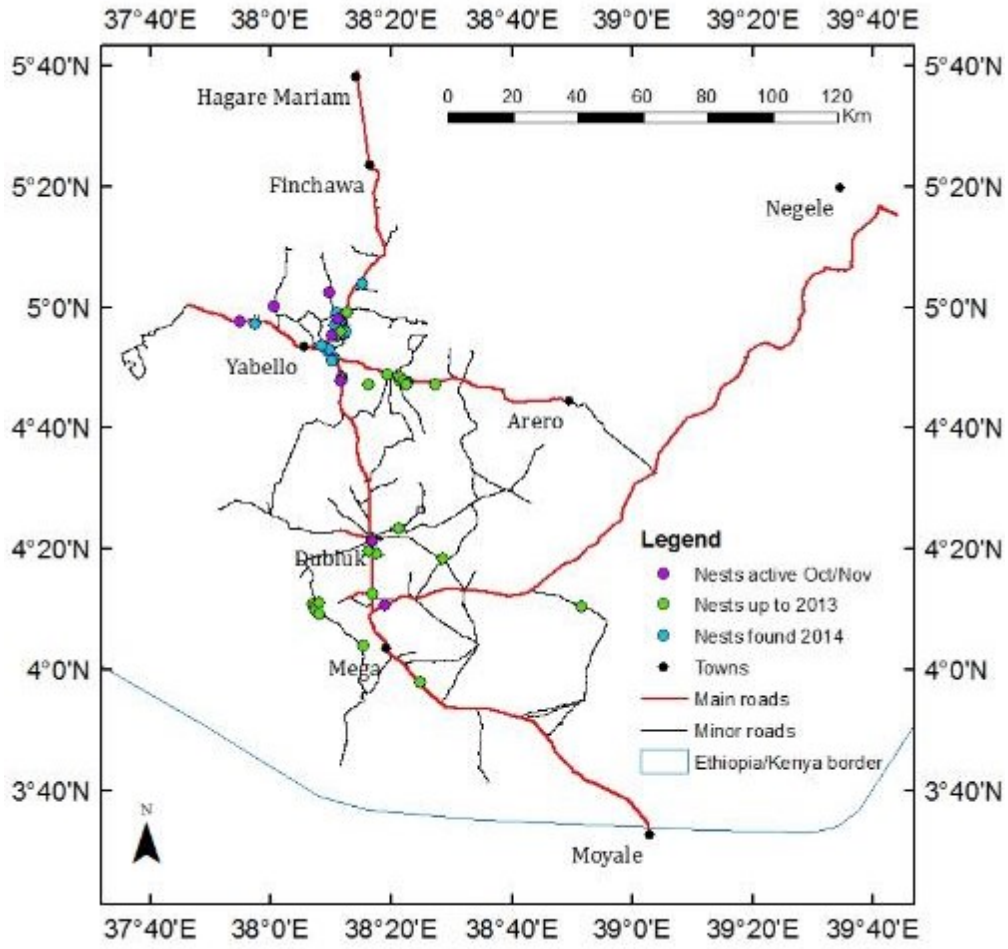

Figure 1. Study region, showing all White-tailed Swallow *Hirundo megaensis* nest records to date. Nests found active in April and May 2014, and in October and November of any year, are highlighted.

Figure 2. White-tailed Swallow *Hirundo megaensis* nest found in April 2013 in a concrete building. This is the only nest record from a non-traditional human building, and it is noticeable that the nest is attached to the wooden beams (perhaps more akin to the sides of a termite mound or the thatching of a traditional hut) rather than to the horizontal corrugated iron roof (Andrew Bladon)

Figure 3. Traditional Borana huts are important nesting sites for the White-tailed Swallow *Hirundo megaensis*. Huts number anywhere from five to a hundred per village and in the best places, such as on Dida Yabello plain, there may be one or even two White-tailed Swallow nests in each village (Andrew Bladon)

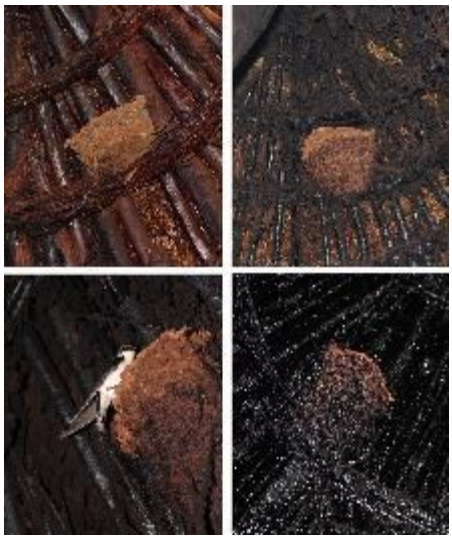

Figure 4. White-tailed Swallow *Hirundo megaensis* nests of different ages **(a)** new nest in a newer hut with a clean roof; **(b)** old nest with a second layer of paler mud at the top; **(c–d)** older nests (here 3 and 5 years old) are deeper in construction, and the lower, older, part is blackened by carbon deposits from the hut's fire. Carbon deposits can also be seen hanging from the ceilings of these huts. This suggests the birds re-use nests from year to year, with some mud being added in later years (Andrew Bladon)

Figure 5. White-tailed Swallow *Hirundo megaensis* nest inside a termite mound on Soda Plain, found by a Sunbird tour party in November 2008 (Les Colley/Sunbird)

Figure 6. An old termite mound, previously used as a bread oven by villagers, in which a White-tailed Swallow *Hirundo megaensis* nest was found in June 2010 (Nigel Collar)

Figure 7. Comparison of a White-tailed Swallow *Hirundo megaensis* (top) and Ethiopian Swallow *H. aethiopica* (bottom) nest. White-tailed Swallows lay three or four pure white eggs in a simple grass- and hair-lined cup, while Ethiopian Swallows add a thick padding of feathers and lay one to four speckled eggs (mode = four) (Andrew Bladon)

Figure 8. Post-fledging juvenile White-tailed Swallows *Hirundo megaensis* spend their first few days in the vicinity of the nest, often perching on *Acacia* fences whilst being fed (Andrew Bladon)

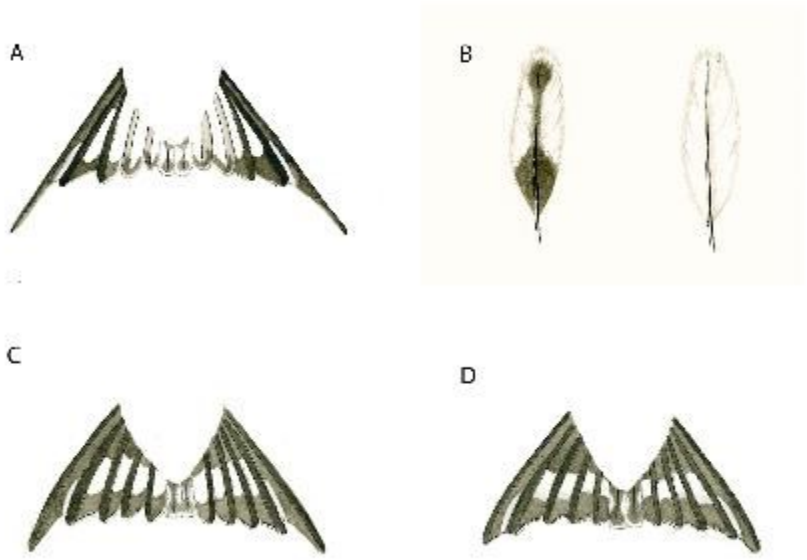

Figure 9. Variation in tail shape and coloration with age and sex of the White-tailed Swallow *Hirundo megaensis*. **A:** male, showing more white in the tail and longer outer rectrices. **B:** variation in tail feather pattern between individual inner rectrices of different males. **C:** female, lacking streamers and with less white than the male, particularly in the inner rectrices. **D:** juvenile, similar to female with slightly smaller white patches and still shorter outer feathers (Stefanie Rick and Till Töpfer)

Figure 10. Comparison of adult male White-tailed Swallow *Hirundo megaensis* (top) and female (bottom) plumage (Kai Gedeon)

Figure 11. White-tailed Swallow *Hirundo megaensis* nestling (top) and juvenile (bottom), with browner head and wings than the adult (*cf*. Fig. 10). Tail feathers of young birds have whitish fringes; the white windows on the inner vanes of tail feathers 2–6 are concealed by overlying feathers (Kai Gedeon and Paul Donald)

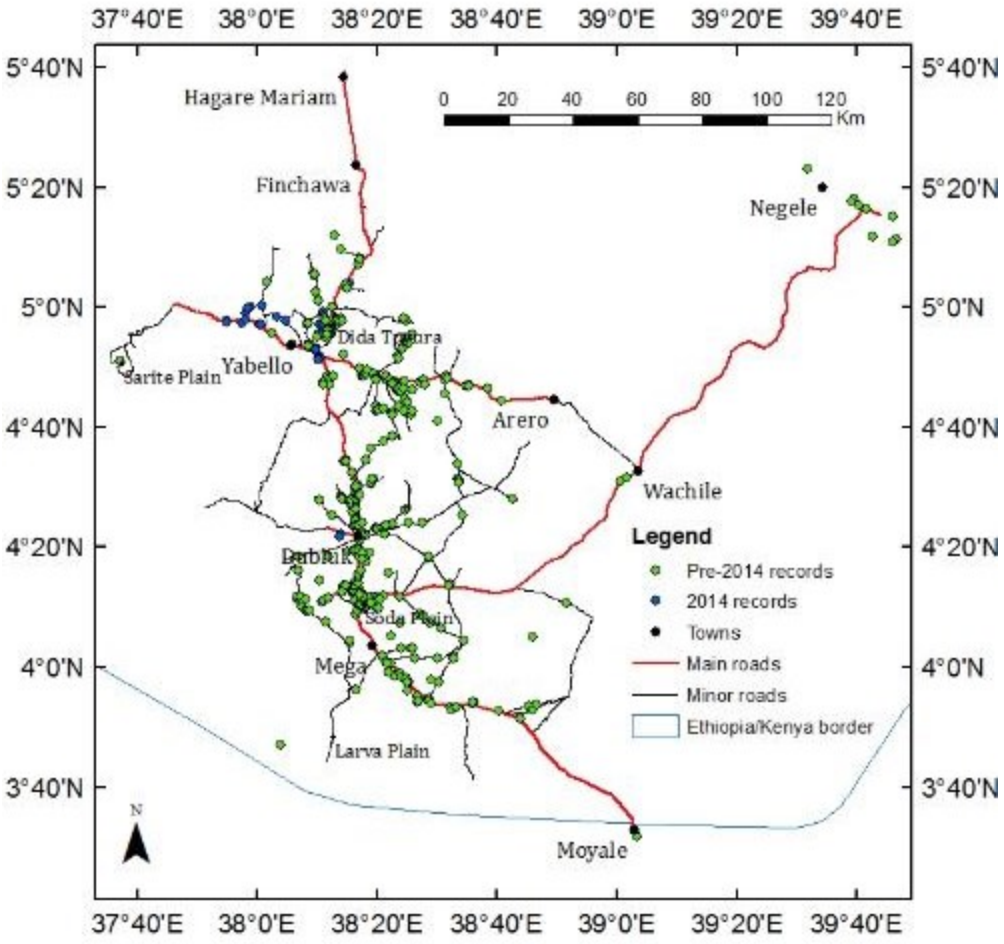

Figure 12. All White-tailed Swallow *Hirundo megaensis* records up to 2014 with available or derivable GPS co-ordinates (collected by the authors, with additional records from published sources mentioned in the text and others mentioned in the acknowledgements). In 2014 the species was observed regularly west of Yabello for the first time.