Occurrence and breeding of swifts Apodidae and swallows Hirundinidae near Wa in northern Ghana, March–May 2010

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Summary

Numbers and breeding activity of swifts Apodidae and swallows Hirundinidae were monitored between 22 March and 8 May 2010, during the late dry and early wet seasons, along two roads near Wa, in Upper West Region, Ghana. Fifteen species were recorded. Species richness was similar on both transects but relative abundance was higher on the transect nearer the Black Volta river, especially after the onset of the rains when numbers of Red-chested/Barn Swallows *Hirundo lucida* and *H. rustica,* Lesser-striped Swallow *H. abyssinica*, Pied-winged Swallow *H. leucosoma*, Common Swift *Apus apus*, White-rumped Swift *A. caffer* and Little Swift *A. affinis* increased significantly. Breeding activity was similar on both transects. Wire-tailed Swallow *H. smithii* was the only species breeding at the start of the study, but by early May, Lesser-striped, Red-chested and Pied-winged swallows, and White-rumped Swift, Little Swift and possibly Palm Swift *Cypsiurus parvus* had all begun to nest.

Résumé

Apparition et reproduction de martinets Apodidae et d'hirondelles Hirundinidae près de Wa au Nord du Ghana, mars-mai 2010. Les nombres de martinets Apodidae et d'hirondelles Hirundinidae ainsi que leur reproduction ont été suivis entre le 22 mars et le 8 mai 2010, en fin de saison sèche et au début de la saison des pluies, le long de deux routes près de Wa, en Région du Upper West, au Ghana. Quinze espèces ont été enregistrées. La richesse spécifique était similaire sur les deux transects mais l'abondance relative était plus importante sur le transect le plus proche de la rivière Volta Noire, particulièrement après l'arrivée des pluies quand le nombre des Hirondelles de Guinée et rustiques *Hirundo lucida*/*rustica*, des Hirondelles

striées *H. abyssinica*, des Hirondelles à ailes tachetées *H. leucosoma*, des Martinets noirs *Apus apus*, des Martinets cafre *A. caffer* et des Martinets des maisons *A. affinis* a augmenté significativement. L'activité liée à la reproduction a été similaire sur les deux transects. L'Hirondelle à longs brins *H. smithii* était la seule espèce en reproduction au début de l'étude, mais au début de mai, les Hirondelles striées, les Hirondelles de Guinée et les Hirondelles à ailes tachetées, ainsi que les Martinets cafre, les Martinets des maisons et peut-être les Martinets des palmes *Cypsiurus parvus* avaient tous commencé à nidifier.

Introduction

With the exception of an annotated bird-list compiled at Tumu (10°52′N, 1°59′W) in 1968–9 (Sutton 1970), no previous information on the birds of Upper West Region in Ghana has been published. From late March to early May 2010, numbers and breeding activity of swallows Hirundinidae and swifts Apodidae were monitored near the regional capital, Wa, as part of a broader study aimed at assessing the impact on non-target fauna of an aerial spraying operation carried out to suppress populations of tsetse flies *Glossina tachinoides* and *G. palpalis gambiensis*. The spraying operation was only partially successful, and no evidence of harmful effects on non-target fauna was found (I.F. Grant *in litt.*, pers. obs., see below). The results of the monitoring are reported below.

Study area and methods

Swallows and swifts were counted along two transects, one 22.3 km long, in a sprayed area between Dorimon and Wechiau, and the other 30.2 km long in the unsprayed area on the Wa–Mangwe road (Fig. 1). Initial sightings were made by four observers facing forward in a slow-moving (< 30 k.p.h.), hard-topped vehicle that stopped as required to allow adequate observation. All sightings, irrespective of distance from the observer, were recorded against distance from the start of the transect. Counting began between 6h45 and 7h00 at Dorimon (10°2′1″N, 2°41′17″W) and concluded at *c.* 8h10 in Wechiau (9°50′9″N, 2°41′1″W). A second count was made on the return journey from Wechiau, starting at 8h30. However, numbers were almost invariably higher on the first count (*e.g.* Red-chested/Barn swallows: Sign test, n = 24, P = 0.003) and data from the second count have therefore been disregarded for all species. Counting on the unsprayed transect began in Wa (10°3′53″N, 2°29′29″W) at 6h30 h and ended *c.* 1.5–2 h later at Mangwe (9°57′9″N, 2°14′20″W). Rather than transforming counts to normalise the data, the non-parametric Mann-Whitney U-test has been used to examine seasonal differences in numbers.

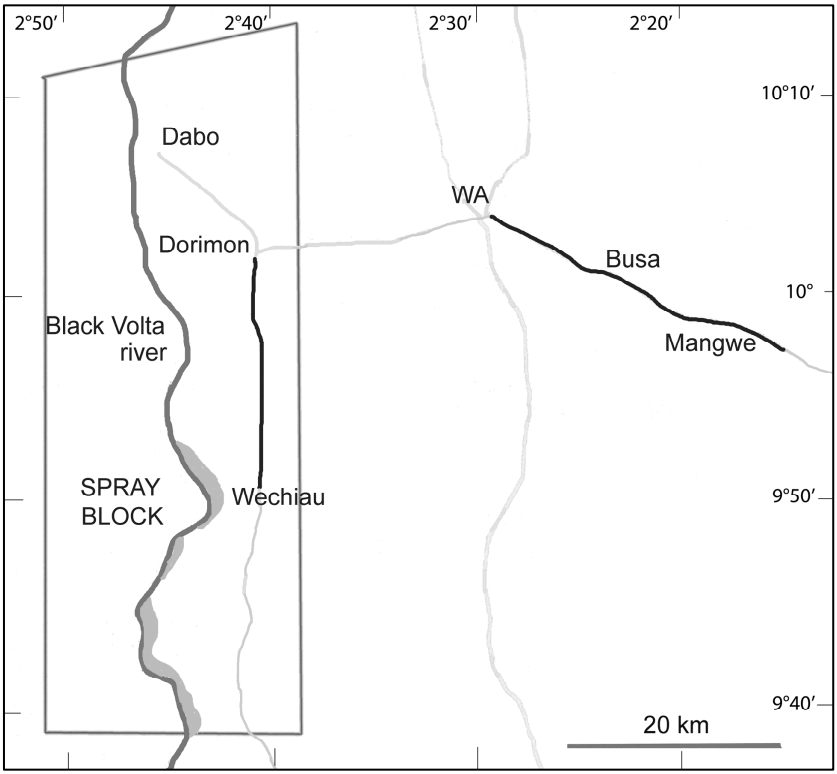

Figure 1. The study area, with road transects shown in black.

In addition to the road counts, numbers of Little Swifts over Wechiau township, at Busa in the unsprayed area, and of Palm Swifts at Dabo school in the sprayed area (but not on a transect: 10°6′59″N, 2°46′4″W), were also counted daily.

Culverts under the road were checked periodically for active swallow and swift nests. After the final spray, a Ridgid SeeSnake endoscope with a 9.5 mm diameter head was used to inspect the contents of retort-shaped swallow nests.

Low voltage power transmission lines run alongside both roads, providing conspicuous perches for swallows and other birds. Both roads pass through gently undulating Guinea Savanna that has been heavily degraded by shifting cultivation and fire, and by the cutting of trees for fuelwood, timber and browse. The dominant tree was the Shea Butter Tree *Butyrospermum paradoxum*. Despite their similarities in vegetation and land use, the two sample areas differ in other respects. The Dorimon–Wechiau road, which lies 5–10 km east of the Black Volta river, is underlain by

sedimentary rocks (slates, phyllites, schists, tuffs and greywackes) and is lower lying (< 275 m altitude), better watered, and more heavily settled than the area beside the Wa–Mangwe road. The latter crosses volcanic granitoid rocks on higher ground (> 325 m). Thus the Dorimon–Wechiau area is probably more favourable for insects and insectivorous birds than the area between Wa and Mangwe.

Spraying to suppress tsetse populations was carried out at night by aircraft flying parallel transects 270 m apart a few metres above the tree canopy, though higher in the vicinity of the numerous cellular phone masts. An area of *c*. 7530 km^2 in Upper West Region of Ghana and neighbouring Burkina Faso was sprayed. Four spray treatments were made of the entire area with a further three of heavily infested areas on the banks of the Black Volta river. Spraying of the area between Dorimon and Wechiau took place between 6 April and 6 May (Table 1). The insecticide used was deltamethrin, which was applied as an aerosol in ultra-low volume at the rate of 0.33–0.35 g active ingredient ha^{-1}. The fate of the insecticide is unknown but meteorological conditions were generally unfavourable for spraying and some of the spray may have dispersed into the atmosphere rather than reaching target sites near the ground.

The start of the spraying operation had been delayed by poor visibility due to a persistent *harmattan*, with very hot (daily maxima > 40°C), very dry (relative humidity RH < 10 %), dusty northeast winds. Conditions ameliorated in the first few days of April and light southwesterly winds set in. Heavy rain fell overnight on 5–6 April (Table 1), flooding roadside borrow pits and drainage culverts on the Dorimon transect. With the onset of the rains, southwesterly winds prevailed; the RH increased to over 60 %, and daily maximum temperatures fell 5–10°C. Shallow temperature inversions were noted on some days around dawn.

Results

Counts are summarised in Table 2. The median and range, rather than mean and standard error, are given because the means for some species appeared to be skewed by the inclusion of occasional high counts, perhaps due to passage on migration. Under these circumstances the median better expresses the "typical" number present.

***Apus apus* Common Swift.** Seen between 9 April and the end of the study; on the Dorimon–Wechiau transect, significantly more numerous after the onset of the rains (Table 2). Flocks of 30–150 birds were noted moving northwest on 14 April, 24–26 April and 3–6 May.

***A. affinis* Little Swift.** Flocks were seen regularly over Wechiau and Busa. Numbers increased in both areas after the rains began and a breeding colony with 11 nests was found under the eaves of the Wechiau mosque on 28 April.

***A. caffer* White-rumped Swift.** Seen intermittently in small numbers on both transects, on the Dorminon–Wechiau transect more commonly after the onset of the

Table 1. Key dates in the monitoring programme.

Date	Rainfall in Wa (mm)	Event
22 March		Monitoring began
5 April	31	
6/7 April		Dorimon transect sprayed
9 April		RJD left; WZ continued monitoring
13 April	11.5	
15 April	43	
15/16 April		Dorimon transect sprayed
19 April	1	
21 April		Black Volta river sprayed
22 April	72.5	
24/25 April		Dorimon transect sprayed
26 April	29	
30 April		Black Volta river sprayed
1 May	15.5	
5 May	Trace	RJD resumed monitoring
5–6 May		Dorimon transect and Black Volta river sprayed
8 May		Monitoring ended

Table 2. Counts of swifts, martins and swallows between Dorimon and Wechiau, and Wa and Mangwe. Dry season = up to 5 April; wet season = 6 April onwards. Numbers are median (minimum–maximum) counts. Significance of differences was assessed using the Mann-Whitney U test; ns indicates $P > 0.05$.

	Dorimon–Wechiau			Wa–Mangwe		
	Dry season	Wet season	*P*	Dry season	Wet season	*P*
Number of counts	9	18		4	6	
Common Swift	0	2 (0–200)	<0.025	0	3 (0–130)	ns
Little Swift	9 (0–17)	15 (5–68)	<0.025	0 (0–8)	9 (0–20)	ns
White-rumped Swift	0 (0–3)	2 (0–19)	<0.05	0 (0–4)	0 (0–36)	ns
Palm Swift	4 (0–8)	4 (0–11)	ns	0	0 (0–2)	ns
Sand Martin	0 (0–1)	0	ns	0	0	-
Grey-rumped Swallow	0	0	-	0	0 (0–2)	ns
Red-chested/Barn swallows	36 (13–73)	131 (61–302)	<0.001	15 (5–23)	16 (13–25)	ns
Wire-tailed Swallow	1 (0–2)	2 (0–8)	ns	3 (0–4)	4 (0–6)	ns
Lesser-striped Swallow	20 (13–28)	31 (22–57)	<0.001	21 (18–24)	24 (23–31)	ns
Red-rumped Swallow	0	0 (0–6)	ns	0 (0–1)	1 (0–4)	ns
Mosque Swallow	0	0 (0–5)	ns	0	2 (0–10)	ns
Rufous-chested Swallow	1 (0–2)	0 (0–2)	ns	0	0	-
Pied-winged Swallow	3 (0–15)	6 (0–18)	<0.05	0	1 (0–3)	ns
House Martin	0 (0–20)	0 (0–20)	ns	0 (0–3)	0	ns

rains. Many of the retort-shaped swallow nests found in culverts showed evidence of previous use by swifts, with feathers stuck to the mouths of the nest chambers. Two nests, one on each transect, were occupied by White-rumped Swifts at the end of the study: both contained a single egg, and both had probably been built originally by Lesser-striped Swallows *Hirundo abyssinica*.

***Cypsiurus parvus* Palm Swift.** Up to 11 were seen on the Dorimon transect, including six or seven that frequented palm trees on the edge of the village. Up to nine were also seen regularly around a palm tree to the north of the transect, in the school grounds at Dabo. Up to two were seen on the Wa transect. There was no evidence of seasonal change in numbers but one pair was suspected of breeding at Dabo at the end of the study.

***Riparia riparia* Sand Martin.** One amongst migrating House Martins and Barn Swallows near Wechiau, 31 March.

***Pseudhirundo griseopyga* Grey-rumped Swallow.** The only record was of two on the Wa–Mangwe road, 19 April.

***Hirundo lucida* Red-chested Swallow and *H. rustica* Barn Swallow.** No attempt was made to separate Red-chested and Barn swallows routinely, due to their similarity, the large numbers present, and time constraints. Flocks of migrating Barn Swallows, together with House Martins, were noted in late March, but photographs of several groups taken in May show only immature Red-chested Swallows. Numbers increased significantly on the Dorimon transect with the onset of the rains, but no similar influx occurred on the transect from Wa, where they were less common throughout the study (Fig. 2). A Red-chested Swallow nest with one egg was found in a culvert beneath the Dorimon–Wechiau road on 9 May.

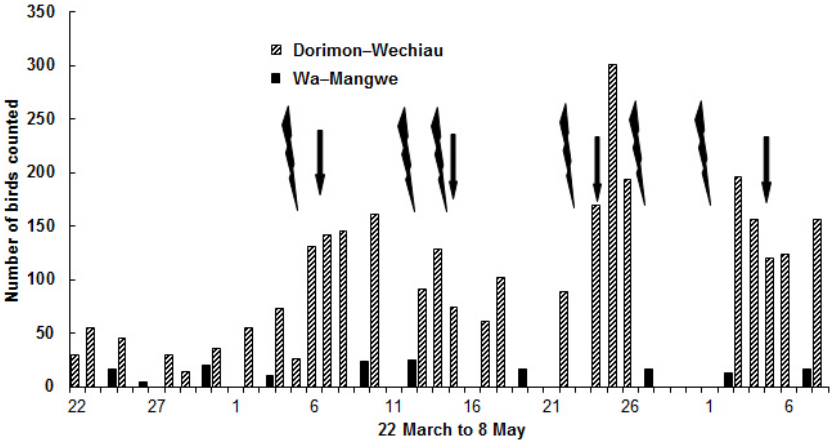

Figure 2. Counts of Red-chested and Barn swallows. All counts are shown (none had a count of zero birds). Flashes = rainfall; arrows = spray treatment.

***Hirundo smithii* Wire-tailed Swallow.** Small numbers present throughout the study on both transects, with up to eight between Dorimon and Wechiau and six on the Wa–Mangwe road. There was no evidence of a seasonal change in abundance. Breeding was in progress in both areas at the start of the study. A nest in a culvert near Wechiau contained two eggs on 25 March and three on 29 March but the chicks were probably taken by children in mid-April shortly before fledging. On the Wa transect, one nest held two eggs on 26 and 30 March and two chicks on 9 April. On 19 April one chick remained in the nest, while the second had fledged and was seen nearby.

***H. abyssinica* Lesser-striped Swallow.** Common on both transects throughout the study, and the most numerous species on the Wa–Mangwe road. Numbers increased significantly on the Dorimon transect with the onset of the rains but no comparable increase occurred on the Wa transect. Family parties were present on both transects at the start of the study but had dispersed by the end, leaving populations mainly comprised of pairs. Nest building began immediately after the first rain and by the end of the study there were three nests each with four eggs on the Dorimon transect, and one nest with four eggs on the Wa–Mangwe road. A badly decomposed adult was found in an old nest on the Wa transect but the cause of death was not determined.

***H. daurica* Red-rumped Swallow.** Present in small numbers on both transects with no evidence of change.

***H. senegalensis* Mosque Swallow.** Seen in small numbers on both transects following the onset of the rains.

***H. semirufa* Rufous-chested Swallow.** Seen in small numbers throughout the study on the Dorimon transect but not recorded along the Wa–Mangwa road.

***H. leucosoma* Pied-winged Swallow.** Present throughout the study on both transects, with a significant increase occurring on the Dorimon–Wechiau road after the onset of the rains. A newly lined but empty nest was found in a culvert on the Dorimon transect on 9 May.

***Delichon urbicum* House Martin.** Seen infrequently (9 days out of 27) on the Dorimon transect, in flocks of up to 20 birds, between 31 March and 3 May. On the Wa–Mangwe road, one record of three birds on 3 April.

Discussion

Deltamethrin aerosols applied for tsetse-fly control in southern Africa are known to have short-lived "knock-down" effects on a broad spectrum of arthropods, which may result in their greater vulnerability to predation and reduced population size (SEMG 1987, 1993). In ideal conditions, the effects of spray drift may occur up to 40 km downwind (pers. obs.). However, no effects of this spraying operation were detected in bats or birds (pers. obs.) or in non-target terrestrial and aquatic arthropods (I.F. Grant *in litt*.). A lack of any significant impact on the prey of swallows, *i.e.* small insects, is confirmed by the lack of any change in swallow abundance before and after

each spray treatment. Red-chested/Barn and Lesser-striped swallow numbers in the three days before each spray cycle, for example, were similar to those recorded in the three days immediately afterwards (Mann-Whitney U-test, pre-spray counts = 11, post-spray counts = 8, $P > 0.05$, for both taxa).

The most dramatic influx of Red-chested/Barn swallows to the sprayed area occurred on 6 April, the day after the first heavy rain had fallen and before the area was sprayed. Spraying during the previous night had taken place some 22–42 km to the north, but the wind at the time was southeast Force 2, *i.e.* blowing spray droplets gently away from rather than towards the study area. It was therefore concluded that spraying had no effect on the numbers of those species studied.

While the diversity of swift and swallow species was similar on the two transects, relative abundance was generally greater on the Dorimon transect, especially after the rains began, when numbers of Red-chested/Barn, Lesser-striped and Pied-winged swallows, and Common, White-rumped and Little swifts all increased significantly on the Dorimon transect with no comparable increase on the Wa transect (Table 3). It was clear that migrants favoured the more humid, riverine corridor of the Black Volta river, where food may have been more abundant, rather than the drier uplands of the Wa–Mangwe transect.

No breeding activity was recorded at the start of the study except in the Wire-tailed Swallow, but with the onset of the rains, Lesser-striped Swallows began collecting mud immediately and other species began to prospect for nest sites in culverts under the roads. By early May, Lesser-striped, Red-chested and Pied-winged swallows, and White-rumped, Little and possibly Palm swifts had all begun to breed, confirming the lack of any adverse impact of spraying.

The bird-life in much of Africa is threatened by habitat destruction caused mainly by a rapidly expanding human population that is heavily dependent upon subsistence farming and wood fuel. The impact of these changes on bird populations is largely unknown as monitoring schemes are either non-existent or still in their infancy, *e.g.* in Uganda and Botswana. The Upper West Region of Ghana is in many ways typical, undergoing rapid environmental change and lacking any previous replicable observations on bird populations. The sites and methods used in this study could easily be used for repeat counts by some of the numerous visitors to the nearby Wechiau Hippo Sanctuary, but a suitable forum for recording their observations is presently non-existent.

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