Breeding phenology and morphology of some forest birds in Benin and Nigeria

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Summary

In three rainforest patches in Nigeria and one in the Republic of Benin during 2017–2019, we mist-netted a total of 1035 birds (including 173 retraps) of 48 species. Excepting January and August, mist-netting was conducted in all months of the year, providing evidence for breeding phenology. Brood patches and juveniles revealed that 33 species were breeding, with more breeding evidence noted in the wet than the dry season. We document first recorded breeding attempts of four species for Nigeria (White-bellied Kingfisher *Corythornis leucogaster*, Baumann's Greenbul *Phyllastrephus baumanni*, Red-tailed Bristlebill *Bleda syndactylus*, Red-tailed Greenbul *Criniger calurus*) and one for the Republic of Benin (Little Greenbul *Eurillas virens*). The size and mass of adult birds, disaggregated by sex where possible, are also presented.

Résumé

Phénologie de la reproduction et morphologie de quelques oiseaux des forêts du Bénin et du Nigeria. Dans trois parcelles forestières du Nigeria et une en République du Bénin, au cours des années 2017–2019, nous avons capturé au filet japonais un total de 1035 oiseaux (incluant 173 recaptures) de 48 espèces. Hormis en janvier et août, les filets japonais ont été mis en place tous les mois de l'année, fournissant les informations sur la phénologie de la reproduction. Des plaques incubatrices et des juvéniles ont révélé que 33 espèces étaient en période de reproduction, avec plus de signes de reproduction notés en saison humide qu'en saison sèche. Nous documentons les premières observations de tentatives de reproduction de quatre espèces pour le Nigeria

(Martin-pêcheur à ventre blanc *Corythornis leucogaster*, Bulbul de Baumann *Phyllastrephus baumanni*, Bulbul moustac *Bleda syndactylus*, Bulbul à barbe blanche *Criniger calurus*) et une pour la République du Bénin (Bulbul verdâtre *Eurillas virens*). La taille et le poids des oiseaux adultes, différencié par sexes quand cela a été possible, sont aussi présentés.

Introduction

An understanding of the influence of environmental variables on bird breeding is critical for their conservation (Crick *et al.* 1997, Studds & Marra 2007). However, breeding data remain patchy for many African bird species (Elgood *et al.* 1994, Dowsett-Lemaire & Dowsett 2019) and are mainly based on observational studies (*e.g.* Watson *et al.* 1997, Ivande *et al.* 2012, Awoyemi *et al.* 2018). Mist-netting provides additional information, particularly about elusive birds, and in Nigeria has been used to understand trends in bird diversity (Sharland 1964, 1980), breeding (Cox *et al.* 2013) and body reserves (Nwaogu & Cresswell 2016). While these studies were mainly conducted in the savanna zone, our mist-netting study (2017–2019) advances knowledge about the breeding phenology and morphology of forest birds in West Africa.

Study sites

The study was conducted in four regenerating secondary rainforest patches (Table 1, Fig. 1), three of which are in south-western Nigeria, including the International Institute of Tropical Agriculture (IITA) Forest Reserve (IFR), Emerald Forest Reserve (EFR) and Lekki Urban Forest and Animal Sanctuary Initiative (LUFASI) Nature Park (LNP). The fourth, Drabo Gbo Forest Reserve (DFR) is located in the southern region of the Republic of Benin (hereafter "Benin"). These patches are privately-owned, dedicated to biodiversity conservation, research and recreation, and enjoy a relatively high degree of protection. During our surveys they also experienced a similar climate, with a Mar–Sep wet season and Oct–Feb dry season.

Table	1.	Study	sites	and	mist-netting	details.

	Loca	tion	Size	Altitude	N days	N species
	Ν	Е	(ha)	(m a.s.l.)	netting	netted
IITA Forest Reserve	7°30′	3°55′	360	243	36	42
Emerald Forest Reserve	7°18′	4°8′	120	130	36	19
LUFASI Nature Park	6°27′	3°39′	20	13	6	16
Drabo Gbo Forest Reserve	6°30′	2°18′	14	50	6	13



Figure 1. Nigeria and Benin showing the study sites (map by IITA GIS Unit).

The IFR is located within the campus of the IITA. Protection since 1967, with a perimeter fence and patrol, has allowed the regeneration of this forest, which holds large native tree species such as *Ceiba pentandra*, *Milicia excelsa*, *Terminalia superba* and *T. ivorensis* (Manu *et al.* 2005, Neuenschwander *et al.* 2015). The area experiences an annual rainfall of 1500–2000 mm (Ezealor 2001) and a daytime temperature of 26–38°C (Neuenschwander *et al.* 2015). Despite encroaching urbanization, the IFR supports a huge diversity of birds, and has been designated as an Important Bird and Biodiversity Area (IBA: Ezealor 2001).

The EFR is located c. 25 km south of Ibadan, with rainfall and temperature patterns similar to those of the IFR. The forest is dissected by two seasonal streams, the Aworin and Akinrin, which flow into the River Osun, which itself provides water to communities in the surrounding areas (Olajire & Imeokpartia 2000). The streams and river support luxuriant vegetation forming gallery forest, an important habitat corridor in the area (Ayoade *et al.* 2006). *Antiaris toxicaria, Brachystegia eurycoma, Cynometra megalophylla* and *Triplochiton scleroxylon* are some of the native tree species that dominate the EFR, which supports high diversity of Guineo-Congolian bird species and qualifies as an IBA (Awoyemi *et al.* 2020).

The LNP is in the heart of Lagos but protected by a perimeter fence. The area is on silty sands (Adebisi *et al.* 2016) and experiences a mean annual temperature of 30°C and mean annual rainfall *c.* 1700 mm (Ojeh *et al.* 2016). Consequently, LNP is mostly swampy, supporting native tree species such as *Ficus vogelii*, *Holarrhena floribunda*, *Lophira alata* and *Sarcocephalus latifolius*, all of which were identified during our study. The ground vegetation of LNP comprises wildlings, saplings and undergrowth, dominated by *Alchornea cordifolia*. The park has two lakes, Nora and Moses, which serve as an important source of water and habitat for wild animals. In a buffer zone, there are cabins, adventure playgrounds, a zoo and administrative offices. In this area, crops like *Mangifera indica, Elaeis guineensis, Cocos nucifera* and *Citrus sinensis* are cultivated. Although there are some stands of trees and bushes in the surrounding neighbourhood, LNP is isolated from other forest patches as a result of urbanization. Adjacent to the park are abattoirs, which provide an important source of food for scavengers.

The DFR is located *c*. 30 km north of Cotonou in Benin. The area has a mean annual rainfall of 1200 mm with two peaks, in May–Jun and Sep, and a long dry season Oct–Feb (Neuenschwander *et al.* 2015). During the peak of the harmattan in Jan, temperatures drop to 18°C, but reach 38°C in Mar–Apr (Neuenschwander *et al.* 2015). Despite its small size and the encroaching urbanisation, the DFR supports three species of monkey, including the Vulnerable Red-bellied Monkey *Cercopithecus erythrogaster* (sighted during this survey), Mona Monkey *Cercopithecus mona* and Green Monkey *Chlorocebus sabaeus*, and holds native trees such as *Blighia sapida*, *Celtis mildbraedi*, *Cola gigantea* and *Trilepisium madagascariense* (Neuenschwander & Adomou 2017).

Methods

At the IFR and EFR, birds were mist-netted during quarterly Constant Effort Surveys (Mar–Apr, Jun–Jul, Sep, Nov–Dec), from 2017 to 2019. Meanwhile, mist-netting sessions were held twice in each of DFR (May 2018 and Feb–Mar 2019) and LNP (Oct 2018 and Feb 2019). Birds were therefore mist-netted in at least one site in all months of the year except Jan and Aug, covering dry and wet seasons. Our analyses are based on seven months of wet (Mar–Sep) and five months of dry (Oct–Feb) seasons. We trapped birds for three days during each survey, and used the same mist-nets (120 m long, 2.5 m high, five shelves, 32 mm mesh size), pliers, vernier calipers, metre rules and electronic balance. Nets were opened at 6h00, closed at 11h00 and checked at 30-min. intervals. Birds were identified using Borrow & Demey (2014). Where possible, photographs were taken to confirm identification and document breeding evidence while all ringing data (SAFRING) were submitted to the A.P. Leventis Ornithological Research Institute, Jos, Nigeria. AGA participated in all surveys and ringed 550 birds (53 %). The remaining birds were ringed by co-authors and other visiting ornithologists.

All ringed birds were classified by age (adult; juvenile), sex (male; female; unknown for sexually monomorphic species), type (new; retrap) and breeding status (brood patch; juvenile). Juveniles were identified by the presence of gape, feather shape and structure, and dull eyes compared to adult birds, while brood patches were classified following Cox *et al.* (2013): little-developed (defeathering of breast and belly, wrinkles on skin), well-developed (skin of belly opaque, swollen and engorged) and post-incubation (refeathering). We estimated breeding period as the number of months a species was caught breeding in at least one site and assumed that all mistnetted juveniles had fledged 1–2 months earlier. We measured wing, tarsus and mass only for adult birds, disaggregated by sex where possible. All error measures presented are SD.

Results

We mist-netted 1035 birds of 48 species (Appendix 1). Of this total, 80 (8 %) were juveniles and 173 (17 %) retraps, tentatively interpreted as proportional to recruitment and survival rates, respectively. The totals of species mist-netted per site are indicated in Table 1, while the numbers of individuals of each species mist-netted are in Appendix 1. Olive Sunbird *Cyanomitra olivacea* (163 individuals), Yellow-whiskered Greenbul *Eurillas latirostris* (157), Grey-headed Bristlebill *Bleda canicapillus* (109) and Little Greenbul *Eurillas virens* (94) were the most netted species across all sites (Appendix 1). The presence of brood patches and juveniles indicated that 33 species were breeding during our surveys. More breeding evidence was noted during the wet season (61 birds with brood patches or juveniles) than in the dry (39) (Appendix 1).

Trapped birds of the following species included four new breeding records for Nigeria and one for Benin.

Corythornis leucogaster White-bellied Kingfisher. Eight individuals were mistnetted along streams that dissect the EFR, mainly in the dry season (Sep–Mar), during which one individual with old primary feathers was observed with a little-developed brood patch, on 19 Sep 2018. One juvenile, with less striking plumage and bill colours, was trapped on 11 Oct 2017. These findings are consistent with breeding data from Cameroon (Jul, Oct) and Gabon (Jun–Sep, Jan) (Fry *et al.* 1988).

Phyllastrephus baumanni Baumann's Greenbul. Twenty individuals were mistnetted. We observed well-developed brood patches on three individuals at IFR (6 Jul 2017; Fig. 2) and EFR (10 Oct 2017, 29 Mar 2018). We mist-netted two juveniles with dull eye colours and pale bills at IFR (2 Dec 2017, 11 Dec 2018). Although it appears that this species breeds during both seasons, we recorded more evidence in the dry than wet season. This is further supported by the report of a begging juvenile at the Abdoulaye Wildlife Reserve in Togo on 20 Oct 2015 (Dowsett-Lemaire & Dowsett 2019) and a breeding female (cloaca and brood patch) mist-netted in Cameroon on 23 Feb 2006 (Bobo *et al.* 2007). The plumage (Fig. 2) and measurements



Figure 2. Baumann's Greenbul *Phyllastrephus baumanni* with a well-developed brood patch, IITA Forest Reserve, 6 Jul 2017 (photo: AGA).

(Appendix 1) of the Baumann's Greenbuls mist-netted in our study are similar to those previously described (Fishpool 2000, Bobo *et al.* 2007).

Bleda syndactylus Red-tailed Bristlebill. On 6 Jun 2018, we mist-netted two adults at the EFR, one of which had a well-developed brood patch. Although this was during the wet season, the Red-tailed Bristlebill is known to breed all year round in other African countries (Keith *et al.* 1992); but breeding attempts remain unrecorded in the Dahomey Gap, including Benin and Togo (Dowsett-Lemaire & Dowsett 2019). Another individual was trapped on 12 Dec 2019 at the same site, where it coexisted with the Grey-headed Bristlebill *Bleda canicapillus* (Fig. 3).



Figure 3. Red-tailed Bristlebill *Bleda syndactylus* and Grey-headed Bristlebill *B. canicapillus* coexist in the Emerald Forest Reserve, 6 Jun 2018 (photo: OO).

Criniger calurus Red-tailed Greenbul. Six adults were mist-netted at the EFR, of which two had little-developed (4 Sep 2019) and well-developed (30 Mar 2018) brood patches. Breeding is reported to be independent of season in other African countries (Keith *et al.* 1992).

Eurillas virens Little Greenbul. Four adults were mist-netted at the DFR on 12 May 2018 (Fig. 4), two of which had little- or well-developed brood patches. Surprisingly for such a common bird species (Akker 2003), breeding had been unrecorded for Little Greenbul in the Dahomey Gap (Dowsett-Lemaire & Dowsett 2019), despite being plausible all months of the year (Keith *et al.* 1992; Appendix 1).



Figure 4. Little Greenbul *Eurillas virens* with a little-developed brood patch, Drabo Gbo Forest Reserve, 12 May 2018. (photo: AGA).

Discussion

We provided baseline data on the diversity, morphology, breeding, and survival and recruitment rates of relatively elusive forest birds, which appear to be under-studied in the area (Elgood *et al.* 1994, Dowsett-Lemaire & Dowsett 2019), and which are useful for comparison with other regions and vegetation zones. The observed variation in species diversity recorded between the study sites may be due to forest patch size and quality (remnant forests are very fragmented and degraded in the region), and survey duration. However, failure to capture some bird species does not imply their absence from a site. For instance, elusive forest species such as the Yellow-browed Camaroptera *Camaroptera superciliaris* and Fire-crested Alethe *Alethe castanea* were occasionally heard at the EFR but were never mist-netted.

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All of our new breeding records for Nigeria were documented at the EFR, a previously unknown site until recent work by Awoyemi *et al.* (2020). This not only demonstrates the value of exploring potential sites for bird conservation but also of deploying different and suitable census techniques. Through the Constant Effort Surveys employed in this study, we also confirmed the presence of breeding populations of the Buff-spotted Woodpecker *Campethera nivosa* and Rufous-sided Broadbill *Smithornis rufolateralis* in the IFR (Appendix 1), both new species for the IFR, as they were not recorded while designating the site as an IBA (Ezealor 2001, Adeyanju *et al.* 2014). Baumann's Greenbul *Phyllastrephus baumanni* was also mist-netted at the IFR while the observation of active brood patches in both sexes of the Olive Sunbird *Cyanomitra olivacea* (Appendix 1) in the area suggests that both sexes incubate.

In addition to our netting results, we observed an average of 15 Hooded Vultures *Necrosyrtes monachus* (Critically Endangered) at LNP, mainly in Red Ironwoods *Lophira alata* (Vulnerable), the only emergent tree species (*c*. 35m tall) found in the park. Although no breeding attempts were confirmed, we observed two old but visited nests in these trees, *c*. 500 m away from the abattoir where the vultures foraged. Based on previous awareness campaigns by the staff of LNP, abattoir staff and neighbouring households were aware of the threats facing the Hooded Vulture, and expressed support for its conservation. The DFR could play a similar role as a hotspot for birds of conservation concern in the highly urbanizing southern region of Benin. Following notable regeneration in the last 20 years, the DFR now resembles the other Guineo-Congolian forests visited during this study. Bird species characteristic of this biome were recorded during our surveys at the DFR, including the Chestnut Wattle-eye *Dyaphorophyia castanea*, Red-bellied Paradise-flycatcher *Terpsiphone rufiventer* and Western Nicator *Nicator chloris*.

Our study sites are unlikely to experience severe degradation in the immediate future, thanks to their private ownership. While this is encouraging, the impacts of anthropogenic activities in surrounding areas could nonetheless reduce species richness and diversity. For instance, urbanization has isolated the DFR, IFR and LNP from nearby forests. While the EFR appears still to be connected to the gallery forest along the River Osun, over-fishing and dry-season arable farming pose serious challenges to the avifauna in this area. To promote the conservation of these sites, we recommend community-based approaches, sensitization campaigns, protection against logging and poaching, and constant biodiversity monitoring. Such monitoring programs will unravel trends needed for informing conservation actions.

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I Birds mist-netted, measurements (mm) and mass (g) of adults (excluding retraps), months (1–12 = Jan–Dec) when brood patches and juveniles were recorded, during 2017–19. Sites: D = Drabo Gbo Forest Reserve; E = Emerald Forest Reserve;

I = IITA Forest Reserve; L = LUFASI	Nat	ure F	ark.							
	Sex	Sites	N adults	Z	N mea-	Wing	Tarsus	Mass	Brood patch	Juveniles
		-	(+ retraps)	juvs	sured	length	length		months	months
Turtur tympanistria Tambourine Dove	F	Ι	2		2	116, 127	24.4, 24.4	68.9, 59.6		
	Σ	ED	0		0	116, 119	25.6, 26.0	49.1, 75.4		
	D	П	7	1						7
Centropus monachus Blue-headed Coucal	D	Ι	1							
Ceuthmochares aereus Yellowbill	D	D	1		1	114	31.6	40.0		
Kaupifalco monogrammicus Lizard Buzzard	D	Ι	-		-	220	63.2	245.9		
Accipiter tachiro African Goshawk	D	₿	5(+2)		5 1	60.6 ± 56.0	57.8 ± 3.5	188.9 ± 93.4		
Lophoceros nasutus Grey Hornbill	D	Ι		1						4
Ispidina picta Pygmy Kingfisher	D	ILD	4	-	4	52.3 ± 2.8	12 ± 1.3	9.6 ± 1.6		6
Corythornis leucogaster White-bellied Kingfisher	D	Щ	6(+1)	1	9	57.8 ± 1.8	13.1 ± 1.8	14.5 ± 2.6	6	10
Halcyon malimbica Blue-breasted Kingfisher	D	Ι	ŝ		7	111, 101	26.7, 23.1	83.0, 82.1		
Pogoniulus scolopaceus Speckled Tinkerbird	D	IEL	9		9	54.2 ± 1.2	18.6 ± 0.5	15.0 ± 1.2		
Campethera nivosa Buff-spotted Woodpecker	ц	Ι	1(+1)		1	87	20.8	37.0	10	
	Σ	Ι	-		1	86	35.8	20.5		
Falco biarmicus Lanner Falcon	D	Ι	-		-	330	636	385.8		
Smithornis rufolateralis Rufous-sided Broadbill	Σ	Ι		1						5
Dyaphorophyia castanea Chestnut Wattle-eye	Ľ.	IED	4		4	57.8 ± 1.3	14.8 ± 5.1	12.5 ± 0.5	10	
	Σ	ш	1		1	56	18.4	14.6		
	D	Ι		-						12
D. blissetti Red-cheeked Wattle-eye	Σ	Ι	17(+1)		16	51.4 ± 1.3	19 ± 1.9	10.4 ± 1.1		
	D	Ι		1						б
Dicrurus ludwigii Square-tailed Drongo	D	Ι	ς		б	107 ± 6.1	20 ± 1.2	27.2 ± 1.5		
Trochocercus nitens Western Crested-flycatcher	Ц	Ι	1		1	61	18.1	9.6		

	Sex	Sites	N adults	Z	N mea-	Wing	Tarsus	Mass	Brood patch	Juveniles
		Ū	(+ retraps)	juvs	sured	length	length		months	months
Terpsiphone viridis African Paradise-flycatcher	D	Ð	3		3	84.3 ± 2.5	18.4 ± 0.4	12.9 ± 2.9		
T. rufiventer Red-bellied Paradise-flycatcher	D	IELD	54(+2)	4	54	78.1 ± 3.7	19.5 ± 8.8	15.4 ± 5.5	5, 6, 10 - 12	3,11,12
Nicator chloris Western Nicator	D	ILD	10(+2)	Ч	10	100.4 ± 7.4	34.3 ± 2.4	42.5 ± 10.7	5	5,12
Sylvietta virens Green Crombec	D	Ι	-							
Macrosphenus kempi Kemp's Longbill	D	Ι	7	1	ы	60, 53	27.4, 20.5	13.7, 14.0		12
Camaroptera brachyura Bleating Camaroptera	D	⊖	4		4	54.3 ± 3.3	22.8 ± 1.7	11.1 ± 3.5		
C. chloronota Olive-green Camaroptera	D	IEL	39(+7)	11	39	54.1 ± 3.5	22.6 ± 4.1	11.2 ± 3.7	5,6,10	5, 6, 9, 10, 12
Bleda syndactylus Red-tailed Bristlebill	D	Щ	ŝ		ŝ	111.7 ± 4.9	29.5 ± 0.4	42.4 ± 3.0	9	
B. canicapillus Grey-headed Bristlebill	Π	IEL	64(+44)	1	61	102.7 ± 4.8	28.1 ± 2.8	38.4 ± 5.2	3, 5, 6, 10	11
Chlorocichla simplex Simple Greenbul	D	П	7	0	0	96, 96	26.9, 27.6	38.9, 33.8		6,12
Eurillas latirostris Yellow-whiskered Greenbul	D	Ε	126(+20)	11	126	82.6 ± 4.0	19.2 ± 1.7	21.9 ± 5.3	3,5-7,9,10,12	3,5,6,11,12
E. virens Little Greenbul	D	ILD	75(+14)	S	70	75.1 ± 4.4	20.5 ± 1.8	20.7 ± 5.0	2, 3, 5, 6, 12	3,9,11
Criniger calurus Red-tailed Greenbul	D	Щ	5(+1)		5	94.4 ± 5.2	27.0 ± 0.9	29.3 ± 10.1	3,9	
Phyllastrephus albigularis White-throated Greenbul	D	Η	56(+16)	ę	55	79.0 ± 5.9	19.7 ± 1.6	18.0 ± 4.5	6,9	9,10
P. baumanni Baumann's Greenbul	D	Έ	16(+2)	0	14	78.5 ± 3.2	21 ± 1.9	19.8 ± 2.6	3,7,10	12
Pyrrhurus scandens Leaf-love	D	Ι	7		0	105, 100	30.2, 30.0	49.6, 39.7		
Hylia prasina Green Hylia	D	IEL	12(+2)	1	12	66.3 ± 5.6	20.3 ± 1.6	12.6 ± 1.6	2,6	5
Illadopsis fulvescens Brown Illadopsis	D	Π	9(+1)		7	75.7 ± 3.7	29.6 ± 0.9	29.2 ± 2.5	3,9	
Phyllanthus rubiginosus Black-crowned Capuchin	D	Ι	7		0	121, 119	45.9, -	90.4, 97.6	7	
Neocossyphus poensis White-tailed Ant-thrush	D	Η	2(+2)	1	0	105, 115	32.5, 30.5	31.7, 55.1		6
Turdus pelios African Thrush	D	₿	4		4	111.0 ± 8.3	40.1 ± 10.2	46.2 ± 12.8	5	
Cossypha cyanocampter Blue-shouldered Robin-chat	t U	Ι	7(+2)		7	83.0 ± 13.8	30.8 ± 1.3	28.6 ± 1.4	9	
C. niveicapilla Snowy-crowned Robin-chat	D	Θ	16(+1)	Ч	16	96.7 ± 4.9	27.1 ± 2.2	28.8 ± 5.7	9	6,12
Stiphrornis erythrothorax Westem Forest Robin	Π	Ε	16(+9)	0	16	65.4 ± 2.3	24.6 ± 0.8	15.4 ± 2.0	5,6,9	9,12
Hedydipna collaris Collared Sunbird	щ	ILD	10	ы	10	47.7 ± 1.5	17.4 ± 3.9	6.4 ± 1.3		2,12
	Σ	IELD	16		14	50.0 ± 1.4	17.9 ± 0.6	8.2 ± 2.9		
	D	Π	б	9						3,9,10

Malimbus 42

Cyanomitra olivacea Olive Sunbird	ц	Ε	58(+13)	1	58	55.9 ± 2.0	11.8 ± 3.4	5.9 ± 2.1	3,6,7,9–12	12
	Σ	Η	60(+18)		55	62.0 ± 1.8	14.6 ± 1.3	7.8 ± 1.2	3,5,7	
	D	Η	3(+8)	0						6,12
Cinnyris chloropygius Olive-bellied Sunbird	Σ	Γ	0		0	48	16 ± 0.3	9		
Ploceus nigricollis Black-necked Weaver	[II]	Γ	1		1	72	24.2	23.4	10	
	Σ	Γ	1		-	74	24.7	26.1		
Malimbus nitens Blue-billed Malimbe	D	IEL	8(+1)	5	٢	83.3 ± 4.9	24.0 ± 2.1	34.3 ± 3.4		3, 6, 11, 12
Spermophaga haematina Western Bluebill	[II]	Ξ	11(+1)	4	6	70.0 ± 1.6	24.8 ± 1.0	25.4 ± 1.7	5,6,9	7,12
	Σ	IEL	16(+2)		16	70.3 ± 2.0	24.7 ± 0.7	25.2 ± 6.7		
	D	Π		0						9,10
Spermestes bicolor Black-and-white Mannikin	D	Ι	7		0	53, 55	10.9, 10.1	15.6, 15.5		
Total			782(+173)	80	717					