**Live wild bird exports from West Africa: insights into recent trade from monitoring social media**

Alisa J. Davies; Ana Nuno; Amy Hinsley; Rowan O. Martin

**Appendix S1: Additional Method Details regarding sample selection, data collection and analysis.**

**Pilot Study**

We conducted a pilot study assessing 15 potential pages run by individuals known a-priori to be involved in the commercial trade of birds from West Africa. We excluded three pages not based in West Africa and three with no recent trade activity. The remaining seven profile pages, a business page and a community page with one admin.

**Data Collection**

We chose 2016 as a stopping point following the pilot study, in order to capture activity from all traders in our sample while remaining recent enough to be relevant. For example, monitoring activity long before January 2017 might have captured high trade in *Psittacus* species before their listing on CITES Appendix I. Due to the overabundance of re-used posts by one seed-page, we applied a cap of 100 S-posts per seed-page to prevent overrepresentation, as has been used elsewhere to manage comment data (Spee *et al.* 2019). Private posts or those removed prior to the study could not be recorded.

**Species Analysis**

We conducted a percentage agreement test between the lead author and experts using the first 45 PICs (posts split 20:25 between the two experts). If a post featured multiple media files, one was chosen at random. If a reviewer was uncertain of the species, they identified the bird at a genus or family level. Percentage agreement was used because of the large number of potential categories and the risk of agreement due to chance was minimised as reviewers were not forced to guess. Agreement was 67% for species, 77% for genera and 82% for families. Most disagreements were due to a species being missed (46.8%), followed by identification at different taxonomic levels (29.8%). Corrections were made and families that were identified as challenging, including Columbidae, Sturnidae and Viduidae, were identified with the assistance of experts or recorded at a higher taxonomic level.

**Species Accumulation Curve**

Our data was characterised as ‘sample-based incidence data’ because the sample (i.e., the PIC) was the unit of analysis and measure of effort, and species were recorded as present or absent in that sample. The Chao2 estimator is suggested as appropriate for providing a conservative asymptotic species richness estimate for this type of data (Colwell *et al.* 2012).

REFERENCES

Spee, L.B., Hazel, S.J., Dal Grande, E., Boardman, W.S.J. and Chaber, A.L. (2019). Endangered exotic pets on social media in the middle east: Presence and impact. *Animals* 9:480. https://doi.org/10.3390/ani9080480

Colwell, R.K., Chao, A., Gotelli, N.J., Lin, S.Y., Mao, C.X., Chazdon, R.L. and Longino, J.T. (2012). Models and estimators linking individual-based and sample-based rarefaction, extrapolation and comparison of assemblages*. J. Plant. Ecol.* 5:3-21.

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| **Appendix S2:** The frequency of observed taxa by estimated volume and their presence in databases regarding invasive species and biosecurity.  |
| **Binomial Name** | **Common Name** | **Frequency in PICs by estimated volume** | **GAVIAa** | **GISDb** | **OED-WAHIS-Wildc** |
| **1-10** | **11-100** | **100+** | **Copied** | **Total** |  |  |  |
| **Accipitridae** |   |   |   |   |   |   |  |  |  |
| *Stephanoaetus coronatus*  | Crowned Eagle | 1 | - | - | - | 1 |  |  |  |
| **Alcedinidae** |   |   |   |   |   |   |  |  |  |
| *Halcyon leucocephala* | Grey-headed Kingfisher | 1 | - | - | - | 1 | ✓ |  |  |
| *Halcyon malimbica* | Blue-breasted Kingfisher | 2 | - | - | - | 2 |  |  |  |
| **Anatidae** |   |   |   |   |   |   |  |  |  |
| *Dendrocygna viduata*  | White-faced Whistling Duck | 2 | - | - | - | 2 | ✓ |  | ✓ |
| *Nettapus auritus* | African Pygmy Goose | 2 | 2 | - | - | 4 |  |  |  |
| **Ardeidae** |   |   |   |   |   |   |  |  |  |
| *Egretta ardesiaca* | Black Heron | 1 | - | - | - | 1 |  |  |  |
| **Bucerotidae** |   |   |   |   |   |   |  |  |  |
| *Horizocerus albocristatus* | Western Long-tailed Hornbill | 2 | - | - | - | 2 |  |  |  |
| **Charadriidae** |   |   |   |   |   |   |  |  |  |
| *Vanellus senegallus* | Wattled Lapwing | - | 2 | - | - | 2 |  |  |  |
| **Columbidae** |   |   |   |   |   |   |  |  |  |
| Columbidae sp. |   | -  | 2  | -  | -  | 2  |  |  |  |
| *Aplopelia larvata* | Lemon Dove | 5 | - | - | - | 5 |  |  |  |
| *Columba guinea* | Speckled Pigeon | 10 | 1 | - | 1 | 12 | ✓ |  |  |
| *Columba iriditorques* | Western Bronze-naped Pigeon | 7 | - | - | - | 7 |  |  |  |
| *Columba livia*  | Rock Dove | 5 | 1 | - | - | 6 | ✓ | ✓ | ✓ |
| *Oena capensis* | Namaqua Dove | 3 | 1 |   | 3 | 7 | ✓ |  |  |
| *Spilopelia senegalensis* | Laughing Dove | 1 | - | - | - | 1 |  |  |  |
| *Streptopelia hypopyrrha* | Adamawa Turtle-Dove | 9 | - | - | - | 8 |  |  |  |
| *Streptopelia roseogrisea* | African Collared-Dove | 2 | - | - | - | 2 | ✓ |  |  |
| *Streptopelia turtur*  | European Turtle-dove | - | 1 | - | - | 1 | ✓ |  | ✓ |
| *Streptopelia vinacea* | Vinaceous Dove | 6 | - | - | - | 6 |  |  |  |
| *Treron calvus* | African Green-pigeon | 3 | 1 | - | - | 4 |  |  |  |
| *Treron waalia* | Bruce's Green-pigeon | 7 | 15 | - | - | 22 | ✓ |  |  |
| *Turtur* sp. |   | 1  | -  | -  | -  | 1 |  |  |  |
| *Turtur abyssinicus* | Black-billed Wood-dove | 3 | 4 | - | - | 7 |  |  |  |
| *Turtur afer* | Blue-spotted Wood-dove | 2 | 4 | - | - | 6 |  |  |  |
| *Turtur tympanistria* | Tambourine Dove | 5 | 17 | 1 | - | 23 | ✓ |  |  |
| *Tutur brehmeri* | Blue-headed Wood-dove | 11 | 5 | - | - | 16 |  |  |  |
| **Coraciidae** |   |   |   |   |   |   |  |  |  |
| *Coracias abyssinicus* | Abyssinian Roller | 1 | - | - | - | 1 |  |  |  |
| Coracias cyanogaster | Blue-bellied Roller | - | 2 | - | - | 2 | ✓ |  |  |
| **Dicruridae** |   |   |   |   |   |   |  |  |  |
| *Dicrurus* sp. |   | 1 | - | - | - | 1 |  |  |  |
| **Estrildidae** |   |   |   |   |   |   |  |  |  |
| Estrildidae sp. |   | 2 | 17 | 3 | -  | 22 |  |  |  |
| *Amadina fasciata* | Cut-throat Finch | 1 | 11 | 3 | 4 | 19 | ✓ |  |  |
| *Amandava subflava* | Zebra Waxbill | 1 | 1 |   | 3 | 5 | ✓ |  |  |
| *Estrilda astrild* | Common Waxbill | 1 | - | - | 2 | 3 | ✓ | ✓ |  |
| *Estrilda coerulescens* | Lavender Waxbill | 1 | 4 | 1 | 4 | 10 | ✓ |  |  |
| *Estrilda melpoda* | Orange-cheeked Waxbill | 2 | 7 | 1 | 2 | 12 | ✓ |  |  |
| *Estrilda troglodytes* | Black-rumped Waxbill | 2 | 5 | 3 | 1 | 11 | ✓ |  |  |
| *Euodice cantans* | African Silverbill | - | - | - | 3 | 3 |  |  |  |
| *Lagonosticta* sp. |   | 2 | 2 | - | 3 | 7 |  |  |  |
| *Lagonosticta rara* | Black-bellied Firefinch | - | - | - | 1 | 1 |  |  |  |
| *Lagonosticta senegala* | Red-billed Firefinch | - | - | - | 1 | 1 | ✓ |  |  |
| *Pyrenestes ostrinus* | Black-bellied Seedcracker | 1 | - | - | 3 | 4 |  |  |  |
| *Pytilia* sp. |   | - | 1 | - | - | 1 |  |  |  |
| *Pytilia hypogrammica* | Yellow-winged Pytilia | - | 1 | - | - | 1 |  |  |  |
| *Pytilia melba* | Green-winged Pytilia | 1 | - | - | - | 1 | ✓ |  |  |
| *Pytilia phoenicoptera* | Red-winged Pytilia | 2 | - | - | - | 2 | ✓ |  |  |
| *Spermestes* sp. |   | - | 1 | - | - | 1 |  |  |  |
| *Spermestes bicolor* | Black-and-white Mannikin | - | - | - | 1 | 1 |  |  |  |
| *Spermestes cucullata* | Bronze Mannikin | 1 | 1 | - | 1 | 3 |  |  |  |
| *Spermestes fringilloides* | Magpie Mannikin | - | 14 | 2 | - | 16 |  |  |  |
| *Spermophaga haematina* | Western Bluebill | 2 | - | - | - | 2 |  |  |  |
| *Uraeginthus bengalus* | Red-cheeked Cordon-bleu | 3 | 7 | - | 2 | 12 | ✓ |  |  |
| **Fringillidae** |   |   |   |   |   |   |  |  |  |
| *Crithagra leucopygia*  | White-rumped Seedeater | - | 6 | - | 4 | 10 | ✓ |  | ✓ |
| *Crithagra mozambica* | Yellow-fronted Canary | 1 | 22 | 13 | 2 | 40 | ✓ |  |  |
| **Gruidae** |   |   |   |   |   |   |  |  |  |
| *Balearica pavonina* | Black Crowned Crane | 2 | - | - | - | 2 | ✓ |  |  |
| **Jacanidae** |   |   |   |   |   |   |  |  |  |
| *Actophilornis africanus* | African Jacana | - | 2 | - | - | 2 |  |  |  |
| **Lybiidae** |   |   |   |   |   |   |  |  |  |
| *Poginornis dubius* | Bearded Barbet | - | 4 | - | 2 | 6 |  |  |  |
| **Malaconotidae** |  |   |   |   |   |   |  |  |  |
| *Laniarius barbarus* | Yellow-crowned Gonolek | 1 | - | - | - | 1 |  |  |  |
| **Musophagidae** |   |   |   |   |   |   |  |  |  |
| *Corythaeola cristata* | Great Blue Turaco | 4 | - | - | - | 4 |  |  |  |
| *Crinifer piscator* | Western Plantain-eater | 8 | 2 | - | 1 | 11 |  |  |  |
| *Musophaga violacea* | Violet Turaco | 8 | 11 | - | - | 21 | ✓ |  |  |
| *Tauraco persa* | Green Turaco | 7 | 12 | - | 3 | 22 |  |  |  |
| **Phasianidae** |   |   |   |   |   |   |  |  |  |
| *Coturnix coturnix*  | Common Quail | 1 | - | - | - | 1 | ✓ |  | ✓ |
| *Pternistis bicalcaratus* | Double-spurred Francolin | 1 | - | - | - | 1 |  |  |  |
| **Ploceidae** |   |   |   |   |   |   |  |  |  |
| *Euplectes* sp. |   | 2 | 3 | - | - | 5 |  |  |  |
| *Euplectes afer* | Yellow-crowned Bishop | - | 1 | 1 | - | 2 | ✓ |  |  |
| *Euplectes ardens* | Red-collared Widowbird | 3 | 8 | - | - | 11 | ✓ |  |  |
| *Euplectes franiscanus* | Northern Red Bishop | 4 | 4 | 1 | 1 | 10 | ✓ |  |  |
| *Euplectes hordeaceus* | Black-winged Bishop | 3 | 7 | 1 | - | 11 | ✓ |  |  |
| *Euplectes macroura* | Yellow-mantled Widowbird | 1 | - | - | - | 1 | ✓ |  |  |
| *Ploceus* sp. |   | - | 2 | - | - | 2 |  |  |  |
| *Ploceus cucullatus*  | Village Weaver | - | 2 | - | - | 2 | ✓ |  | ✓ |
| *Ploceus melanocephalus* | Black-headed Weaver | 1 | 2 | - | - | 3 | ✓ |  |  |
| *Quelea erythrops* | Red-headed Quelea | 8 | 1 | - | - | 9 | ✓ |  |  |
| *Quelea quelea* | Red-billed Quelea | 1 | - | - | 3 | 4 | ✓ |  |  |
| **Pluvianidae** |   |   |   |   |   |   |  |  |  |
| *Pluvianus aegyptius* | Egyptian Plover | - | 4 | - | - | 4 |  |  |  |
| **Psittacidae** |   |   |   |   |   |   |  |  |  |
| *Poicephalus fuscicollis* | Brown-necked Parrot | 1 | - | - | - | 1 |  |  |  |
| Poicephalus gulielmi | Red-fronted Parrot | 1 | 2 | - | - | 3 |  |  |  |
| Poicephalus senegalus  | Senegal Parrot | 5 | 29 | 2 | 5 | 41 |  |  | ✓ |
| Psittacus erithacus  | Grey Parrot | 5 | 7 | 5 | 4 | 21 | ✓ |  | ✓ |
| *Psittacus timneh* | Timneh Parrot | 1 | 5 | - | - | 6 |  |  |  |
| **Psittaculidae** |   |   |   |   |   |   |  |  |  |
| *Agapornis pullarius* | Red-headed Lovebird | 3 | 10 | - | 2 | 15 | ✓ |  |  |
| *Psittacula krameri*  | Rose-ringed Parakeet | 5 | 31 | 18 | 4 | 58 | ✓ | ✓ | ✓ |
| **Pteroclidae** |   |   |   |   |   |   |  |  |  |
| *Pterocles exustus* | Chestnut-bellied Sandgrouse | 1 | - | - | - | 1 | ✓ |  |  |
| *Pterocles quadricinctus* | Four-banded Sandgrouse | - | 3 | - | - | 3 |  |  |  |
| **Strigidae** |   |   |   |   |   |   |  |  |  |
| *Ptilopsis leucotis* | Northern White-faced Owl | - | - | - | 2 | 2 |  |  |  |
| **Sturnidae** |   |   |   |   |   |   |  |  |  |
| Sturnidae sp. |   | 1 | 4 | - | - | 5 |  |  |  |
| *Cinnyricinclus leucogaster* | Violet-backed Starling | 6 | 3 | - | - | 9 |  |  |  |
| *Lamprotornis* sp. |   | 4 | - | - | - | 4 |  |  |  |
| *Lamprotornis caudatus* | Long-tailed Glossy Starling | 2 | 1 | - | - | 3 | ✓ |  |  |
| *Lamprotornis iris* | Emerald Starling | 3 | 1 | - | - | 4 |  |  |  |
| *Lamprotornis purpureus* | Purple Starling | 9 | 2 | - | - | 11 | ✓ |  |  |
| **Vangidae** |   |   |   |   |   |   |  |  |  |
| *Prionops plumatus* | White-crested Helmetshrike | - | 1 | - | - | 1 |  |  |  |
| **Viduidae** |   |   |   |   |   |   |  |  |  |
| Viduidae sp. |   | - | 1 | - | - | 1 |  |  |  |
| *Vidua* sp. |   | 8 | 10 | 1 | 1 | 20 |  |  |  |
| *Vidua chalybeata* | Village Indigobird | - | 1 | - | - | 1 | ✓ |  |  |
| *Vidua macroura* | Pin-tailed Whydah | - | 10 | 2 | 2 | 14 | ✓ |  |  |

**Appendix S3:** Photos illustrating housing conditions representative of those found in this study. a) Multiple finch and weaver species housed in large aviary. b) Rose-ringed parakeets and Senegal parrots housed together. Sourced from the World Parrot Trust

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