



Documenting a New Distribution Record of a Fruit Bat Species in a Fragmented Lowland Forest: A Technical Note

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Abstract

Short notes announcing that a bat species has been found outside its known range are among the commonest papers in regional zoological journals, and for Old World fruit bats (family Pteropodidae) they supply much of what is known about distribution. Their value depends entirely on how the record is documented. A note that cannot be verified adds a doubtful point to the map, and doubtful points are hard to remove once they enter databases and assessments. This technical note sets out what a new distribution record of a fruit bat from a fragmented lowland forest should contain if it is to be usable by others. It describes the levels of evidence on which a record can rest, from a sighting to a vouchered specimen with a DNA barcode, and the minimum information on identification, locality, capture method and habitat that should accompany it. It then considers how such a record ought to be interpreted, since in a fragmented landscape a new locality may reflect an overlooked resident population, a recent arrival or a transient individual. The note reports no record of its own. It is intended as a checklist for field workers preparing such a report and for editors and reviewers asked to judge one.

Keywords: *Pteropodidae*, *Range extension*, *Voucher specimens*, *DNA barcoding*, *Forest fragmentation*, *Occurrence data*

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1. Introduction

Knowledge of where species occur is incomplete for most tropical animals, a deficiency that conservation biogeographers have named the Wallacean shortfall (Whittaker et al., 2005). Fruit bats illustrate it well. The family Pteropodidae contains close to two hundred species across Africa, Asia, Australia and the Pacific; many are known from few localities, and the first global action plan for the group identified the lack of basic distributional data as an obstacle to assessing their status (Mickleburgh et al., 1992). Because these bats disperse seeds and pollinate trees of ecological and economic value (Fujita and Tuttle, 1991), the gaps matter beyond the bats themselves.

Lowland forest is where the gaps are closing fastest and where the habitat is disappearing fastest. Surveys of remnant patches regularly turn up species not previously listed for a district, a state or a

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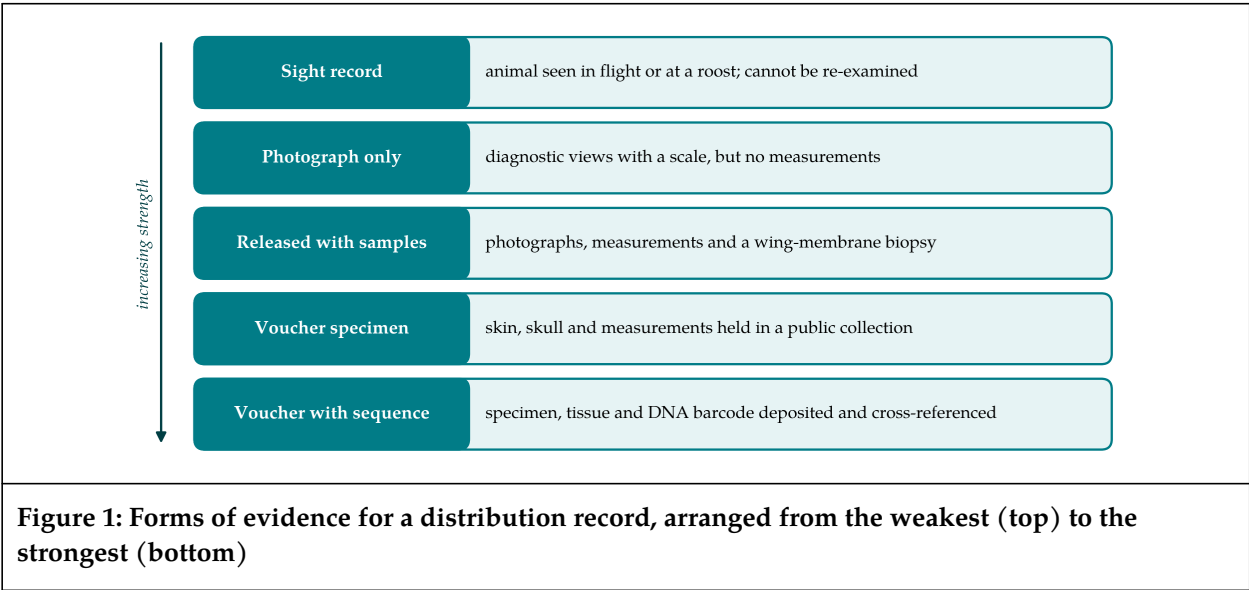
country, and these are published as new distribution records. This note concerns the form such a report should take. It presents no new record. Its subject is the evidence and information that make a record verifiable, and the caution needed in drawing conclusions from it.

2. Why Documentation Standards Matter

A published locality has a long afterlife. It is copied into checklists, aggregated in biodiversity databases and used to draw the range polygons from which extent of occurrence is calculated under the IUCN Red List criteria (IUCN, 2012). A single outlying point can enlarge that extent considerably and so alter a threat category. If the identification was wrong, the error spreads with the record and is seldom traced back. Fruit bats are prone to such errors because several widespread genera contain species that differ by small margins in forearm length, dentition or pelage, and because genetic surveys have revealed deeply divergent lineages within what were treated as single Southeast Asian species (Francis et al., 2010). A name applied in the field may not survive re-examination, and re-examination requires that something was kept.

3. Levels of Evidence

Records differ in what they leave behind for others to check. Figure 1 arranges the usual forms of evidence in order of strength. A sighting of bats at a fruiting tree leaves nothing. Photographs can be decisive for species with unmistakable external characters, but many pteropodids cannot be told apart from images, and a photograph without a scale or measurements often cannot settle even the genus. An animal that is measured, photographed, sampled for tissue and released provides a record that can be tested genetically. A voucher specimen deposited in a public collection, with tissue and a sequence linked to it, is the only form that permits every later question to be asked.



The choice between releasing and collecting is an ethical and legal one as well as a scientific one. Professional guidelines accept the collection of vouchers where it is justified, permitted and limited to what the question requires (Sikes et al., 2016). For a first record of a species that belongs to a taxonomically difficult group, one or two vouchers are normally defensible. For a threatened species that is readily identified, a biopsy and photographs may be the better course. Whatever is decided, the report should state it and give the permit under which the work was done.

4. What the Report Should Contain

Table 1 lists the elements that allow a reader to verify and reuse a record. Most are routine in good field practice (Kunz and Parsons, 2009); the purpose of setting them out is that short notes frequently omit one or more.

Table 1: Elements of a verifiable distribution record for a fruit bat

Element	Minimum to report	Reason
Identification	Diagnostic characters used and the species they exclude	Shows how similar species were ruled out
Measurements	Forearm length, body mass, sex, age class, reproductive state	Allows comparison with published ranges
Voucher or sample	Collection name and catalogue number; sequence accession	Makes the record re-examinable
Locality	Coordinates, datum, uncertainty, elevation, place name	Permits accurate mapping
Capture details	Date, method, net height, effort	Indicates how detectable the species was
Habitat	Patch size, forest type, condition, nearest continuous forest	Needed to interpret the record
Context	Nearest previous records and their sources	Defines what is new

Two of these deserve comment. Identification by DNA barcode, the comparison of a standard fragment of the mitochondrial cytochrome *c* oxidase I gene with a reference library (Hebert *et al.*, 2003), is now inexpensive and should accompany morphological identification wherever a sample exists. It is only as good as the library: a match to a reference sequence that was itself misidentified proves nothing, so the report should name the reference sequences and say whether they derive from vouchered material. Locality data should follow a recognised standard. Georeferencing guidelines explain how to record coordinates with their datum and uncertainty (Chapman and Wieczorek, 2006), and the Darwin Core terms provide field names under which the record can pass into shared databases without loss (Wieczorek *et al.*, 2012).

5. Interpreting a Record From a Forest Fragment

A new locality invites the phrase "range extension", which implies that the species has moved. More often it has simply been found. Fruit bats do not use the laryngeal echolocation that lets insectivorous bats be surveyed with acoustic detectors, so they are recorded mainly by netting, and ground-level nets miss species that forage in the canopy. A species may therefore have been present throughout a region and unrecorded for want of canopy nets or of any survey at all. The report should describe earlier survey effort in the area, so that readers can judge whether absence from previous lists means anything.

Fragmentation complicates the reading further. Pteropodids are strong fliers and many cross open country between feeding sites, so an individual netted in a small patch may roost and breed elsewhere. Reviews of bat responses to fragmentation find that outcomes vary widely among species and depend on the surrounding matrix as much as on patch size (Meyer *et al.*, 2016). One capture does not show that a fragment supports a population. Evidence that would, such as pregnant or lactating females, juveniles, repeated captures across seasons or a located roost, should be reported if available and its absence acknowledged if not. Claims about the conservation value of the patch ought to be proportionate to that evidence.

6. Conclusion

A distribution record is a small contribution that others will build on, and it should be made to bear the weight. For fruit bats in fragmented lowland forest that means an identification supported by stated characters, measurements and where possible a sequence; a voucher or sample lodged where it can be consulted; a locality recorded to a published standard; and an interpretation that separates what was observed from what is inferred about range or population. Editors and reviewers can help by asking for

these elements as a condition of publication.

Conflict of interest

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References

- Chapman, A.D. and Wieczorek, J. (eds) (2006). [Guide to Best Practices for Georeferencing](#). Global Biodiversity Information Facility, Copenhagen.
- Francis, C.M., Borisenko, A.V., Ivanova, N.V., Eger, J.L., Lim, B.K., Guillén-Servent, A., Kruskop, S.V., Mackie, I. and Hebert, P.D.N. (2010). [The role of DNA barcodes in understanding and conservation of mammal diversity in Southeast Asia](#). *PLoS ONE*, 5: e12575. <https://doi.org/10.1371/journal.pone.0012575>
- Fujita, M.S. and Tuttle, M.D. (1991). [Flying foxes \(Chiroptera: Pteropodidae\): threatened animals of key ecological and economic importance](#). *Conservation Biology*, 5: 455-463.
- Hebert, P.D.N., Cywinska, A., Ball, S.L. and deWaard, J.R. (2003). [Biological identifications through DNA barcodes](#). *Proceedings of the Royal Society B: Biological Sciences*, 270: 313-321. <https://doi.org/10.1098/rspb.2002.2218>
- IUCN (2012). [IUCN Red List Categories and Criteria: Version 3.1, 2nd edition](#). International Union for Conservation of Nature, Gland and Cambridge.
- Kunz, T.H. and Parsons, S. (eds) (2009). [Ecological and Behavioral Methods for the Study of Bats, 2nd edition](#). Johns Hopkins University Press, Baltimore.
- Meyer, C.F.J., Struebig, M.J. and Willig, M.R. (2016). [Responses of tropical bats to habitat fragmentation, logging, and deforestation](#). In: Voigt, C.C. and Kingston, T. (eds), *Bats in the Anthropocene: Conservation of Bats in a Changing World*. Springer, Cham, pp. 63-103.
- Mickleburgh, S.P., Hutson, A.M. and Racey, P.A. (1992). [Old World Fruit Bats: An Action Plan for their Conservation](#). International Union for Conservation of Nature, Gland.
- Sikes, R.S. and the Animal Care and Use Committee of the American Society of Mammalogists (2016). [2016 Guidelines of the American Society of Mammalogists for the use of wild mammals in research and education](#). *Journal of Mammalogy*, 97: 663-688. <https://doi.org/10.1093/jmammal/gyw078>
- Whittaker, R.J., Araújo, M.B., Jepson, P., Ladle, R.J., Watson, J.E.M. and Willis, K.J. (2005). [Conservation biogeography: assessment and prospect](#). *Diversity and Distributions*, 11: 3-23. <https://doi.org/10.1111/j.1366-9516.2005.00143.x>
- Wieczorek, J., Bloom, D., Guralnick, R., Blum, S., Döring, M., Giovanni, R., Robertson, T. and Vieglaiss, D. (2012). [Darwin Core: an evolving community-developed biodiversity data standard](#). *PLoS ONE*, 7: e29715. <https://doi.org/10.1371/journal.pone.0029715>

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