Mapping the Void: An In-depth Analysis of the VertNet Database to Unearth Global Gaps in Avian Specimen Collections

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Background

Museum and Natural history collections are important, essential and invaluable source of earth history's biodiversity information. Museum collections, often spanning centuries, represent a treasure trove of biological specimens and data. The specimens in natural history collections serve as the basis for numerous fields of basic science and research. Natural history collections also contain deep, taxon-specific information derived from global populations of plants, animals, fungi, and microorganisms. (Hope, Sandercock, and Malaney 2018; Johnson et al. 2011; Card et al. 2021) By evaluating how species evolve over time, museum specimens offer crucial baseline data for studies of conservation and emerging diseases (such as Hantavirus and West Nile Virus). The importance of museum collections lies in their ability to serve as both a historical record of life on our planet and a contemporary resource for scientific inquiry.

What initially began as cabinets filled with mounted specimens has transformed into vast, digitized repositories. With the advent of modern databases and digitization efforts, these collections are now more accessible and interconnected than ever. VertNet is one such effort to bring together museum collections records from over 250 natural-history collections. (Constable et al. 2010) VertNet, a comprehensive repository of biodiversity data,serves as an invaluable resource for assessing the state of biodiversity worldwide. The exploitation of VertNet's expansive dataset not only facilitates a profound comprehension of the immense diversity encompassed within avian taxa but also provides the tools to identify important gaps in our intellectual understanding. Through the meticulous analysis of this wealth of information, we can discern regions characterized by a dearth of avian tissue collections, taxonomic groups that remain underrepresented in scientific investigations, and temporal gaps. These conclusions play a crucial part in determining how future specimen collection initiatives will proceed.

Data

Vertnet data base is well organised and freely available from their cloud platform and can be downloaded/accessible from their website and aves database can be downloaded from here.

Questions

VertNet has developed and deployed couple of their own pipeline and packages for data manipulation.

1) Where are the major data gaps in terms of specimen collection and tissue sample?
2) Which are the over and under represented groups/family of birds?
3) Are the global south under-represented in the museum collection?
4) Is the long-term trends in specimen accumulation increasing or decreasing?

Caveats

Although VertNet is a good source of database it is not updated since 2016.

References

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