Avian taxonomies compared

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February 2019

Recently one of my projects prompted me to compare the four major ornithological taxonomies: Clements/eBird, BirdLife International/Handbook of the Birds of the World (BirdLife/HBW), International Ornithological Committee / Union (IOC), and Howard & Moore. I thought I'd share the highlights, especially since I couldn't find similar information on the Web. First the facts & figures, then the overall conclusions.

Facts and figures

As of this writing, the four taxonomies list 11,524 bird forms among them. 162 of these have become extinct over the past five centuries. Thus if all forms were recognized as full species, we'd have 11,362 today. No taxonomic authority recognizes all of these:

- BirdLife - 11,126 species
- IOC - 10,896 (230 fewer than BirdLife)
- Clements - 10,585 (311 fewer than IOC)
- Howard & Moore - 10,175 (410 fewer than Clements, 951 fewer than BirdLife).

Currently 9,968 species, 86.5% of the 11,524 total, are recognized by all four authorities though some decisions are still contestable and changing. Scientific and English names mostly match across lists but some vary. So the prevailing taxonomic disarray is actually limited. The status of only 1556 possible species, or 13.5% of the total, is debated:

- 496 species, or 4.3% of the total, are recognized by three taxonomic authorities.

- 362 species, or 3.14%, are recognized by two authorities.

- 698 species, or 6.1%, are recognized by a single authority only.

These breakdowns vary among taxonomies:

- BirdLife: 89.6% of species shared with all others; 5.6% shared with one or two other lists; 4.8% unique to itself.

- Clements: 94.2% of species shared with all others, 5.6% with 1-2 other lists, 0.21% unique to itself.

- IOC: 91.5% of species shared with all others, 7.4% with 1-2 other lists, 1.13% unique to itself.

- Howard & Moore: 98% of species shared with all others, 1.8% with 1-2 other lists, 0.2% unique to itself.

So most authorities accept Howard & Moore species, but not vice versa. BirdLife recognizes numerous species that all others don't. IOC recognizes many species rejected by two authorities but accepted by one other authority. Clements accepts many species recognized by two or three other authorities; fewer recognized by only one other authority; and very few that no one else recognizes (same for Howard & Moore).

Of the 698 species recognized by a single authority:

- 532 occur only on BirdLife's list (this organization assesses species differently from the rest; see below).
- 123 occur only on IOC.
- 22 occur only on Clements.
- 21 occur only on Howard & Moore.

Of the 496 species recognized by three of the four authorities:

- 490 are recognized by IOC
- 427 by BirdLife
- 420 by Clements
- 151 by Howard & Moore

Thus the top three share most of these species, while Howard & Moore doesn't recognize them. Another perspective:

- 6 species are recognized by everyone except IOC.
- 69 species are recognized by everyone except BirdLife.
- 76 species are recognized by everyone except Clements.
- 345 species are recognized by everyone except Howard & Moore.

IOC readily accepts splits while Howard & Moore is far more reserved than others about this. BirdLife and Clements are intermediate.

This trend continues with the 362 species recognized by two authorities and rejected by the other two:

- 315 of these are recognized by IOC.
- 199 by BirdLife.
- 175 by Clements
- 35 by Howard & Moore.
- 160 species are recognized by BirdLife and IOC, not Clements or Howard & Moore.
- 149 species are recognized Clements and IOC, not BirdLife or Howard & Moore.
- 21 species are recognized by BirdLife and Howard & Moore, not Clements or IOC.
- 18 species are recognized by BirdLife and Clements, not IOC or Howard & Moore.
- 8 species are recognized by Clements and Howard & Moore, not BirdLife or IOC.
- 6 species are recognized by IOC and Howard & Moore, not Clements or BirdLife.

Again, most of these 2-lists-only species are `shared' among IOC (especially), Clements and BirdLife.

Another pairwise comparison: which taxonomies are most similar ? Clements and IOC are closest with 96.2% of their species overlapping, yet this is asymmetrical. IOC recognizes 365 species that Clements doesn't, while Clements recognizes only 54 species that IOC doesn't. That's because the IOC list is 311 species longer overall than Clements, and more likely to accept splits. So the overlap zone covers most of Clements but less of IOC.

BirdLife and Howard & Moore are least similar with 89.7% of species overlapping. The imbalance here is even more striking because the BirdLife list is 951 species longer than Howard & Moore. The two authorities also differ much in approach and methodology. BirdLife recognizes 1055 species that Howard & Moore doesn't, vs. 104 species recognized by Howard & Moore but not BirdLife.

The other four pair combinations are intermediate between these. BirdLife and IOC are most `balanced' since they are of similar length and don't recognize many of each other's species. BirdLife recognizes 577 species that IOC doesn't while IOC recognizes 347 species that BirdLife doesn't.

IOC recognizes most species that Clements (especially) and BirdLife do: IOC and BirdLife recognize 10,549 species between them; IOC and Clements recognize 10,531. BirdLife and Clements together, without IOC, recognize 10,337 species between them - about 200 fewer. All combinations with Howard & Moore are lower but follow the same pattern: 10,119 species with HM+IOC, 10,071 with HM+BirdLife, 10,051 with HM+Clements.

Conclusion

These are the highlights so I'll stop here with the figures (which go on). Finally, in plain English, how do the ornithological taxonomic authorities compare overall ? A reminder first: they all agree on the decisive majority of species.

Howard & Moore is decidedly the most conservative and traditional taxonomy. It doesn't recognize many lumps and splits that others do. The species it does recognize are widely accepted. Hence it is less contestable and more stable than the rest in an age of taxonomic turmoil. It serves as an unofficial benchmark. If Howard & Moore recognizes a species, in all likelihood it is well-defined and taxonomically "solid", not a debatable split.

This authority still accepts a few species that others don't recognize, or that others have split or lumped. For example, currently it is the only taxonomy that accepts Thayer's Gull, Caribbean Coot and Afghan Sparrow as full species. Website:
https://www.howardandmoore.org/

Conversely, IOC is the most liberal taxonomy. It accepts a very large proportion of proposed splits, including many that some others reject and quite a few that no one else recognizes. For example, currently it is the only taxonomy that splits the Palearctic's Common Teal (Anas crecca) from the New World's Green-winged Teal (Anas carolinensis). It is also the only one that splits both Osprey and Cattle Egret each into two species. Only six species are recognized by all authorities save IOC, e.g. Taiwan Thrush. Yet some of the species that only IOC recognizes are distinctive and this may be important for certain purposes. E.g. it splits Lava Heron from Green / Striated Heron. Website:
https://www.worldbirdnames.org/

Clements / eBird is intermediate. It recognizes many of the splits and species that IOC does, and far more than Howard & Moore. It is said to adhere to North and South American ornithological societies' checklists (AOS/AOU and SACC) more closely than the other taxonomies. However, it is circumspect about recognizing numerous (probably controversial) splits that IOC accepts, or BirdLife's independent methodology. It is evidently more inclined to accept species that at least two other taxonomies recognize.

Nevertheless, currently it doesn't accept some species that everyone else does, e.g. Red-tailed Wheatear and... Sira Barbet (Capito fitzpatricki, named for the Cornell Lab's director - manager of the Clements taxonomy). It also rejects various extinct species that other taxonomies accept. Only a few species are recognized by Clements alone, e.g. Red-billed Gull and Margelanic Whitethroat.

It is a robust taxonomy, more mainstream / standard and less contentious than the others. A natural choice for eBird. Website:
http://www.birds.cornell.edu/clementschecklist/

Birdlife / HBW is unique. It used to be very conservative taxonomically until a few years ago, when BirdLife adopted and adapted a new species assessment method. It systematically scores visual, vocal, geographic and other differences among various forms, and assigns a full species rank to those whose score exceeds a certain threshold. It also accounts for genetic differences. This method is disputed scientifically but eminently pragmatic. BirdLife also manages its taxonomy differently from the other authorities. Hence it is idiosyncratic and not as comparable to the rest.

BirdLife's list is the longest and contains the most species recognized by no one else. This is due less to acceptance of proposed splits and mostly to BirdLife's own methodology. It is slightly more split-liberal than Clements as concerns most species. It differs from Howard & Moore about as much as Clements does. However, it rejects many splits that Clements and IOC accept.

So overall, BirdLife doesn't recognize many species / splits that others do but its own splits are likewise unrecognized by others. For example, it is currently the only authority that lumps Common and Hoary Redpolls but splits Franklin's Grouse from Spruce Grouse.

BirdLife taxonomy relies more on visual, vocal and behavioral differences to define species than other authorities, and less on genetic differences (which it still considers). This is useful to various ends, e.g. conservation and birding. Website:
http://datazone.birdlife.org/species/taxonomy

With all taxonomies, subjective conventions ultimately determine what types and magnitudes of differences suffice to define a given form as a species. Therefore each authority has strengths and weaknesses.

However, the existence of multiple, independent taxonomies (and nomenclatures) engenders decentralization, non-standardization and disorganization. These undermine the very goals of biological classification and constitute a major challenge to ornithology, conservation and birding. Fortunately the problem is recognized and efforts have been undertaken to mitigate it.

Acknowledgement: I'd like to thank the International Ornithological Committee (IOC) for providing the file with the raw data used in the analysis.