

Taxonomic advances and mysteries in the OSME Region

YOAV PERLMAN, MICHAEL BLAIR & ROB SHELDON

OSME members received with their spring 2018 copy of *Sandgrouse* (40 issue 1) the newly-produced *Pocket Checklist of the Birds of OSME Region*, compiled by the present authors (Blair *et al* 2018). In this informal checklist, 1154 distinct taxa are presented. Bird species are variously defined by ornithologists. Most naturalists nevertheless have a fairly good idea what comprises a species.

However, what is a 'distinct taxon'? Why are some taxa distinct and others not? The word taxon has an interesting history. First used in 1926 in German, it was a back-formation from the long-established 'taxonomie'. It describes the hierarchy of taxonomic rank from kingdom down to subspecies, the latter being regarded as a minor rank, all above being major ranks. A quick comparison between the listed subspecies in the current Gill & Donsker IOC Worldlist (Gill & Donsker 2018), the online updated Clements (2007), currently Clements *et al* (2017), and the two volumes of Howard and Moore 4th edition (Dickinson & Remsen 2013, Dickinson & Christides 2014) reveals many cases of substantial disagreement as to how many subspecies there are: for example, cross-checking Common Pheasant *Phasianus colchicus* results in totals of 34, 29 and 30, respectively. Clearly, the distinctiveness of each subspecies was not clear cut enough for agreement.

Furthermore, the conclusions of many recent research papers have included suggestions for subspecies to be raised to species level or have argued that a population merits subspecific rank. The distinctiveness of the taxa in question may arise from such as plumage characteristics, morphology, a slew of multimethod genetic analyses or a combination of these aspects. Almost as common in these papers is the identification of a population that might also be worthy of further investigation to establish its description as a subspecies, but further work is required. In the ORL, we highlight these uncertainties to keep them in view as possibly valid 'distinct taxa', taking a broad view. In this article, we address these issues, explain in more detail how the checklist was collated, and present several examples of interesting taxa.

In recent decades, taxonomy, the science of classifying and naming groups of animals into distinct units, has advanced considerably. Nowadays, ornithologists have more available knowledge, and use better tools, that allow them to see more, find more and learn more. We see more with our better optics, and we hear more with our better sound recording systems. Major advances in genetic methods have improved quantification of genetic distances or dissimilarities to describe phylogenetic relationships between taxa. These methods have become more available to researchers as costs have been driven down. Modern techniques support many older taxonomic conclusions but necessitate considerable revision in others (Watson 2005). The latter publication set the scene for the need for integrative taxonomy of birds to be developed. Although no pragmatic definition of integrative taxonomy is yet fully accepted, a useful detailed approach is provided by Sangster (2013). Essentially, many lines of evidence are assessed, including plumage details, morphometrics, vocalizations and playback studies. Watson (2005) noted that there are no clear cut definitions of 'diagnosability' or 'distinctiveness' that cover every case. The corollary is that there are cryptic species that cannot be diagnosed as such in the field. Most can be diagnosed, often with difficulty, in the hand. Some can be diagnosed only in the laboratory.

The compilers of the OSME region list of avian taxa (ORL, www.osme.org/ORL) and its offshoots have endeavoured to emphasise where such enigmatic 'grey areas' may exist by listing the taxa affected separately, but we have done so by the use of round brackets in the species name to indicate that uncertainty exists. For example, Spotted Eagle Owl is *Bubo africanus*. Traditionally, it was regarded as having a sedentary subspecies outside Africa in Arabia, *milesi*. König & Weick (2008) suggested that *milesi* was sufficiently distinct to be elevated to species rank on allopatry, colour, size and vocalisation grounds, but more research was needed, largely due to small sample sizes. At the same time, they, Ash & Atkins (2009), and Redman *et al* (2009) made the case for splitting off Vermiculated or Greyish Eagle Owl as *B. cinerascens* from Spotted Eagle Owl. The former occurs on the African side of the Bab-el Mandab straits as far south as the equator. The latter *sensu novo* now occurs almost entirely south of the equator over the whole of southern Africa. The ORL cautiously groups Vermiculated and Spotted Eagle Owls as forming a superspecies and lists 'Arabian Eagle Owl' *B. (africanus) milesi* as likely separable from Vermiculated Eagle Owl, the round brackets indicating uncertainty (or 'don't know'). This way we keep in view a taxon that new research may confirm as a full species or otherwise. The simplified ORL, SORL and Blair *et al* (2018) follow the same general approach.

A wealth of genetic information is now available mostly in narrative form to the wider public, including conservationists and birders. Nowadays, a description of a new bird species or subspecies must include analysis of genetic information to be accepted by the scientific community. Even rarity records of cryptic or little-known birds are often accompanied by genetic information; collection of a dropped feather or even faeces is becoming an important part of fieldcraft (Collinson 2017).

There is some debate in scientific and ornithological circles about the interpretation and validity of different types of data in taxonomy and conservation *eg* DNA analysis, vocalisations, morphological differences and DNA barcoding (Ceríaco *et al* 2016, Donegan 2018, Raposo & Kirwan 2017, Tobias *et al* 2010, Kerr *et al* 2007, 2009). In any case, DNA barcoding offers new methods of identification of bird species. In the UK for example, DNA analysis of many Lesser Whitethroats *Sylvia curruca* was an eye-opener in revealing that eastern subspecies, mainly *blythi*, are regular and not so rare, mainly along the east coast of the UK in autumn (Collinson 2017). In the OSME region, *blythi* is a regular migrant through Israel, UAE and adjacent countries. Additionally, Votier *et al* 2016 showed stable isotope ratio analyses unequivocally place many museum specimens in *blythi* that had been morphologically identified & catalogued as *minula* or *halimodendri*, thus helping clarify the identity, breeding and wintering locations and movements of *curruca* group taxa.

This attention to taxonomic changes and development is important for several reasons. Conservation priorities are defined at species levels by global conservation authorities *eg* BirdLife International (BLI). Correctly diagnosing what a new species is, and unveiling cryptic species, might have significant conservation implications. For example, the sad story of the Galápagos Vermilion Flycatcher *Pyrocephalus (rubinus) dubius* becoming extinct before it was identified and described was highlighted by Carmi *et al* (2016) and serves as a reminder that cryptic populations, likely commoner than previously realised (Kerr *et al* 2009), need to be identified so that conservation threats may be countered.

OSME follows revisions in two of the three main global bird checklists. del Hoyo *et al* (2018) *ie* HBW Alive together with BLI now work to maintain a single list that is gradually updating the BLI Datazone (<http://datazone.birdlife.org/home>). This approach, initially mainly based on morphology, is now increasingly applying the integrative taxonomy approach, but has also included what is known as 'Tobias criteria' for morphological distances (Tobias *et al* 2010). Those BLI Datazone species whose threat status is low are

likely to be the last group to be reviewed by the HBW Alive/BLI list. Unfortunately, peer-reviewed publication of the detailed applications of the Tobias criteria to bird taxa lags far behind its use in books and papers.

IOC taxonomy (Gill & Donsker 2018) is seeking to minimize differences between the IOC List and the Clements/eBird checklist and so the ORL checklist committee has not followed revisions in the latter. In the IOC Reference List (www.worldbirdnames.org/ioc-lists/references/), using the 'Find' function for the publication years 2012–2018 reveals the enormous impact that genetic research results have in informing taxonomic conclusions. The ORL and our informal pocket checklist (Blair *et al* 2018) are mostly based on the IOC Checklist. However, the ORL and Blair *et al* (2018) seek to interpret what both IOC and BLI/HBW place as forthcoming updates. The ORL team often makes provisional decisions in listing likely changes to taxonomic status to keep these well in view, because a proportion of forthcoming updates are held over for one or more issues of the IOC World List.

Blair *et al* (2018) was compiled to mark the 50th anniversary of OSME, which began as the Ornithological Society of Turkey. It is intended as a helpful aide-memoire for ornithologists, but although it is derived from the simplified OSME region list, it is not intended to be a taxonomic authority. Because of space constraints in Blair *et al* (2018), some simplification was necessary, as were some compromises, such as omitting full and detailed explanation of terms, all of which can be found on the OSME website in the ORL section.

To ornithologists and birders, the ability to identify taxa in the field and thus record them is of primary importance. Nowadays, more ornithologists worldwide use global platforms, such as BirdTrack and eBird to record bird species, and in many cases, subspecies which also can be registered in those systems.

Continuous advances in our abilities to identify taxa in the field, such as by learning more about morphological and vocal differences between subspecies, allows us to record far more detail than previously was possible

Taxonomic studies and reviews have been scarcer for taxa in the OSME region, but in the last decade, large-scale studies have covered many OSME region taxa. Endemic or near-endemic OSME region taxa have been less well-served, and where those are from remote areas, the taxonomic conclusions tend to be less certain, for taxa in parts of Central Asia where distributions are poorly known, or because fewer museum specimens are available than there are in Europe. Some taxa require more fieldwork to establish whether they require targeted conservation attention, or to promote better understanding of their phylogenetic relationships. In the pocket checklist we commented on some of these understudied taxa/taxonomic groups and on others that have been recently studied, revealing new information. Subspecies currently unidentifiable in the field were not considered for inclusion in Blair *et al* (2018), but in this paper, we examine some examples of particular interest to ornithologists and birders.

SHIFTING GENERIC NAMES AND A TENTATIVE SPLIT: THE INTERMEDIATE EGRET COMPLEX *Ardea intermedia* vs *A. brachyrhyncha*

The medium-sized-egret taxon '*intermedia*', widespread in Africa, Asia and Australasia, has shuttled in placement between *Egretta* and *Mesophoyx* (eg Banks *et al* 2007, Sheldon 1987). However, Sheldon *et al* (2000) showed that it is more closely related to *Ardea*, an approach that has generally been adopted by taxonomic authorities. This species has been split by BLI and del Hoyo *et al* (2018) into three species, Intermediate Egret *A. intermedia* of South Asia and the Sundas, Yellow-billed Egret *A. brachyrhyncha* Africa and the extralimital Plumed Egret *A. plumifera* of Australia (but not yet split by IOC). The ORL justifies listing these taxa separately, with suitable caveats. The first occurs regularly in the OSME region:

intermedia breeds west to Oman and is a vagrant to United Arab Emirates. The second, *brachyrhyncha*, breeds just south of Egypt, and is a vagrant to Egypt. Morphological differences vary seasonally between these two species that occur in the OSME Region. During breeding, South Asian *intermedia* look quite different from African *brachyrhyncha* in bare part coloration, but outside the breeding season they become quite similar, though *brachyrhyncha* is somewhat larger. Both forms can undertake short- or medium-distance movements and have histories of vagrancy.

When recorded in their native range, identification is rarely a problem. However, identification of a lone vagrant in an 'intermediate location', such of the bird that comprises the sole record in Israel and Jordan, in November 2004, was more challenging as the caption for Plate 1 shows. At the time, Intermediate Egret was considered to have only two subspecies, the nominate (south India to Japan, the Sundas and Australia) and *brachyrhyncha* (southern Sudan to southern Africa) (Dickinson 2003). It was not until 2007 that it was generally accepted that a third subspecies, *plumifera*, comprised the populations of New Guinea, eastern Indonesia and Australia (Clements 2007). The 2004 vagrant had a dark tip to its upper mandible and so, on the ID information then available, the Israel rare birds committee accepted the record



Plate 1. Intermediate/Yellow-billed Egret *Egretta intermedia/brachyrhyncha*, Yotvata, Israel, November 2004 (image as originally titled). © Rami Mizrachi

without reference to subspecies identification (see www.israbirding.com/irdc/bulletins/bulletin_6/). Likewise, the Jordan rare birds committee reached the same decision, but since their published checklist has not been updated since 2016 (www.jordanbirdwatch.com/jbw-birdlist.html), they appear not to have reviewed that record. Based on ORL entries covering Egypt's Nile valley south of Aswan, there is a trend indicating that bird species from Sudan increasingly are appearing there eg African Openbill *Anastoma lamelligerus*. It is therefore useful to ensure the correct identity of vagrants or range extensions of birds of African origin.

It is worth mentioning that taxonomic uncertainty applies, or has applied, to other herons of the OSME region, including Western and Eastern Cattle Egrets *Bubulcus ibis* and *B. coromandus*, Western and Eastern Great Egrets *Ardea a. alba* and *A. a. modesta* and Reef Egrets *Egretta (gularis) gularis, schistacea & dimorpha*. There is an urgent need for a review of the Reef Egret complex and its relationship with Little Egret *E. garzetta* (Parkin & Knox 2010).

PURPLE 'CHICKENS'—HOW MANY SPECIES?

The superspecies Purple Swampphen *Porphyrio porphyrio* has had a volatile taxonomic history of splits and lumps. This taxon radiated from Africa to all corners of the globe, even evolving into flightless taxa on remote islands (Garcia & Trewick 2015). Originally, most authors grouped all the taxa under the English name Purple Gallinule (now used for Nearctic populations). Across the range of Purple Swampphen, from Africa and Iberia across Asia to Australasia and islands in the Pacific, at least 17 races have been described, pictured in pages 39–40 in del Hoyo & Collar (2014). In the OSME region, at least three taxa



Plate 2. African Swamphen *Porphyrio (p.) madagascariensis*, Judean plains, Israel, August 2015. © Ezra Hadad



Plate 3. Grey-headed Swamphen *Porphyrio (p.) poliocephalus*, Kuwait, August 2016. © Mike Pope

occur: Iberian *porphyrio* is a vagrant, African *madagascariensis* (Plate 2) breeds in Egypt, Israel and S Arabia; Asian *poliocephalus* (Plate 3) occurs west to Iraq and Kuwait. Another group, *seistanicus*, possibly breeds (once bred?) in Turkey and the Caspian region. These groups differ considerably in upperpart and head colours and have at times been considered separate species. However, current knowledge shows significant morphological variation within groups, indicating some gene flow between them (del Hoyo & Collar 2014). The ORL aligned first with Garcia & Trewick (2015), whose conclusions were supported by the IOC World Bird List. Thus, we now have African Swamphen *P. madagascariensis*, Purple Swamphen *P. porphyrio* and Grey-headed Swamphen *P. poliocephalus* (in which is subsumed *seistanicus*) in the OSME Region. Garcia & Trewick (2015) noted that many recent papers have revealed the variability of influence of gene flow, making the idea of a 'one size fits all' approach to taxonomic identity unsupportable. They also noted a thorough evaluation of species limits in this superspecies is still needed.

STRIX MYSTERIES

Until a few years ago, foreign birders visiting southern Israel had 'Hume's Owl' high on their wishlist. In 2013, the 'sound approach' team made an exciting discovery of an unknown *Strix* owl in the El-Hajar mountains in northern Oman, and provisionally classified it as *S. omanensis* (Robb *et al* 2013). This discovery reignited the debate on the validity of species described based on photographs and sound recordings only, without physical samples (Shatalkin & Galinskaya 2017), but it also led to a reevaluation of Middle Eastern desert *Strix* taxonomy. First, the owl from northern Oman was found to be genetically and morphologically identical to the type specimen (from Ormara, Pakistan) of *S. butleri* (Plate 4) and so this new taxon at first was accepted under the English name Hume's



Plate 4. Omani Owl *Strix butleri*, Al Hajjar mountains, Oman. © Arnoud B van den Berg/The Sound Approach



Plate 5. Desert Owl *Strix hadorami*, Wadi el Gemal, Egypt, February 2017. © Mohamed Habib

Owl. It subsequently was found in several locations in northern Iran and Baluchistan, Pakistan (Robb *et al* 2016). Consequently, it was necessary to review and reevaluate older and recent data for the populations in Israel, Jordan, Sinai and across much of Arabia. The unequivocal conclusion was that they belonged to a separate species from *S. butleri*. These are now considered as Desert Owl *S. hadorami* (Plate 5), named after the Israeli ornithologist Hadoram Shirihai, who had been the first to note morphological differences between *butleri* and *hadorami* (Kirwan *et al* 2015). Hume's Owl, for reasons of avoiding confusion with past records, is now more generally known as Omani Owl.

LITTLE AND GREEN

Bee-eaters are one of the most colourful and charismatic bird groups in the Old World. Most *Merops* species are found in Africa south of the Sahara, and in the Orient. In the OSME region only a few species are represented. Traditionally, the



Plate 6. Arabian Green Bee-eater *Merops [o.] cyanophrys*, Judean desert, Israel, December 2010. © Yoav Perlman

small and green bee-eaters breeding in the desert regions of OSME were named 'Little Green Bee-eater'. Marks *et al* (2007) reviewed the molecular phylogenetics of bee-eaters and did not recommend splitting *M. orientalis*. Several years later HBW and BLI adopted a three-way split, based on distinct morphological differences and geographic allopatry. IOC has not adopted this split, citing a lack of sufficient genetic differences between the taxa. Nevertheless, the ORL lists these taxa separately, with necessary caveats. All three taxa are represented in the OSME region: Asian Green Bee-eater *M. [o.] orientalis* breeds west to Iran, African Green Bee-eater *M. [o.] viridissimus* breeds along the Nile north to Egypt, and Arabian Green Bee-eater *M. [o.] cyanophrys* (Plate 6) breeds in Arabia and S Israel and so becomes a regional endemic.

BLACK ENIGMA

In the basalt desert, El-Harra, of southern Syria and northern Jordan, breeds a very special bird—the Basalt Wheatear *Oenanthe (lugens) warriiae* (Plate 7). This bird, discovered only in the 1960s, has been climbing up the taxonomic ladder since then as more data have been uncovered, and might finally reach full species status. In the first field guides and publications, these dark wheatears were regarded as dark morph Variable Wheatear *O. picata*, following the pioneering work of James Ferguson-Lees and Ian Wallace (Wallace 1983). Those wheatears breeding in Jordan were indeed very similar to what was known back then about Variable Wheatear, as described in the comprehensive studies of Evgeniy Panov (Panov 1992). Subsequently, it was thought to be a dark morph of Mourning Wheatear *O. lugens* (Svensson *et al* 2009). Then it was recognised as *O. l. warriiae*, a subspecies of Mourning Wheatear (Shirihai *et al* 2011). Finally, Shirihai & Svensson (2018) recently suggested recognising this enigmatic taxon as a full species.

Little is known about the conservation status of the Basalt Wheatear and about its movements. It is a rare winter visitor to southern Israel, and there are a few records along the Red sea coast of Egypt (Perlman 2016). Once a widespread breeding species in northern Jordan, targeted searches in their former breeding range revealed that their densities there are extremely low (Khoury *et al* 2010), and they are now completely absent from parts of their former range in Jordan (Hadoram Shirihai pers comm). Their status in Syria is unknown. It is possible that combined effects of political and civil unrest, overgrazing and prolonged droughts drove this taxon from lower elevations in Jordan to higher elevations of the El-Harra desert in Syria. Hadoram Shirihai (pers comm) speculated that few hundred pairs remain. If Basalt Wheatear gets officially recognised as a full species, it will probably become one of the rarest and most threatened breeding bird species in the OSME region.



Plate 7. Basalt Wheatear *Oenanthe (lugens) warriiae*, Negev, Israel, November 2017. © Yoav Perlman

FINAL WORDS

We believe exciting times lie ahead. Many more discoveries await, including clarifications of current mysteries. Further species groups require attention from researchers: examples are 'large white-headed gulls', Nubian Nightjar, Long-billed Pipit and 'large grey shrikes'. With advances in science, we expect Blair *et al* (2018) will become rapidly outdated. However, the 'live' and twice-yearly updated ORL forms the basis of our documentation of OSME's bird taxa. New splits and lumps arising from taxonomic research and reviews will be referenced there, adding to the present total of c1750, covering 1165 taxa. We believe that many future confirmed changes will be largely in line with any provisional arrangement in the current ORL, SORL and the informal Blair *et al* (2018). After all, we believe that the ORL has had a decent track record of confirmation of such arrangements since version 1.0 in 2006!

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LITERATURE CITED

- Ash, J & J Atkins. 2009. *Birds of Ethiopia and Eritrea*. Christopher Helm/A&C Black, London.
- Banks, RC, RT Chesser, C Cicero, JL Dunn, AW Kratter, IJ Lovette, ... & DF Stotz. 2007. Forty-eighth supplement to the American Ornithologists' Union check-list of North American birds. *Auk* 124: 1109–1115. doi:10.1642/AUK-16-77.1
- Blair, M, Y Perlman & R Sheldon (compilers). 2018. Pocket Checklist of the birds of OSME Region. OSME, UK.
- Carmi, O, CC Witt, A Jaramillo, & JP Dumbacher. 2016. Phylogeography of the Vermilion Flycatcher species complex: Multiple speciation events, shifts in migratory behavior, and an apparent extinction of a Galápagos-endemic bird species. *Molecular Phylogenetics and Evolution* 102: 152–173. doi:10.1016/j.ympev.2016.05.029
- Ceriaco, LMP, EE Gutiérrez & A Dubois. 2016. Photography-based taxonomy is inadequate, unnecessary, and potentially harmful for biological sciences. *Zootaxa* 4196: 435–445. doi:10.11646/zootaxa.4196.3.9
- Clements, JF. 2007. *The Clements Checklist of the Birds of the World*. 6th edn. Christopher Helm, London.
- Clements, JF, TS Schulenberg, MJ Iliff, D Roberson, TA Fredericks, BL Sullivan, and CL Wood. 2017. *The eBird/Clements checklist of birds of the world*. 2017 version. www.birds.cornell.edu/clementschecklist/download/
- Collinson, JM. 2017. CSI: Birding—DNA-based identification of birds. *British Birds* 110: 8–26.
- Donegan, TM. 2018. What is a species? A new universal method to measure differentiation and assess the taxonomic rank of allopatric populations, using continuous variables. *Zoo Keys* 757: 1–67. doi: 10.3897/zookeys.757.10965 <http://zookeys.pensoft.net>
- Dickinson, EC. 2003. *The Howard and Moore Complete Checklist of the Birds of the World*. 3rd edn. Christopher Helm, London.
- Dickinson, EC & L Christidis. 2014. *The Howard and Moore checklist of Birds of the World*. 4th edn. Vol 2. *Passerines*. Aves Press, Eastbourne, UK.
- Dickinson, EC & JV Remsen Jr (eds). 2013. *The Howard and Moore checklist of Birds of the World*. 4th edn. Vol 1. *Non-Passerines*. Aves Press, Eastbourne, UK.
- García-R, JC & SA Trewick. 2015. Dispersal and speciation in purple swamphens (Rallidae: Porphyrio). *Auk* 132: 140–155. doi:10.1642/AUK-14-114.1
- Gill, F & D Donsker. 2018. *IOC World Bird List* (v8.1). www.worldbirdnames.org/.
- del Hoyo, J & NJ Collar. 2014. *Illustrated Checklist of the Birds of the World*. Vol 1. Lynx Edicions, Barcelona.
- del Hoyo, J, A Elliott, J Sargatal, DA Christie & E de Juana. 2018. *Handbook of the Birds of the World Alive*. <https://www.hbw.com/>.
- Kerr, KCR, SM Birks, MV Kalyakin, YA Red'kin, EA Koblik & PDN Hebert. 2009. Filling the gap - COI barcode resolution in eastern Palearctic birds. *Frontiers in Zoology* 6: 29–42.

- Kerr, KCR, MY Stoeckle, CJ Dove, LA Weigt, CM Francis & PDN Hebert. 2007. Comprehensive DNA barcode coverage of North American birds. *Molecular Ecology Notes* 7(4): 535–543. doi: 10.1111/j.1471-8286.2006.01670.
- Khoury, F, M Förschler, M Janaydeh, M Aliabadian & AP Al-Hmoud. 2010. Distribution, habitat and differentiation of the poorly-known black morph of Mourning Wheatear *Oenanthe lugens* in Jordan. *Sandgrouse* 32: 113–119.
- Kirwan, GM, M Schweizer & JL Copete. 2015. Multiple lines of evidence confirm that Hume's Owl *Strix butleri* (AO Hume, 1878) is two species, with description of an unnamed species (Aves: Non-Passeriformes: Strigidae). *Zootaxa* 3904: 28–50.
- König, C & F Weick. 2008. *Owls of the World*. 2nd edn. Helm, London.
- Marks, BD, JD Weckstein & RG Moyle. 2007. Molecular phylogenetics of the bee-eaters (Aves: Meropidae) based on nuclear and mitochondrial DNA sequence data. *Molecular Phylogenetics and Evolution* 45: 23–32. doi:10.1016/j.ympev.2007.07.004
- Panov, EN. 1992. Emergence of hybridogenous polymorphism in the *Oenanthe picata* complex. *Bulletin of the British Ornithologists' Club Centenary Supplement* 112A: 237–249.
- Parkin, DT & AG Knox. 2010. *The Status of Birds in Britain and Ireland*. Helm/A&C Black, London.
- Perlman, Y. 2016. The black ghost. *Birdwatch*, June 2016: 65–69.
- Raposo, MA & GM Kirwan. 2017. What lies beneath the controversy as to the necessity of physical types for describing new species? *Bionomina* 12: 52–56. doi:10.11646/bionomina.12.1.6
- Redman, N, T Stevenson & J Fanshawe. 2009. *Birds of the Horn of Africa*. Christopher Helm/A&C Black, London.
- Robb, MS, AB van den Berg & M Constantine. 2013. A new species of *Strix* owl from Oman. *Dutch Birding* 35: 275–310.
- Robb, MS, G Sangster, M Aliabadian, AB van den Berg, M Constantine, M Irestedt, ... & AJ Walsh. 2016. The rediscovery of *Strix butleri* (Hume, 1878) in Oman and Iran, with molecular resolution of the identity of *Strix omanensis* Robb, van den Berg and Constantine, 2013. *Avian Research* 7: 1–10. doi:10.1186/s40657-016-0043-4
- Sangster, G. 2013. Integrative taxonomy of birds: Studies into the nature, origin and delimitation of species. Ph.D thesis. Stockholm University (Faculty of Science, Department of Zoology). URN: urn:nbn:se:su:diva-96049. ISBN: 978-91-7447-818-1 (print)
- Shatalkin, AI & TV Galinskaya. 2017. A commentary on the practice of using the so-called typeless species. *ZooKeys* 693: 129–139. doi:10.3897/zookeys.693.10945
- Sheldon, FH. 1987. Phylogeny of herons estimated from DNA-DNA hybridization data. *Auk* 104: 97–108.
- Sheldon, FH, CE Jones & KG McCracken. 2000. Relative patterns and rates of evolution in heron nuclear and mitochondrial DNA. *Molecular Biology and Evolution* 17: 437–450. doi:10.1093/oxfordjournals.molbev.a026323
- Shirihai, H, GM Kirwan & AJ Helbig. 2011. A new taxon in the Mourning Wheatear *Oenanthe lugens* complex. *Bulletin of the British Ornithologists' Club* 131: 270–291.
- Shirihai, H & Svensson, L. 2018. *Handbook of Western Palearctic Birds (Passerines)*, Helm/Bloomsbury, London.
- Svensson, L, K Mullarney & D Zetterström. 2009. *Birds of Europe*. 2nd edn. Princeton University Press, USA.
- Tobias, JA, N Seddon, CN Spottiswoode, JD Pilgrim, LDC Fishpool & NJ Collar. 2010. Quantitative criteria for species delimitation. *Ibis* 152: 724–746. doi:10.1111/j.1474-919X.2010.01051.x
- Votier, SC, S Aspinall, S Bearhop, D Bilton, J Newton, P Alström, P Leader, G Carey, RW Furness & U Olsson. 2016. Stable isotopes and mtDNA reveal niche segregation but no evidence of intergradation along a habitat gradient in the Lesser Whitethroat complex (*Sylvia curruca*; Passeriformes; Aves). *Journal of Ornithology* 157: 1017–1027.
- Wallace, DIM. 1983. The first identification of the Eastern Pied Wheatear in Jordan. *Sandgrouse* 5: 102–104.
- Watson, DM. 2005. Diagnosable versus Distinct: Evaluating Species Limits in Birds. *BioScience* 55(1): 60–68.

Yoav Perlman, yoav.perlman@gmail.com.

Michael Blair, blair@dialstart.net.

Rob Sheldon, vanellus1970@yahoo.co.uk.