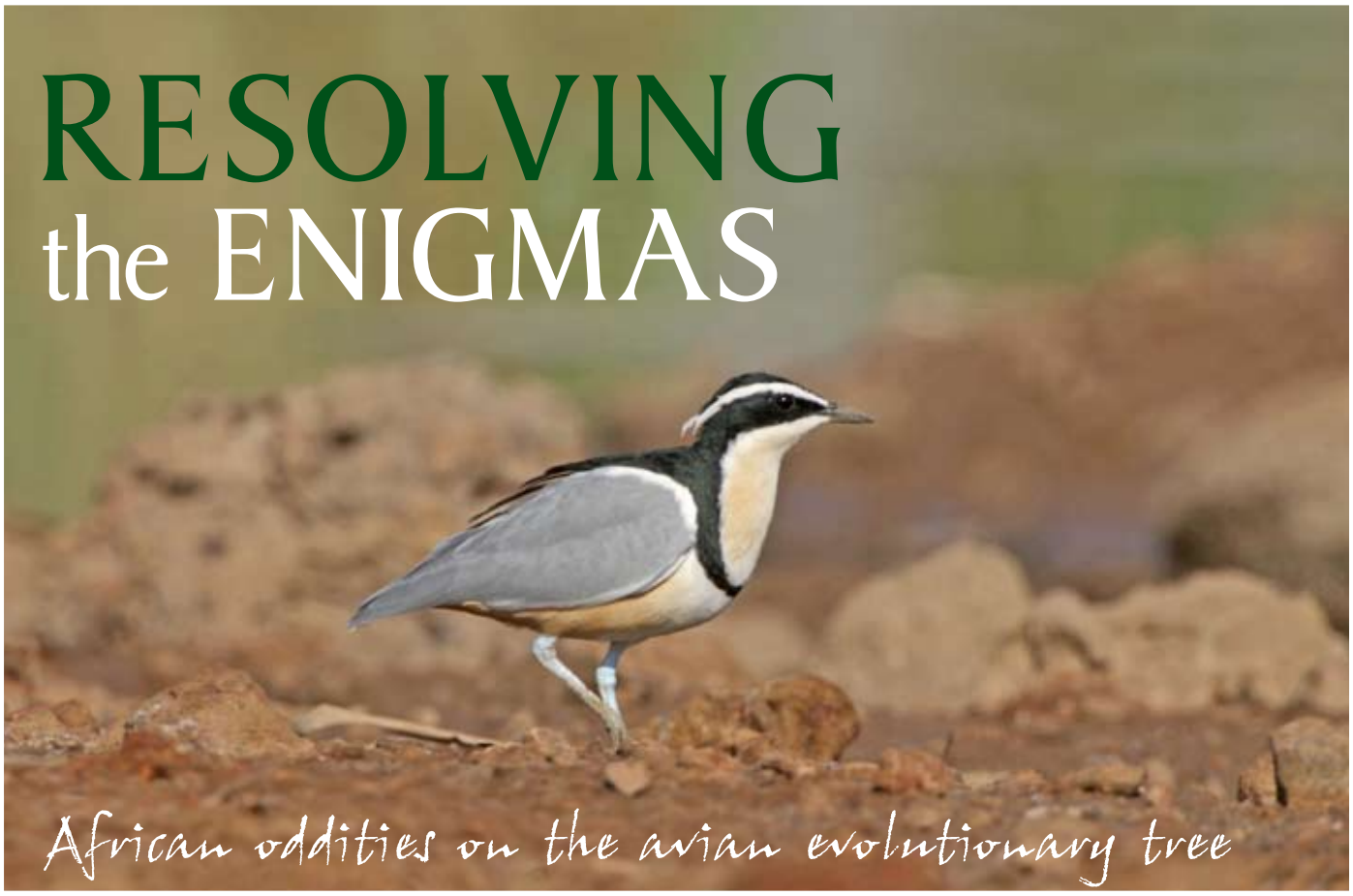
RESOLVING the ENIGMAS



African oddities on the avian evolutionary tree

DIGITALSOURCE/MINDEN/BILL BASTON

One of the most interesting aspects of birding is speculating how the fascinating diversity of birds arose and quite what the affinities are of some of the enigmatic species that lack obvious relatives. Genetic evidence provides an objective way to assess these relationships. Spurred on by the need to update Sinclair & Ryan's field guide *Birds of Africa South of the Sahara*, **Peter Ryan** summarises some of the latest findings from an African perspective.

Until recently, attempts to infer the relationships among all organisms, the so-called 'Tree of Life', seemed to be very ambitious. However, the rapid technological advances in genetic sequencing have brought them closer to reality. Where once relationships were based on the comparison of a few hundred base pairs, usually from a single gene, studies today compare thousands of base pairs from multiple genes in both the nuclear and the mitochondrial genomes. The results obtained are more robust and we are rapidly converging on a new understanding of the evolutionary history of life. Birds have been at the forefront of this research, and new surprises continue to emerge.

At the macro scale, there have been major changes in the way that birds are classified. The deep relationships among bird orders remain poorly resolved, probably because the radiation of major lineages was rapid, but the latest classification recognises 39 orders and 222 families of birds – many more than was the case even a decade ago. In terms of endemic orders, the Afrotropics come out tops, with three orders confined to the continent (ostriches, turacos and mousebirds) and two more on Madagascar and adjacent islands (mesites and the Cuckoo-Roller *Leptosomus discolor*). The only other biogeographic regions with endemic bird orders are South America with four (rheas, tinamous, seriemas and Hoatzin *Opisthocomus hoazin*) and one each in Australasia (cassowaries) and New Zealand (kiwis).

At a family level, the southern hemisphere continues to dominate, indicating the likely origins of most bird diversity in the south. However, the greatest concentration of endemic families is found in Oceania, with 28 families confined to Australasia, six more in New Zealand and one on New Caledonia. South America and the Afrotropics are tied in second place, with 28 endemic families (23 in continental Africa and five Malagasy endemics). By comparison, the northern hemisphere supports few endemic families: there are 12 in Eurasia, six spread across the Holarctic, two in North America and two in the Caribbean.

In the Afrotropics, the number of endemic families has doubled since 2000. Two new monotypic families are now recognised: the Shoebill *Balaeniceps rex* (Balaenicipitidae), now known to be closer to the pelicans than the storks, and the Egyptian Plover *Pluvianus aegyptius* (Pluvianidae), previously allied with the coursers and pratincoles, but now ▷

MARTIN HARVEY

Above *The charismatic Shoebill is now placed in its own family, the Balaenicipitidae, one of many 'new' families confined to Africa.*

Previous page *The Egyptian Plover, previously placed with the coursers and pratincoles, is now also in its own monotypic family, the Pluvianidae.*

known to be a separate lineage basal to the plovers and stilts.

Among other changes to the non-passerines are wholesale modifications to the composition of the Gruiformes, long acknowledged to be a catch-all for a suite of at best poorly related bird groups. New orders have been formed for the bustards (Otidiformes), mesites (Mesitornithiformes), seriemas (Cariamiformes) and Kagu *Rhynochetos jubatus* and Sunbittern *Eurypyga helias* (Eurypygiformes), while the button-quails (Turnicidae) have been moved to the Charadriiformes. But the most surprising finding among the Gruiformes is that the flufftails appear to be closer to finfoots than to other rails and crakes. As a result they are now placed in their own family, the Sarothruridae, which is yet another family confined to the Afrotropics.

Most other changes have been among the passerines. Three new African endemic families have been recognised among shrike-like birds, in the batises and wattle-eyes (Platysteiridae), helmet-shrikes (Prionopidae) and bush-shrikes

The hyliotas, such as these Violet-backed Hyliotas, were long considered to be warblers, but are now known to be a separate radiation with no close relatives.

African barbets, such as this Yellow-billed Barbet, have been accorded family status, distinct from the Asian barbets and the Neotropical barbets and toucans.

(Malaconotidae). More interesting is the placement of the nicators, a group that over the years has been shuffled back and forth between the bulbuls and bush-shrikes. As is often the case, the genetic evidence indicates that they are not closely allied to either group. Nicators appear to be distantly related to the larks and Bearded Reedling *Panurus biarmicus* at the base of the sylvioid radiation and are placed in their own family, Nicatoridae. Another endemic African family has been recognised for the hyliotas, Hyliotidae. Traditionally placed among the warblers, hyliotas are basal to the passeroid radiation, with no close relatives.

The São Tomé Short-tail isn't a warbler but a motacillid that has adapted to the dense rainforest on the Gulf of Guinea island.

Recent work has confirmed earlier suggestions that the Old World warblers need major revision. At least eight families are now recognised, including two endemic to the Afrotropics: a Malagasy radiation (Bernieridae) and a still-to-be-named African family that includes the crombecs, longbills, Victorin's Warbler *Cryptillas victorini*, Cape Grassbird *Sphenoeacus afer*, Moustached Grass-Warbler *Melocichla mentalis* and Rockrunner *Achaetops pycnopygius*. Further work is needed to resolve how best to treat the *Sylvia* warblers and the closely related babblers, laughing-thrushes and white-eyes.

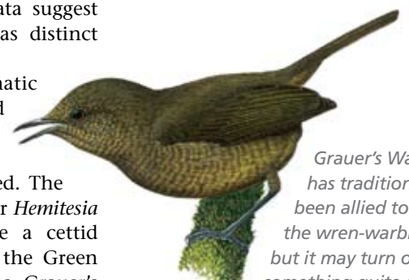
Not all developments have been at higher taxonomic levels. The peculiar São Tomé Short-tail *Amaurocichla bocagei*, usually considered to be a warbler perhaps related to the longbills, turns out to be a highly derived motacillid, allied to the wagtails and pipits. This concurs with its pipit-like gait and shows how amazingly adaptable some birds are when faced with a completely alien environment. Another enigmatic Gulf of Guinea endemic, Dohrn's Thrush-Babbler *Horizorhinus dorhni* from Príncipe, is related to the African Hill Babbler *Pseudoalcippe abyssinica* and the *Sylvia* warblers. However, the Grey-chested Illadopsis *Kakamega poliothorax* is not a babbler like the other illadopsises, but is linked to the modulatrixes, Spot-throat *Modulatrix stictigula*

The Short-tailed Warbler is thought to be a cettid warbler, perhaps allied to the Green Hylia, but there is as yet no genetic evidence to confirm this.

and Dapple-throat *Arcanator orostruthus*. Bizarrely, these three forest-understorey skulkers are most closely related to the sugarbirds. Some authorities even place them in the same family, Promeropidae. Whether this unlikely pairing persists probably depends on whether other birds are found to belong to this group. The rock-jumpers and rockfowl were initially placed in the same family when their genetic similarity was first detected, but subsequent data suggest that they are best treated as distinct families (see overleaf).

Many of Africa's enigmatic birds have now been placed with reasonable confidence on the avian tree of life, but a few remain to be examined. The exquisite Short-tailed Warbler *Hemitesia neumanni* is thought to be a cettid warbler, possibly related to the Green Hylia *Hylia prasina*, whereas Grauer's Warbler *Graueria vittata*, another Albertine Rift endemic, is usually placed with the wren-warblers *Calamonastes* in the Cisticolidae, although some have suggested that it too may be a cettid warbler. Finding out where they belong awaits the collection of blood samples.

And the surprises are unlikely to end once all the oddities have been assessed. Routine sampling within seemingly uniform groups may throw up unexpected results, like the Olive Warbler *Peucedramus taeniatus*, which was thought to be a fairly typical New World warbler until genetic evidence showed that it belongs to a quite distinct lineage. It is now placed in its own family, Peucedramidae. ▷



Grauer's Warbler has traditionally been allied to the wren-warblers, but it may turn out to be something quite different.

Stay up to date

Keeping up with the latest developments in bird systematics can be challenging. One useful resource is the IOC World Bird List (*www.worldbirdnames.org*). In addition to providing a standard set of English names for all the world's birds, it summarises the latest taxonomic decisions, including splits, lumps and higher-level rearrangements, supported by references to the relevant literature. Consider adding the site to your 'bookmarks' bar.

Illustrations reproduced from *Birds of Africa South of the Sahara* by Ian Sinclair and Peter Ryan, with the kind permission of Philip and David Chamberlain and Struik Nature. The second edition of this title will be available from September 2010.