

# Harriers

## Skydancing through time

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Harriers... For some, they conjure up lazy days on a wind-swept grassland, watching a lone marsh harrier slowly and buoyantly quartering the dips and hollows, meticulously searching for mammals and the unwary bird before disappearing into the heat haze.

For others, a day in the Cape's fynbos may reveal a rare jewel, the stunning jet-black-and-white Black Harrier, skydancing majestically overhead before descending into a protea-covered valley to search for quail or mice.

Going further afield one can visit the Scottish moors, where 'harrier' is a dirty word and the Hen Harrier is pitted against the gamekeeper's gun; even further afield one can visit the grasslands of India where roosts of a thousand harriers can boggle the mind.



*Diving, twisting and calling in their remarkable skydancing display, Black Harriers mark their territories and simultaneously advertise to prospective mates.*

WENDY DENNIS



Occurring worldwide, harriers are elusive, a quality adding to their mystique, for they are alone in the raptor world as being the only genus in which polygyny – a male pairing with two or more mates – is regular. Three species – the Hen, Northern and European Marsh harriers – commonly practise polygyny, while several others do so at lower levels.

It is this trait that started me on a harrier odyssey which led me in the footsteps of great naturalists such as Eddie Balfour in Orkney and Frances Hamerstrom in North America, and found me finally and firmly on the African continent. My quest was not to repeat what they had already uncovered, but to delve into other aspects of

harrier ecology (such as the polygyny), to explain why some females continue to pair with an already mated male and leave fewer copies of themselves than they would with a monogamous male, and to understand first-hand why harriers in southern climes lay fewer eggs and rear fewer offspring than their northern cousins.

At a more fundamental level I also wanted to have first crack at determining how many species of harrier there are in the world, and in the process clear up the confusion around the world's five marsh harriers, all originally designated as subspecies of the European Marsh Harrier.

Now, 20 years after the journey began, I am able to provide some answers to those questions. So how many harriers are there, do new species lurk around the world to frustrate or galvanise the globe-trotting birder, and why is polygyny so common in this group?

Twenty-seven years ago the Dutch taxonomist Ebel Nieboer proposed 10 species of harrier: from Europe and eastern Russia, the Hen, European Marsh, Montagu's and Pallid; from the African continent, the African Marsh and Black harriers; from Siberia and Mongolia the striking Pied Harrier; from Australia the only tree-nesting species, the Spotted Harrier; and from South America, the Cinereous and Long-winged harriers. Fifteen years later three new species were added by American researchers Dean Amadon and John Bull. They recognised as full species the Madagascar/Réunion Harrier of the Indian Ocean Islands, and the two marsh harriers in the eastern hemisphere: the Eastern Marsh and Australasian Marsh harriers. (As a reflection of the uncertainty of the affinities of the Australian harriers, taxonomists there named the Australasian Marsh Harrier *Circus approximans*, meaning 'approximately like other harriers' and the Spotted Harrier *Circus assimilis*, meaning 'similar to other harriers' – names that don't fill one with much faith in the taxonomic process.)

Now 12 years on, with the assistance of Professor Michael Wink and his colleagues in the genetics labs of Heidelberg University, we can reveal with more certainty yet another three 'hidden' species. We can also reveal the ancestry of southern Africa's own endemic (and particularly tissue-shy) species, the Black Harrier. Blood samples from this species were only obtained after more than a year's search and many false trails, following a request in *Africa – Birds & Birding* in 1999. Almost no



Despite the Black Harrier's endemic status, it remains one of the world's least known harriers.

museum specimens of this bird exist, and to this day no body mass data have been published.

From mitochondrial DNA extracted from feather and blood samples we know that the Réunion Harrier differs by 1.5 per cent from its closest neighbour, the Madagascar Marsh Harrier, meaning that they diverged from one another more than 760 000 years ago. These species did not evolve from the African Marsh Harrier but diverged from their closest cousin, the European Marsh Harrier, about a million years ago. With only an estimated 72 pairs in the world, the small, dark Réunion Harrier is the world's rarest. It is also the only harrier adapted to foraging over forest rather than marshland or steppe.

The second 'hidden' species to emerge is the North American Northern Harrier. This species differs from the world's most common harrier, the Hen Harrier, by 0.8 per cent, meaning it diverged only about 400 000 years ago. The third species proposed (but not proven by DNA since none could be extracted) is the Papuan Harrier of New Guinea. It is thought to be a good species because it is resident on New Guinea, differs in plumage from its nearest congener, the Eastern Marsh Harrier, and because island forms have all proven good species. The full tally of the world's harriers now stands at 16 species and may increase as other island forms are analysed.

The affinity of the Black Harrier is surprising because its nearest living ancestor is not, as was expected, one of the current 'steppe' harriers which visit Africa from Europe (that is, the Hen or Pallid). It is South America's small Cinereous Harrier. The two species diverged about 1.5-million years ago and as such the Black Harrier is the youngest of the 'steppe' harriers. It is an interesting quirk of nature that the youngest harriers (such as the Black) are frequently found alongside the oldest (such as the African Marsh which is about 4.6-million years older) on each continent. For example, the youngest harrier in Europe is the European Marsh, which forages alongside Montagu's, the species which gave rise to the entire marsh harrier group some 3.5-million years before present. Likewise, in South America, the cradle of harrier evolution, the ancestral Long-winged is also about 3.5-million years older than the Cinereous Harrier with which it shares foraging and nesting grounds in Argentina. For harriers, therefore, the mixing of the old and the new is the rule, not the exception.

As for polygyny, most European biologists presume that this rare mating system arises from an excess of females unable to find mates and thus forced into polygyny. However, sex ratios are not skewed in North America and yet polygyny is just as prevalent there. There is little doubt that polygyny is closely tied to open habitats (many marsh-nesting species are polygynous in relation to those that inhabit three-dimensional habitats) and diet – especially a diet of voles. Because vole populations reach higher levels in more northerly latitudes, one expects and does find more polygyny there. It is also more prevalent in the two species which dominate northern latitudes – the Hen and Northern harriers, and is more common during vole population peaks than vole troughs among these species.



All marsh harriers, bar the newly recognised Réunion Harrier, are found foraging over reeds and open water, where they also breed. Whether they will survive man's onslaught on their wetland habitat remains uncertain. Here a female African Marsh Harrier tends to her young.

J.J. BROOKS/PHOTO ACCESS



*The increasingly rare African Marsh Harrier is the smallest of the world's six marsh harriers.*

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ALBERT FRONEMAN

**Scientific names of the harriers mentioned in this article, in alphabetical order:**

- African Marsh Harrier *Circus ranivorus*
- Australasian Marsh Harrier *C. approximans*
- Black Harrier *C. maurus*
- Cinereous Harrier *C. cinereus*
- Eastern Marsh Harrier *C. spilonotus*
- European Marsh Harrier *C. aeruginosus*
- Hen Harrier *C. cyaneus*
- Long-winged Harrier *C. buffoni*
- Madagascar Marsh Harrier *C. macrroscelus*
- Montagu's Harrier *C. pygargus*
- Northern Harrier *C. hudsonius*
- Pallid Harrier *C. macrourus*
- Pied Harrier *C. melanoleucos*
- Réunion Harrier *C. maillardi*
- Spotted Harrier *C. assimilis*

Left *Montagu's Harrier* (young male shown here) is the smallest and the only truly colonial nesting species of harrier. It is found breeding and foraging over the grasslands and farmlands of southern Europe and Asia. Birds winter mainly in West Africa and India, but a small number make it to southern Africa each summer.

Below *Male Montagu's Harriers* rarely visit the nest, and leave incubation and chick-feeding duties entirely to the female.

From studies of the mate choice of female harriers it appears that polygyny arises because some males are able to supply lots of voles to several females in sequence as they start to breed, yet they are unable to maintain an ever-increasing rate as each female's young hatch. Thus, while they can attract many females, only the first becomes the favoured female and is able to rear most of her young. The others, having been deceived into expecting large food supplies from the male, rear their young virtually single-handed and raise fewer young than if they had chosen a monogamous male. Rarely do food supplies in southern climes reach the levels found in the Northern Hemisphere so polygyny is rare to absent among the Southern Hemisphere's harriers.

The experiments with clutch size of African Marsh Harriers have revealed several traits that are common to northern species – and one major difference. Like their northern cousins, African Marsh Harriers increase the number of eggs they lay when they are given extra food before laying. This suggests immediately that there is some food constraint preventing them from laying clutches as large as northern-zone birds. This was verified by giving some pairs more young to rear in order to gauge their child-rearing abilities. Not only were they un-

able to gather more food, but nestling growth rates were much lower than in unmanipulated broods. But is this because there was less food in the environment or is it because these southern harriers were not working as hard to gather food (and saving themselves for future breeding)?

This is a difficult question to answer and has never been assessed before. By comparing the time spent foraging by African birds with that spent by northern birds at the same time of the breeding cycle, I found that African birds spent about 29 per cent of their time foraging – exactly the same amount of time spent by northern birds. So they were working as hard to find food. However, when I assessed the amount of prey caught for every hour of hunting, some remarkable differences became apparent. The foraging yield of African birds was approximately half that of northern zone birds; thus, for every hour of hunting, an African Marsh Harrier caught half the amount of prey that its northern cousins did. On looking for other evidence of this difference I found in four north/south comparisons of other raptors that the southern (tropical) species were also collecting about half the amount of food that northern (temperate) species were collecting per unit time. This means that food is less available in subtropical or tropical

areas and because of the close relationship between food and clutch size, this is sufficient to explain the lower clutches of tropical and subtropical species such as harriers.

Studies of harriers, and particularly the polygynous ones, have also revealed the reasons why female raptors are larger than their mates, and it has also highlighted the astonishing abilities of females to change the sex ratio of their brood according to circumstances. There is far more to learn about this unusual group and I hope this article and our just-published book will stimulate others to unravel more of the mystique of the harriers. □



Rob Simmons and his twin brother, John, have recently collaborated on *Harriers of the World: Their Behaviour and Ecology*, published by Oxford University Press.

