

Sacred Ibis: a new invasive species in Europe

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Sacred Ibis *Threskiornis aethiopicus* is closely related to both Black-headed Ibis *T. melanocephalus* (from the Indian subcontinent) and Australian White Ibis *T. molucca* (which breeds in Australia, New Guinea and some nearby islands) – to the point that they are sometimes treated as one species, *T. aethiopicus*. However, they are generally regarded as three distinct species forming a superspecies (*eg* del Hoyo *et al.* 1992).

The nominate form of Sacred Ibis (*T. a. aethiopicus*) is widespread in sub-Saharan Africa, while different subspecies breed on Madagascar (*T. a. bernieri*) and Aldabra (*T. a. abbotti*, although this is considered by some as inseparable from *bernieri*). The species is common to very common within its main African range, where its population is considered to be stable at an estimated 200,000 to 450,000 individuals (Delany & Scott 2002). North of its present range, the species was common in Egypt until the beginning of the 19th century, when it died out for unknown reasons (del Hoyo *et al.* 1992). Also, a very small and declining population occurs in the marshes of southern Iraq (Delany & Scott 2002).

There is no evidence that the species ever

occurred in the wild in Europe – *eg* no fossil remains have ever been found in Europe (Maurer-Chauviré 1993). Sacred Ibises have, however, escaped from captivity and been seen in the wild in Europe since the 19th century, *eg* in Italy (Andreotti *et al.* 2001), but this remained a rare event until about the 1970s when it became fashionable to breed free-flying groups of ibises in zoological gardens. This led to a regular flow of escapes, which in turn led to the establishment of breeding pairs in the wild, and breeding populations have now become established in Spain, Italy and France, as well as on the Canary Islands. Stray birds have also been reported in other countries.

This addition to the European avifauna has been welcomed by some, due to the tameness and attractiveness of the birds, as well as the aura surrounding the species, which has been venerated since the time of the Pharaohs (and is also the emblem of the BOU!). Its feeding habits, however, are cause for real concern. In some areas, it is proving to be a serious predator of other bird species of conservation concern. Here we report on the current European status of Sacred Ibis and on its potential conflicts with conservation interests.

Plate 1. Sacred Ibis *Threskiornis aethiopicus* colony, Loire Estuary, Loire-Atlantique, France, June 2005 (*Pierre Yésou*).





Plate 2. Sacred Ibises *Threskiornis aethiopicus*, Loire Estuary, Loire-Atlantique, France, June 2005 (Jean-Luc Potiron). Sacred Ibises breed colonially, with the nests very close together and the young tended in a crèche.

Breeding in Spain

According to Jordi Clavell, co-ordinator of the exotic species study group within SEO/BirdLife Spain (pers. comm.), the species is held in a number of zoos in Spain, from where escapes have occurred in various regions from Galicia, Asturias and Cantabria in the north to the Guadalquivir Marismas of Andalusia in the south. In Barcelona (Catalonia), birds initially breeding in the zoo escaped to settle in a nearby public park, where breeding first occurred in 1974. There were up to 18 individuals there in the early 1980s, but this reduced to 4-6 pairs in the 1990s, and the last breeding occurred in 2001. The species is still kept in the zoo, but the birds are now under control. When breeding outside the zoo, these birds used to visit nearby wetland areas, including the Llobregat and Ebro Deltas. Sacred Ibises are no longer known to breed in the wild in the area, or to escape from the zoo, but occasional birds continue to occur in the wetlands of northern Catalonia, and it is considered that these probably come from the French population (see below).

In recent years, up to five birds have been regularly seen at the Guadalhorce rivermouth in Malaga and immatures have joined the adults

initially present, suggesting that breeding might have occurred in the area.

Breeding in the Canary Islands

The first sighting in the wild in the Canary Islands dates back to 1989 and there are now records for Tenerife, Gran Canaria, Lanzarote and Fueteventura. However, the species is kept in zoos on all four of these islands, and at least some of these birds are known to be free-flying, so all records are presumed to be escapes. Up to about five pairs have been breeding in the wild in the vicinities of the zoos on Lanzarote and Fuerteventura since at least 1997 (Juan Antonio Lorenzo *in litt.*).

Breeding in Italy

The species has been breeding in the wild in Italy, in the upper Po valley, Piemonte, since 1989. There were 26 pairs and about 100 individuals in 2000. In 2003, breeding was observed at another site in the same area, with possibly up to 25-30 pairs, and a few more pairs were found at a third colony in 2004. Unfortunately, there have been neither co-ordinated counts of the breeding sites nor updated estimates of the population size since 2000 (Andreotti *et al.* 2001, Giovanni Boano and Nicola Baccetti pers. comm.).

Breeding in western France

From 20 Sacred Ibises imported from Kenya in four deliveries during 1975-1980, and then supplemented with 10 more birds from another French zoo in 1987, a breeding colony soon became established at Branféré Zoological Gardens in southern Brittany. There were 150 pairs in the zoo by 1990. The young were allowed to fly free and many quickly wandered away, mostly visiting nearby wetlands, but with some travelling hundreds of kilometres along the French Atlantic coast (Frémont 1995, Yésou 2005). Breeding in the wild in France stemmed from these birds and was first noted in 1993 at both Golfe du Morbihan, 25km from the introduction source (Frémont 1995; although it is suspected that breeding began a few years earlier, Yésou 2005) and Lac de Grand-Lieu, 70km away (following an attempt there in 1991, Marion & Marion 1994). Breeding ceased at Branféré Zoo in 1997.

Since then, colonies have been established at various sites along the French Atlantic seaboard up to 350km south of Branféré, from Morbihan to Gironde: at Brière Marshes (up to c.100 nests, although none in 2005, Jacques Hédin pers.

comm.), Golfe du Morbihan and on an island nearby (up to c.100 nests), Brouage marshes (a few nests 1980-2004) and near Arcachon (1-3 nests 1997-2000; Fleury 2004), but the largest colony was discovered in 2004, on an artificial island in the Loire Estuary. In 2005, this colony consisted of at least 820 pairs (Jérôme Cabelguen pers. comm.). With about 190 pairs at Lac de Grand-Lieu (Sébastien Reeber & Loïc Marion pers. comm.) and c.120-130 pairs in the Golfe du Morbihan area (Gérard Sourget & François Quenot & David Lédan pers. comm.), the French Atlantic breeding population was a little over 1,100 breeding pairs in 2005. Estimates of the total population size, including immature birds, were first made in the winters of 2003-2004 and 2004-2005, when censuses of winter roosts were organised and revealed totals of c.2,500 and c.3,000 respectively (the late Jo Pourreau pers. comm.). Although most of these birds frequent wetlands and adjacent pastures along the Atlantic coast, they also visit rubbish dumps. Some reach northern Brittany and Normandy, with increasing frequency, and a few move into eastern France (including a ringed bird from Lac de Grand-Lieu seen near the Belgian border).

Figure 1. Breeding colonies and range of introduced Sacred Ibises in Europe in 2005. The main French dispersal areas are shown, but a few birds disperse much further, up to the N and E French borders and possibly abroad.



Breeding in southern France

Eight Sacred Ibises were imported from a British zoo to the 'African Reserve' zoo at Sigean in 1982. They were allowed to fly free by 1989 and a pair bred in the zoo in 1991. Observations in wetlands around the zoo became regular from 1995 onwards and, in 2000, eight pairs bred in the wild at nearby Etang de Bages-et-Sigean. This colony held 75 pairs by 2004 and 105 pairs in 2005 (Yves Kayser pers. comm.). The current total population size, including immatures and non-breeding birds, is thought to be well over 250 individuals (Kayser *et al.* 2005, Dominique Clément pers. comm.). These birds disperse through the wetlands along the Mediterranean coast, reaching the Camargue to the northeast (where one pair attempted to breed in 2000), and possibly passing over the Spanish border to visit wetlands in Catalonia.

Sacred Ibises elsewhere in Europe

According to information forwarded by AERC national representatives, it appears that Sacred Ibises are held in captivity in most European countries. Free-flying colonies occur, or have occurred, at least in Belgium (at Antwerp Zoo, Gunter de Smet pers. comm.) and Germany (at least at Walsrode bird-park, where there was a

colony during the 1980s, although these were no longer allowed to fly free by the end of the 1990s, Andreas Buchheim pers. comm.).

Escaped birds have occurred in most countries, although such records are much rarer towards the north and east. For example, there are only four records of escapes in Poland (Tadeusz Stawarczyk pers. comm) and just one in Sweden (and that coming from a German zoo, Christian Cederoth pers. comm.), compared with over 70 records in Belgium (Gunter de Smet and Walter Bellis pers. comm.). About 30 escapes have been recorded in Britain (Blair *et al.* 2000). Escapes usually occur as singles, but small groups have been seen in the vicinity of Antwerp Zoo, Belgium. Also, a group of up to 20 birds, possibly coming from a local zoo, frequented the Dombes marshes, north of Lyon, France, from the late 1980s to the early 1990s (Maurice Benmergui pers. comm.). One bird apparently began to build a nest in Belgium in 1991 (Walter Bellis pers. comm.), and three Sacred Ibises found near Coimbra, Portugal, in early 1998 were thought possibly to have bred in the area, as the group increased to six by the end of the year; they disappeared thereafter (Gonçalo Elias pers. comm.).

Plate 3. Sacred Ibises *Threskiornis aethiopicus*, Sigean, Aude, France, May 2005 (Georges Olios). Foraging in the rubbish bins behind McDonalds.





Plate 4. Adult Sacred Ibis *Threskiornis aethiopicus*, Lac de Grand-Lieu, Loire-Atlantique, France, December 2004 (Sébastien Reeber). The bare black head and the 'dirty' yellow-toned plumage indicate that this is an adult.

Plate 5. First-winter Sacred Ibises *Threskiornis aethiopicus*, Marais Breton, Vendée, France, March 2005 (Matthieu Vaslin). Note the sparse whitish feathering on the heads and necks, which indicate that all three are immatures.



Sacred Ibises elsewhere in the world

Although this paper focusses on the situation in Europe, it is relevant to mention that introductions have occurred in other parts of the world too. In the United Arab Emirates, a small population (fewer than 10 birds) was introduced to Sir Bani Yas Island, 150 miles west of Abu Dhabi, in 1989 and breeding was then regularly reported there, although no birds were ever known to stray from the island or occur on the mainland. Also in UAE, about 70 birds were brought to Al Ain Zoo in 1993 and these were free-flying and unmarked. They were seen flying around the Al Ain area for years afterwards, with 32 still present in 1997. In February 1994, about 50 seen flying over Awir (a village c.80 miles from Al Ain) were suspected to have come from Al Ain, although this was not proven. Up to three Sacred Ibises were at Dubai Creek wetland sanctuary from 2002 to at least 2004 and were generally believed to be escapees. The status of captive individuals at Al Ain and Sir Bani Yas is currently unknown. Unmarked individuals (birds in private collections are rarely tagged) have been reported in many locations with suitable

habitat elsewhere in the UAE since 1982 and at least seven reports since then, all between October and March, could have involved genuine vagrants (C. Richardson *in litt.*). It has been suggested that some of these birds may have arrived from the marshes of Iraq (which are the most probable origin for vagrancy to Kuwait and for pre-1945 records on the Caspian and Black Sea coasts of the former USSR; Cramp & Simmons 1977).

In the USA, two pairs of Sacred Ibises were found nesting in the Everglades, Florida, in 2005. One pair raised two nestlings which were captured just before they fledged and donated to a zoo and the other nest failed at the egg stage. This is the first such nesting in the wild there. It is thought that these birds may have originated from Miami Metro Zoo, where the 1992 Hurricane Andrew is said to have caused the release of some birds, with some 30 to 40 Sacred Ibises now apparently living in the wild in the surroundings, but returning nightly to the zoo to roost (Garth Herring and Bill Pranty pers. comm.).

Colour plate opposite by Sébastien Reeber (reproduced with thanks to Ornithos)

The Sacred Ibises breeding in France and Italy appear to be of the nominate form, but any of the three closely related, and similar-looking species, Sacred Ibis, Black-headed Ibis and Australian White Ibis may occur as escapes from captivity.

Sacred Ibis *Threskiornis aethiopicus*

The nominate form has black tips to the primaries and secondaries, which form a black trailing edge to the wing in flight. Also the iris is dark brown.

Breeding adults show 'dirty' yellow-toned plumage, with areas of bare red skin on the underwing and ornamental plumes that are prominent and black.

Juveniles show a feathered neck and head; the tertials and tips to the remiges are brownish-black.

First-winters are intermediate, with the head and neck still well-feathered and some blackish ornamental plumes. They also show a variable amount of black along the centres of the tertials and greater coverts and even, in a few birds, on the median coverts.

The subspecies *bernieri* and *abbotti* lack the black trailing edge to the wing and show a white iris (*bernieri*) or pale blue iris (*abbotti*).

Black-headed Ibis *T. melanocephalus*

Breeding adults have whiter plumage than breeding Sacred Ibises, with more extensive white plumage on the neck, more white plumes on the lower neck, and ornamental plumes that are grey and therefore less obvious. The black tips to the primaries are less prominent than on Sacred Ibis and the secondaries are entirely white. They have areas of black bare skin on the underwing.

Juveniles are very similar to juvenile Sacred Ibis but, like the adults, lack the black trailing edge to the wing.

Australian White Ibis *T. molucca*

Breeding adults show rather less 'dirty' yellow plumage than breeding Sacred Ibises, with more white plumage on the neck, and more-developed plumes on the lower neck. The ornamental back plumes are as black, but less profuse. Like Black-headed Ibis, the black tips to the primaries are less prominent than on Sacred Ibis and the secondaries are entirely white. They have a rather finer bill and darker legs than the other two species, and areas of pink bare skin on the underwing.

For more details see *HBW* (del Hoyo *et al.* 1992) and *Storks, Ibises & Spoonbills of the World* (Hancock *et al.* 1992).

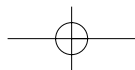
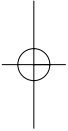
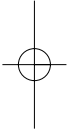
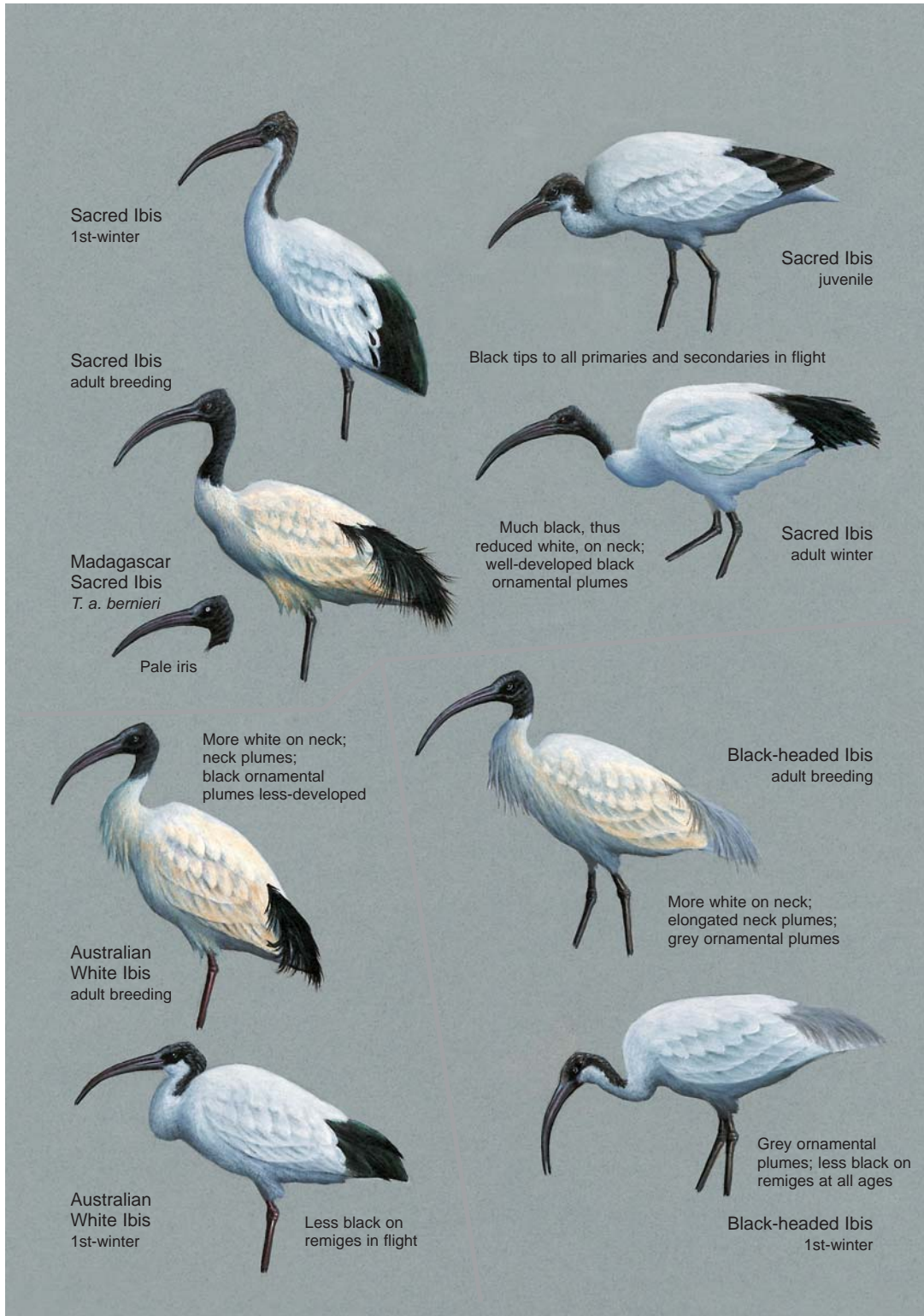
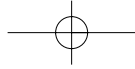




Plate 6. Sacred Ibis *Threskiornis aethiopicus*, Lac de Grand-Lieu, Loire-Atlantique, France, June 2005 (Sébastien Reeber). Any future occurrences in Britain, particularly in SW England, could well come from the French population, rather than being escapes, but none is yet suspected of doing so (BOURC 29th report, 2003, *Ibis*: 145: 178-183, contra Blair *et al.* 2000).

Plate 7. Sacred Ibises *Threskiornis aethiopicus*, Loire Estuary, Loire-Atlantique, France, June 2005 (Jean-Luc Potiron). At least 3,000 birds have been counted in France.



Conservation concerns

The Sacred Ibis is an opportunistic feeder which favours invertebrates when foraging in meadows and marshes, but also takes larger prey when available, including fish, amphibians, eggs and young birds. Individuals can specialise as predators at seabird colonies: V.L Vard and A.J. Williams (pers. comm.) have found that such predation in a colony of Cape Cormorants in South Africa can have a greater impact than predation by Kelp Gulls.

In western France, predation has been observed in a Sandwich Tern colony, with the ibises flushing the terns off their nests and then taking their eggs. Also, colonies of some tens of incubating Black Terns and Whiskered Terns have been destroyed by Sacred Ibises in France on at least three occasions. Predation has also been reported in western France on nests of both Common Tern and Mallard, and on Black-winged Stilts, Black Terns and Lapwings (Vaslin 2005, Didier Montfort, Jacques Hédin, Patrick Philippon and Sébastien Reeber pers. comm.). In southern France, Sacred Ibises have been observed predated the nests of Cattle Egrets. Also, as their breeding numbers have increased in southern France, they have been seen competing for nest sites with Cattle Egrets and Little Egrets and have forced many pairs of both species to leave their colonies (Kayser *et al.* 2005).

Although the cases outlined above are believed to have had no serious impact on the populations of the species preyed upon, nature conservation societies are concerned that such predation may increase. As an example of the potential risk, in April 2005 a pair of Sacred Ibises visited the only colony of the endangered Roseate Tern in France; fortunately, they left the area before the terns had laid (Arnaud Le Nèvé pers. comm.). Apart from birds, there is concern that the observed predation of Sacred Ibises on newts may have detrimental effects on discrete populations of these endangered amphibians.

Discussion

The successful development of the breeding populations of Sacred Ibises in Europe illustrates the ability of the species to adapt to various environments. In France, colonies have settled in naturally protected areas such as large wetlands (where the birds nest either in trees or in reedbeds) or small islands, and also in a clump of trees in a large private garden within a residential area, while the largest colony is situated on an artificial island close to a busy port. Some winter roosts in France have been located in rather wild places, but the largest roost (of



Plate 8. Adult Sacred Ibises *Threskiornis aethiopicus*, Reserve Naturelle des Marais de Müllembourg, Noirmoutier, Vendée, France, July 2004 (Matthieu Vaslin). These two Sacred Ibises visited the colony of Sandwich Terns on Noirmoutier on one July day in 2004 and, in the space of just four hours, devoured the eggs of all 30 pairs and caused the colony to desert for the rest of the season. A similar event occurred in a Black Tern colony on the Brière Marshes, c.40km to the north.

up to 1,030 birds gathering together) occurred close to a shopping centre's illuminated carpark.

When foraging, the ibises take a variety of prey, mostly from meadows (both wet and dry) and marshes, but also from ploughed fields, lakes and sandy or muddy seashores. They also visit farmyards, where they feed on silage or wade into slurry pits after *Eristalis* fly larvae. More importantly, they take advantage of rubbish dumps. Both the largest roost and the largest colony in western France are situated just a few kilometres from the largest dump in the area. This dump offers food at any season, including during the rearing of young. It has also played a vital role during winter cold spells: Sacred Ibises feeding at the dump suffered little when the access to natural food was limited by ice and snow, while at their mixed roosts large numbers of Little Egrets were found dead from starvation (the late Jo Pourreau and Loïc Marion pers. comm.).

The future of these introduced populations seems secure, at least until action is taken to control them, although it has been suggested that the closure of the main rubbish dump in western France, which is planned for 2006, may lead to a population crash. The situation in southern France, however, shows that a population can develop in the absence of any major rubbish dump, and thus the possibilities of other developments should be considered: in



Plate 9. Sacred Ibises *Threskiornis aethiopicus*, Loire Estuary, Loire-Atlantique, France, June 2005 (J rome Cabelguen).

their needs for food resources, the ibises may increase their predation upon wildlife, and they may disperse and colonise larger areas. In any case, there is certainly a risk that the introduced Sacred Ibises will have an increasing impact on indigenous fauna, and they may have a serious impact on some particularly sensitive species such as terns. Under the principle of precaution, situations of this kind are taken into account in agreed European government policies, such as the African-Eurasian Waterbird Agreement, which clearly states that the signatories 'prohibit the deliberate introduction of non-native waterbird species into the environment and take all appropriate measures to prevent the unintentional release of such species if this introduction or release would prejudice the conservation status of wild flora and fauna; when non-native waterbird species have already been introduced, the Parties shall take all appropriate measures to prevent these species from becoming a potential threat to indigenous species' (AEWA, Art. III.1g). In this context, the French ministry of the environment has ordered a case study, which has proposed measures to be implemented in order to either control the population or even eradicate it (Clergeau *et al.* 2005). However, no culling project is presently underway in France (contra *Dutch Birding* 27: 211, 2005).

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