

The Eurasian Eagle-owl (*Bubo bubo*) as a breeder on buildings in Germany

O bufo-real (*Bubo bubo*) como nidificante em edifícios na Alemanha

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SUMMARY

In Germany, Eurasian Eagle-owls (*Bubo bubo*) have been known to breed on man-made structures since the middle of the 16th century. Frequent use was made of such sites, mainly ruins, castles and churches, until the middle of the 19th century with the last documented cases in the 1880s. There was one isolated record in 1927. Since 1975, more than 170 man-made structures have been used as breeding including radio towers, bridges, houses, power stations, ruins, castles, churches, and industrial buildings. In 2016, more than 60 buildings were reportedly occupied by pairs. Although some sites have been used for up to 20 years, most are used for 1-3 years, probably due to disturbance. Many breeding attempts were unsuccessful, particularly those in ruins or churches occupied for 1-2 years. Breeding sites in industrial buildings and buildings in rock quarries and sand or gravel pits are generally used for longer periods. In recent years, Peregrine Falcon nest boxes on buildings have been increasingly used. Particularly at breeding sites in towns, Eurasian Eagle-owls suffer from *Trichomonosis* and *Hepatosplenitis infectiosa strigum* infections from feral pigeons (*Columbidae*), the main prey of the owls in such areas. The captive breeding and release of Eurasian Eagle-owls into the wild has likely contributed to recent increased use of buildings and it is anticipated that a great variety of building types will be used over time. Its population will also increase in larger cities in response to prey availability despite human disturbances in cities. Nests on buildings have also been found in Spain, Sweden, Belarus, Austria, Belgium, Italy, Finland, France and Mongolia.

Keywords: building breeder, Eurasian Eagle-owl, *Hepatosplenitis infectiosa strigum*, nest box, *Trichomonosis*

RESUMO

Na Alemanha, o bufo-real (*Bubo bubo*) é conhecido por nidificar em estruturas artificiais desde meados do século XVI. Essas estruturas foram usadas com frequência até meados do século XIX, sobretudo ruínas, castelos e igrejas, datando os últimos casos documentados da década de 1880. Existe um registo isolado de 1927. Desde 1975, mais de 170 estruturas artificiais têm sido usadas para reprodução, incluindo antenas de telecomunicações, pontes, edifícios de habitação, estações elétricas, ruínas, castelos, igrejas e edifícios industriais. Em 2016 foram reportados mais de 60 edifícios ocupados por casais de bufo-real. Apesar de alguns locais terem sido usados durante períodos de até 20 anos, a maioria é usada durante 1-3 anos, provavelmente devido a perturbação. Várias tentativas de reprodução não foram bem-sucedidas, sobretudo aquelas em ruínas ou igrejas ocupadas durante 1-2 anos. Os locais de nidificação em edifícios industriais, pedreiras e locais de extração de areia ou cascalho são geralmente usados por períodos mais longos. Recentemente, a espécie tem usado cada vez mais caixas-ninho para falcão-peregrino instaladas em edifícios. Em particular nos locais de nidificação em cidades, os bufos-reais são infetados com tricomoníase e Hepatosplenitis infectiosa strigum por pombos assilvestrados (Columbidae), a principal presa da espécie nessas áreas. A libertação de bufos-reais criados em cativeiro contribuiu para o recente aumento do uso de edifícios e prevê-se que uma grande variedade de estruturas artificiais venha a ser usada ao longo do tempo. A sua população irá ainda aumentar nas grandes cidades em resposta à disponibilidade de presas, apesar da perturbação humana. Foram também encontrados ninhos de bufo-real em edifícios em Espanha, Suécia, Bielorrússia, Áustria, Bélgica, Itália, Finlândia, França e Mongólia.

Palavras-chave: bufo-real, caixa-ninho, Hepatosplenitis infectiosa strigum, nidificante em edifícios, tricomoníase

Introduction

Due to massive persecution in Germany as well as throughout western and central Europe, Eurasian Eagle-owl (*Bubo bubo*) populations collapsed in the 19th century. The persecution was boosted by shooting bonuses and the removal of young Eurasian Eagle-owls from nests for use as hunting lures; hunters shot birds of prey and crows that mobbed tethered Eurasian Eagle-owls. In 1900, only 150-155 breeding pairs still survived in Germany within today's borders. In 1930 this had decreased to 50-70 Eurasian Eagle-owl breeding pairs restricted to inaccessible rock faces because of intense persecution on buildings and in accessible places.

By 1965, only about 70-80 breeding pairs remained in Germany (Lindner 2014). As a rule, literature on Eurasian Eagle-owls did not mention breeding on buildings or only mentioned it in relation to the 19th century.

In fact, the Eurasian Eagle-owl is the most flexible of the Palearctic owl species in its choice of nesting sites, including natural rock faces, quarries and steep slopes in mountains and low mountain ranges. In the lowlands they use nests built by other large birds and on the ground (Glutz von Blotzheim & Bauer 1994, Görner 2013). Since the 1980s, the Eurasian Eagle-owl population in Germany has increased sharply. This is due to conser-

vation measures and to the release of more than 4060 captive-bred Eurasian Eagle-owls between 1955 and 2002. Reintroduction has significantly contributed to today's almost nationwide Eurasian Eagle-owl distribution. The majority of the population is made up of direct descendants of introduced owls (Lindner 2015). Information sources differ regarding the Eurasian Eagle-owl population size in Germany. Territory mapping carried out from 2005-2009 for a distribution atlas indicated 2100 to 2500 territories (Gedeon et al. 2014). However, this is almost certainly an underestimate, as the mapping was not specifically aimed at owls. Another estimate is that 4000 to 5000 breeding territories are occupied in Germany (Mikkola 2013). Today Eurasian Eagle-owls can appear anywhere in Germany including on buildings and structures in urban areas.

The data in this paper has been derived from my 31 years of experience with nesting Eurasian Eagle-owls in Germany, many specific nest site records from the literature, and from personal conversations.

Results and Discussion

Nesting on buildings had been widely known in the former German empire since the 16th century (Gessner 1555). Gessner wrote in 1555 that the Eurasian Eagle-owl readily bred in ruins and churches. Breeding on buildings was by no means peculiar to Germany in former times, but occurred in many countries. In 1622, for example, Giovanni Pietro Olina noted that in Italy the Eurasian Eagle-owl inhabited dilapidated ruins, holes in walls and the roofs of deserted houses (Olina & Macdonald 2018). Until the end of the 19th century, almost all literature about the Eurasian Eagle-owl mentioned breeding on buildings. The last three confirmed breeding occurrences on buildings took place in

the 1880s. After that, there was a gap in documented cases until one in 1929 and then a further gap until 1975. In 1990, there were for the first time more than 10 cases of breeding on buildings (Lindner 2016). After 2007, the number of documented cases increased strongly. From 1975 to 2016 at least 170 buildings in Germany were known to be Eurasian Eagle-owl breeding sites. These comprised 45 castles and castle ruins, 50 industrial buildings and commercial buildings, 20 buildings in quarries and sand and gravel pits, 27 churches, eight road and railway bridges, four telecommunications towers, four detached houses, two multi-storey buildings and ten other structures. Extreme cases were nests on a funerary monument, an ammunition bunker, a submarine bunker and a bullet trap of a firing range. Prior to 1975, only ruins, castles, fortifications and churches had been known as breeding places (Lindner 2016). In 2016, at least 60 buildings were occupied by nesting Eurasian Eagle-owls. At least 30 other buildings were occupied by single Eurasian Eagle-owls. These records are minimal estimates as there are data gaps. Breeding on hunters' raised hides (blinds), which are being increasingly reported in Germany, are not included in the data.

Eurasian Eagle-owls generally lay their eggs in scratched-out depressions at the breeding site. If possible, they also scrape such depressions on buildings. But they also readily make use of sites where it is impossible to do so. In 2014, Eurasian Eagle-owls successfully bred on a double U-steel girder on dust and some pigeon feathers in an active warehouse in Karlsruhe. People were working in the warehouse during the day, and goods were handled with large cranes and other heavy equipment such as wheel loaders. The Eurasian Eagle-owls had to fly into the warehouse to reach their nest (Havelka & Scholler 2014).

Many of the successful and long-established breeding sites on buildings are located

on quiet, often shut-down industrial plants and structures in quarries and gravel pits. In many cases, abandoned buildings in quarries and gravel pits were used because the quarries or pits were small and had very low rock or gravel walls without sheltered breeding sites. The period that individual buildings were occupied varied from 1-25 years. Only eight buildings were occupied for more than 10 years. However, many nesting sites on buildings were occupied for only 1-2 years. In cases where breeding ceased, Eurasian Eagle-owl pairs or single birds sometimes remained for some time, occasionally for several years, at the building or in its surroundings. Quite often, Eurasian Eagle-owls using breeding sites on buildings were discovered during the autumn display period prior to the first breeding. Since 1975, the Eurasian Eagle-owl initially only nested on buildings in rural areas, but it is now also colonizing urban areas.

Buildings used by nesting Eurasian Eagle-owls are often unused by humans, at least when the owls start to nest. The owls are still sensitive to disturbance directly at the nest site. On the other hand, they tolerate noise and direct illumination at the nest site. Suitable nearby undisturbed roosts are also important and are typically protected from inclement weather, offer commanding views, and have an unhindered flight access. When Eurasian Eagle-owls are breeding in buildings, they may also use nearby tree roost sites.

On several occasions, breeding took place at sites 50 to 70 m above ground. In 2017, a Peregrine Falcon (*Falco peregrinus*) nest box 100 m high was used but was abandoned after human disturbance (Kladny 2017). In Germany, Eurasian Eagle-owls abandoned their clutches on a number of occasions after human disturbance, and the owls usually gave up such disturbed sites permanently. Young Eurasian Eagle-owl fledged when 45 days old (Penteriani et al. 2004) by jumping from building nests with considerable risk of injury or death. Hard edges, fences and

other sharp objects as well as shafts in the landing area increase the risk of injury to the young birds. In 2009, a fledgling survived the jump from a height of 50 m (Lindner 2016). In 2017, one of two fledglings that jumped from a height of 65 m was killed (Löver 2018). There have been repeated cases of young Eurasian Eagle-owls being picked up and brought to rehabilitation stations after jumping to the ground in inner cities. These were then reared in captivity and later returned to the wild (Lindner 2016). In one extreme case in 1992, young Eurasian Eagle-owls were returned to a nest in a church 22 times until they fledged successfully (Harbeck 1995) because of a lack of understanding that young owls leave their nests before they can fly. In other cases, fledged young were placed in areas closed off to humans in safe areas in which they could mature and disperse (Harms 2016, Löver 2018).

Eurasian Eagle-owls in towns and cities face greater threats due to collisions with vehicles, trains and power lines. In cities, but also in rural areas, dead or sick adult and young Eurasian Eagle-owls infected with Hepatosplenitis infectiosa strigum and Trichomonosis have been found on a number of occasions. These infections are transmitted by feral pigeons (Columbidae), a main prey item in such areas (Lindner 2016).

In Germany, Continuous Ecological Functionality (CEF) measures are invoked when buildings with Eurasian Eagle-owl breeding sites are demolished. These may include the installation of specific artificial nesting sites (nesting or resting boxes) according to § 44 (5) of the German Nature Protection Law (BNatSchG). Such boxes measure 200 cm x 165 cm x 130 cm (width x depth x height) and are installed on other nearby structures (Brandt 2014).

Eurasian Eagle-owl nests on buildings have also been found in Spain, Sweden, Belarus, Austria, Belgium, Italy, Finland, France, Russia, and Mongolia. Today, in

many parts of Europe, Eurasian Eagle-owls are increasingly found nesting on buildings, even in large cities such as Stockholm, Helsinki, Madrid, Córdoba, Jerez de la Frontera, Trento, Budapest, Lyon and Marseille (Lindner 2016). This list of the countries and cities with Eurasian Eagle-owl nests on buildings is very probably incomplete.

The use of buildings by nesting Eurasian Eagle-owls is increasing in Germany. Prey availability is likely higher in cities than in many agricultural areas with their endless expanses of maize monoculture. Suitable prey species typically found in towns and cities include pigeons, the Brown Rat (*Rattus norvegicus*), European Rabbit (*Oryctolagus cuniculus*) and waterfowl (Anatidae) on city waters. The house/street pigeon (*Columba* spp.) is practically always among the main prey items of urban Eurasian Eagle-owls. Telemetry studies of urban Eurasian Eagle-owls have shown that they hunt in areas with a high density of prey species, such as waterfowl, brown rats and pigeons (Lindner 2016). In the future, prey availability for Eurasian Eagle-owls is unlikely to deteriorate in Europe's towns and cities. Therefore Eurasian Eagle-owl numbers in cities and their use of diverse buildings for nesting will continue to grow over the next few years. This may result in increased disturbance by humans requiring more protections by conservationists to prevent or minimize disruption and rescue fledgling owls. It is likely that the Eurasian Eagle-owl will breed most successfully on buildings in rural areas where towers, bridges and industrial buildings have fewer surrounding flight obstacles and young Eurasian Eagle-owls probably have better chances of survival during fledging and post-fledging dispersal.

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