

Bird nests made from anti-bird spikes

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ABSTRACT

The use of man-made, even sharp materials for nest building in birds is well known. The first report of a crow's nest made of barbed wire dates back to 1933, and recent (news) reports document the use of e.g. nails, screws, and drug users' syringes in avian architecture. Here we report the first well-documented study on nests of carrion crow *Corvus corone* and Eurasian magpie *Pica pica* that almost entirely consist of material that is meant to deter birds: anti-bird spikes. Carrion crows in Rotterdam (The Netherlands) and Eurasian magpies in Enschede (The Netherlands), Antwerp (Belgium), and Glasgow (Scotland) tear entire strips with sharp metal pins off buildings and use them as nesting material. Two anti-bird spike nests, now in the collections of Natural History Museum Rotterdam (crow) and Naturalis Biodiversity Center (magpie), were analyzed for composition and structure. Magpies may use the anti-bird spikes not just as ordinary nest material, but specific placement in the dome, over-arching the nest, hints at functional use. The anti-bird spikes may be used by birds in the same way as they were intended to be used by humans: to ward off (other) birds. Crows, for example, are known to prey on magpie eggs and offspring and the specific choice of this sharp material could benefit nest defense, for which magpies may normally rely on thorny branches. Other magpie domes observed were constructed with barbed wire and knitting needles. In the Anthropocene, now that living biomass is outweighed by anthropogenic mass, alternative nesting materials are increasingly being adopted by urban birds. With birds even using bird deterring materials like anti-bird spikes as nesting material, anything may become part of a bird's nest.

Keywords avian architecture, nest defence, urban ecology, nest building, artificial nest material, carrion crow, *Corvus corone*, Eurasian magpie, *Pica pica*

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INTRODUCTION

All sorts of 'hostile architecture' built by humans may guide or restrict undesirable or offensive behaviour of people (Petty 2016, De Fine Licht 2017). Examples include benches that cannot be slept on, spikes in the ground that cannot be stood on, and pieces of metal that hinder one's ability to skateboard (De Fine Licht 2017). There are even anti-homeless spikes –

metal studs implanted at ground level designed to discourage the homeless from sleeping at certain public spaces (Petty 2016). This same principle – placement of spikes – is also used to prevent undesirable avian behaviour, such as resting or nesting on a building. These so-called anti-bird spikes are even dubbed 'evil architecture' (De Fine Licht 2017). The devices are composed of a base and a series of nasty metal

spikes. Peles (1949) is one of the earliest patents granted for such a bird deterrent device. Countless modifications on the basic design have been developed, that are now cheaply mass produced and widely used worldwide. They are often applied in city centers to deal with large flocks of domestic pigeons, and placed on rooftops and ledges of buildings or even on entire tree branches, as practiced e.g. in Bristol, UK (Aspinall 2017).

Anti-bird spikes are not harmless to wildlife. This is shown by the observations of pierced birds and small mammals, injured or killed by the sharp metal pins (Moeliker 2016, Dollen 2018, Hooper 2018). Conversely, peregrine falcons *Falco peregrinus* Tunstall, 1771 in Amsterdam, The Netherlands, use these sharp tips for their benefit. They are known to pierce their prey leftovers on bird control spikes, where they store them for later (Verkerk 2018). This behaviour resembles that of, e.g., red-backed shrikes *Lanius collurio* Linnaeus, 1758, birds that pin their prey on the spines of plants and barbed wire (Lefranc & Worfolk 1997).

Bird spikes are intended to prevent nesting and perching by birds, but there are many examples of similarly sharp unnatural objects being used by birds as nesting material. Published reports of wire nests date back to 1933 (Warren 1933) and the Kansas Barbed Wire Museum proudly displays a corvid nest constructed with barbed wire (Kansas Barbed Wire Museum n.d.). Domestic pigeons *Columba livia domestica*

Linnaeus, 1758 in Accrington, UK, have been seen breeding on nests made of screws and nails (BBC 2013) and pigeons in Vancouver, Canada, even made a nest out of drug users' syringes (Davey 2017).

Ironically, the rows of upward pointing anti-bird spikes may be an appropriate substrate for a nest, as the pins help to secure the twigs and support the structure, especially on sloping surfaces (Vrieling 2021). Another classic example of such 'bird rebellion' is the Australian 'Parkdale Pigeon,' which fought against anti-bird spikes by building a nest on top of them, as documented by Twitter user Michael Bell. This pigeon's nest was repeatedly removed, but the more bird spikes were installed, the better the foundation of the new nest became.

Some birds go even a step further, and tear bird spikes off buildings themselves. Corellas *Licmetis* sp. removed spikes from the St Francis Xavier Cathedral in Geraldton, Australia (O'Connor 2019). Isaac Sherring-Tito captured similar behaviour on video in Katoomba in the Blue Mountains west of Sydney, where a sulphur-crested cockatoo *Cacatua galerita* Latham, 1790 removed bird spikes from the Town Centre Arcade in 2019 (Taylor 2019). The video, originally posted on Facebook, can now be seen on YouTube (ViralHog 2019), where also an earlier observation from 2013 can be found, of a cockatoo ripping anti-bird spikes off a roof (Blow 2013). While these observations are not directly connected to nest building, they do show that members of some bird families are



Figure 1 Carrion crows (*Corvus corone*) on their nest, partly made of anti-bird spikes, in a poplar (*Populus* sp.) tree; Rotterdam, The Netherlands; 7 April 2009. [Garry Bakker]

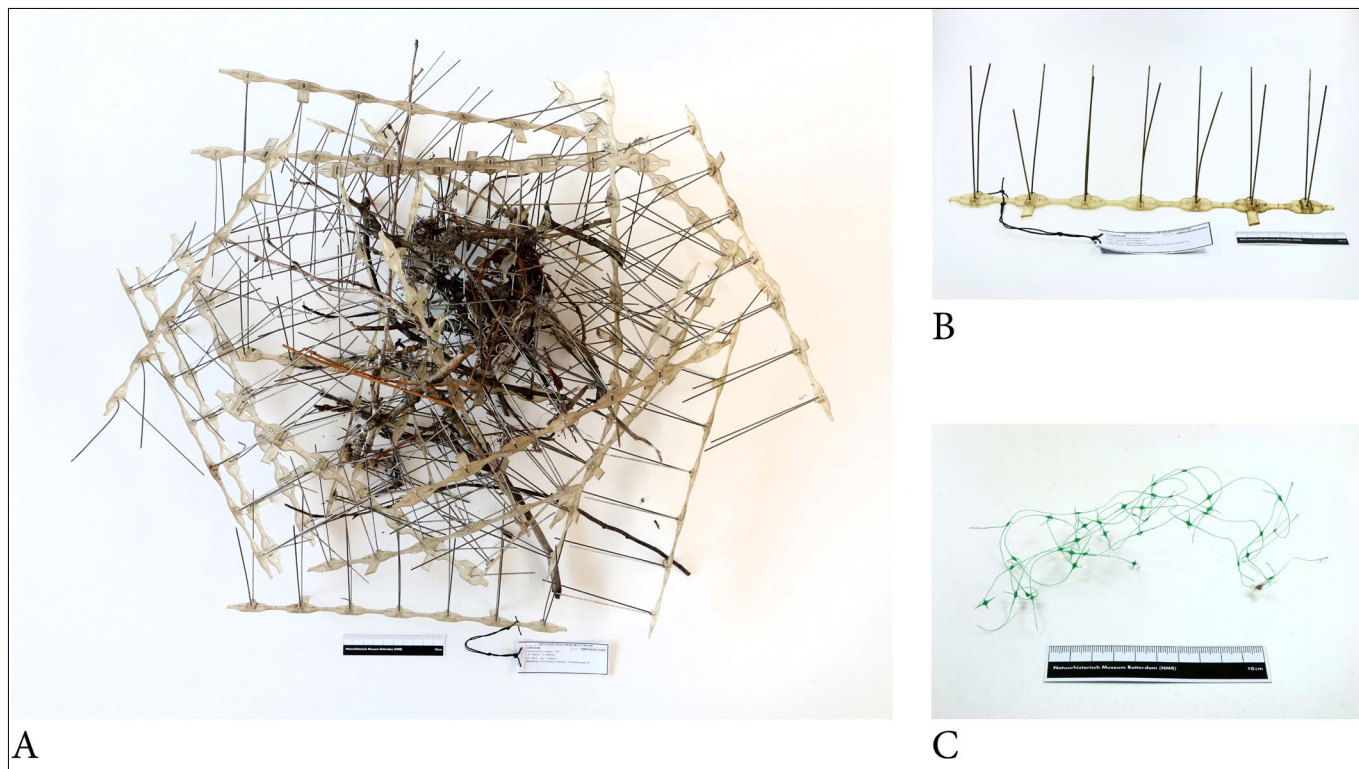


Figure 2 **A** The Rotterdam 2021 anti-bird spike carrion crow nest as kept in the collection of the Natural History Museum Rotterdam; NMR998900189467. **B** A single strip with anti-bird spikes, separated from the nest. **C** A piece of anti-bird net also found in the nest. Scale bars 10 cm. [Kees Moeliker]

able to remove spikes from buildings and learn how to handle them. As a result of this previously observed behaviour, birds might have discovered a new potential for this material, namely to use the spikes as nesting material.

In this publication, we focus exclusively on corvid behaviour, describe all currently known nests of carrion crows and European magpies made out of anti-bird spikes, and discuss the possible implications of the usage of this bird repelling material for nest construction.

METHODS

Here we present all currently known observations of anti-bird spike nests, including four new cases. First, we discovered a magpie nest made out of anti-bird spikes in Antwerp, Belgium. Then, a crow nest made of anti-bird spikes was discovered in Rotterdam, The Netherlands. During the writing of this paper another anti-bird spikes magpie nest discovered in Glasgow, Scotland came to our attention, and during the review process, the finding of another similar magpie nest in Enschede, The Netherlands, was shared by a reviewer.

As this is the first well-documented study on bird nests made out of anti-bird spikes, we relied partly on 'grey' literature to put this phenomenon in context. News articles and social media were systematically searched using the key words 'bird spikes', 'anti bird spike', 'bird spike nest' and 'anti bird spike nest'. This search yielded valuable observations to illustrate other interactions of birds with anti-bird spikes, as presented in the introduction.

RESULTS

To our knowledge, the earliest published finding of a nest partially built from anti-bird spikes was in March 2009 in Rotterdam, The Netherlands (51.90860°N, 4.47285°E; Bakker 2009). There, nesting carrion crows *Corvus corone* Linnaeus, 1758 were observed on a nest at a height of about 12 m in a poplar *Populus* sp., containing at least 16 anti-bird spike strips (Fig. 1). According to the author, the bird spikes were most likely taken from a nearby construction site and positioned with the spikes pointing into the nest structure, presumably in such a way that they would not harm the breeding bird.

Another carrion crow nest was located about 15 m up in a weeping willow *Salix babylonica* L along Provenierssingel in Rotterdam, The Netherlands (51.92697°N, 4.47037°E). It was discovered on 31 August 2021 by climbers during tree maintenance. The tree had to be pruned and the nest was collected for the Natural History Museum Rotterdam (NMR998900189467). The structure (outer dimensions 60 × 54 × 22 cm; Fig. 2a) was made by carrion crows, but the nest seems unfinished, and was not (yet) used for breeding. The major part of the nest consists of 24 identical strips of anti-bird spikes, each 33 cm in length and supporting seven pairs of spikes with a length of 11 cm each (Fig. 2b). This totals almost 8 m of strips and 336 spikes. All spikes were directed inwards to the nest cup that was made of twigs, dry leaves, some dog hair, two feathers (of mallard *Anas platyrhynchos* Linnaeus, 1758 and Eurasian collared dove *Streptopelia decaocto* Frivaldszky, 1838) and shredded plastic. Striking was the presence of another piece of bird deterring material



Figure 3 **A** Aerial view on the roof of the University Hospital Antwerp (UZA) and the courtyard. [Mike Muizenbelt] **B** Row of glue remains, on the ledge of the roof, where bird spikes were installed in the past. In the background, the courtyard can be seen with the sugar maple tree (*Acer saccharum*) in which the nest was located. [Auke-Florian Hiemstra]

in this nest, a fragment of anti-bird net (Fig. 2c), also known as garden net, commonly used to deter birds from gardens and balconies. All anti-bird strips showed traces of Montagekit®. The presence of this adhesive substance suggests that the crow(s) have forcefully removed the strips from a building.

Being able to construct a bird nest with anti-bird spikes is already noteworthy, but even more so if the spikes are employed by the birds in ways resembling their original purpose. This seems to be the case for a magpie *Pica pica* (Linnaeus, 1758) nest built from anti-bird spikes, found in the tallest tree of a small courtyard of the University Hospital of Antwerp, Belgium (51.15764°N, 4.41037°E; Fig. 3a). The nest was discovered by a hospital patient on 24 July 2021 located on the fourth floor, who had a clear view of the nest. It was built in a sugar maple tree *Acer saccharum* Marsh., positioned in the fork of a branch in the top. Since the Antwerp nest site had been used for two years (G. Moens, pers. comm. 2021), two nest layers were built on top of each other, forming one big structure. These nest cups (30 cm wide) consisted of natural materials, i.e. twigs and clay. This presumed safe spot in the middle of the structure was guarded by a total of 148 separate anti-bird strips (that is: the visible number of them), partly sticking out of the structure. It is thus estimated that the nest may have harbored up to 50 m of strips, of which approximately 1500 spikes were visible from the outside. These anti-bird spikes had probably been collected from the edge of the roof of the hospital, where most spikes had disappeared but traces of adhesive substance still indicated prior presence (Fig. 3b). Bird spikes had only disappeared in close vicinity to the nest, while spikes on other edges of the building were still present (Fig. 3a). As magpies are known to exert effort to procure nesting materials (e.g., they rip twigs from trees; Birkhead 1991), it is likely that the anti-bird spikes were forcefully removed from the roof by the magpies themselves. This nest (dimensions 85 x 70 x 80 cm) was collected on 25 October

2021, well after the breeding season, using an aerial work platform (Fig. 4a), and is now in the collection of Naturalis Biodiversity Center (RMNH.AVES.259588; Fig. 4b).

A similar Eurasian magpie nest was found by Jan Schoppers in the city of Enschede, The Netherlands on 1 April 2023 (Fig. 5). The nest is located at a height of 10 meters in an ornamental plum tree (*Prunus spec.*) located in a residential area (52.21794°N, 6.90131°E). A mixture of different types of anti-bird spikes is used, some with metal pins, others completely made out of plastic. Yet another magpie nest with incorporated anti-bird spikes was found in Scotland, discovered by Max Crawford in a residential area in Partick, Glasgow, Scotland (55.86831°N, -4.31514°E), on 13 December 2021 (Potatojunkie 2021; Fig. 6).

DISCUSSION

There are many reports of corvid species using artificial material for their nest, such as e.g. scraps of netting (Nagy 1943), telephone wires (Tekke 1938), electric wires (Münch 2009, Khan *et al.* 2022), aluminium and iron wires (Nagy 1943, Elts & Lepikson 2020) and clothes' hangers (Coomans de Ruiter 1953, Bekirović & Marder 2019). But the reported nests in our study, made out of anti-bird spikes, may hint at a functional use.

Magpie nests are constructed, when available, deep in the prickly heart of impenetrable thorny bushes (Gordon 1931, Linsdale 1937, Birkhead 1991). Here, the natural tangle of thorns is sufficient protection (Lilford 1895, Linsdale 1937), and nests cannot be studied, as Lynes (1925) describes, 'without a severe thorny battle'. However, when nesting more out in the open, for example in easily accessible tree tops, magpies often make a nest with a characteristic domed shape (Moffat 1909, Linsdale 1937, Birkhead 1991), which is mainly constructed by the male (Buitron 1988). The domed structure protects the eggs and nestlings from predators from above



A



B



C

Figure 4 **A** The Antwerp magpie nest constructed with anti-bird spikes, seen on the fork of a branch in a sugar maple tree on 25 October 2021. **B** The collected nest as part of the Naturalis collection; RMNH.AVES.259588. **C** A similar looking single strip of bird spikes, collected from the roof of the Academic Hospital Antwerp (UZA). [Auke-Florian Hiemstra]



Figure 5 Magpie nest constructed with anti-bird spikes in Enschede, The Netherlands, located in an ornamental plum (*Prunus* sp.) tree; 12 April 2023. [Wijnand Koekoek]



Figure 6 Magpie nest in Partick, Glasgow, Scotland, with bird spikes especially placed on top of the nest; 13 December 2021. [Max Crawford]

such as carrion crows, as shown by Baeyens (1981). Nest building by magpies is sometimes disrupted by carrion crows attempting to prevent dome construction, as a dome will hide the content of the nest from attacks from above, but it also hinders intrusion, as the nest entrance is only seven to ten centimeters wide, and hidden (Baeyens 1981). Carrion crows will try to remove material from the dome when attacking the nest (Eguchi 1995) but holes in the dome will be repaired within days (Linsdale 1937).

However, a roof alone may not be enough to prevent nest predation (Eguchi 1995). To enhance inaccessibility of the nest, thorny branches from hawthorn *Crataegus monogyna* Jacq., blackthorn *Prunus spinosa* L., sea buckthorn *Hippophae* sp. or rose *Rosa* sp., are habitually incorporated into the roof when available (Bendire 1892, Taylor 1912, Witherby 1920, Brown 1924, Linsdale 1937, Birkhead 1991, Khan *et al.*, 2022). Magpies were even observed to fly a distance of up to three miles (around 5 km) to collect thorny twigs for dome construction (Stewart 1928). This specific placement of thorny twigs hints at a functional use, i.e. to ward off predators (Birkhead 1991). Stewart (1928) writes: 'The piling of this huge heap of thorn twigs above the nest is a protective habit, acquired by this weaker member of the 'corvine' family against its enemies, there can be no doubt'.

The roof of our collected Antwerp magpie nest consists almost entirely of metal anti-bird spikes. In the roof alone, a total of 61 strips were counted, containing 604 metal spikes, altogether 16.72 m of strips. The anti-bird spikes may represent the urban equivalent of the thorny branches used in 'natural' magpie nests, and is another example of artificial nest material that mimics natural materials (Hiemstra *et al.* 2021).

The magpie nest from Scotland also contained anti-bird spikes and interestingly, all anti-bird spikes (circa 12 strips) were located on top of the nest (Fig. 6). Two magpie nests that were found in 2001 in Arnhem, The Netherlands, included barbed wire and knitting needles in the dome (S. Waasdorp, pers. comm. 2021). These nests may further support the notion that the use of these sharp anthropogenic materials can be used to enhance nest defense.

There may be different motivations for birds to use artificial nesting material (Jagiello *et al.* 2019). It may for example strengthen the nest (Antczak 2010), repel parasites (Suárez-Rodríguez *et al.* 2013) or function for 'signalling' (Sergio *et al.* 2011). And while the metal anti-bird spikes may also strengthen the nest, their specific form and placement within the dome suggests a more specific use. To our knowledge, what we present here is a new function of artificial material usage, namely for nest defense.

Additional research should focus on the effect on fledgling success of nests with and without thorny twigs in the dome, and the incorporation of artificial spikes therein. An experimental study may look at preference for either natural or artificial spikes for dome construction. The anti-bird spikes may be used by urban birds purely as a replacement for thorny twigs which are less available in cities (Floron 2022), but a further understanding of the use of bird deterring product by birds themselves, may also show an increased protection from avian predation.

This innovative use of bird spikes for nest construction can be seen as a modification of a pre-existing natural behaviour (Kaufman & Kaufman 2015, Nicolakakis & Lefebvre 2000) and shows the flexibility of nest-building behaviour and use of materials (Collias & Collias 1984, Hansell 2002). In today's Anthropocene epoch, there is more anthropogenic material present than natural biomass (Elhacham *et al.* 2020), and it may thus not come as a surprise that these spikey alternatives are being adopted by urban birds. If even bird deterring material is used as nesting material, anything may become part of a bird's nest today.

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