

Marker pens to prevent bird deaths from collisions with windows

It is estimated that millions of birds die each year as the result of collisions with windows and other reflecting and transparent glass panes. Dr. Roland Kolbe, a researcher from the Baden-Württemberg city of Eningen unter Achalm has addressed this problem with the development of two products to prevent such collisions. The products are based on the differences in the physiology of vision between birds and human beings. Both products alert birds to the presence of glass obstacles without restricting people's ability to see through the glass, making them excellent alternatives to the commonly used, but rather ineffective, black bird-of-prey silhouettes.



The reflection of the sky and plants in windows is frequently fatal for birds. Dr. Roland Kolbe has developed a marker pen that helps to save robins and other birds from being killed as the result of collisions with windows.

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There can be very few people who have not heard that dull whump at the window and discovered a motionless bird on the floor in front of it. The bird in question often appears to recover and flies away. However, the injured bird may later suffer internal haemorrhaging that leads to death. It is estimated that around 250,000 birds die in Europe every year as a result of collisions with windows and other glass panes. This problem affects over 70 species of birds, from blackbirds to wrens. The problem is that birds are unable to recognize reflective and transparent glass panes as obstacles. The reflection of the sky

and plants in windows is particularly deceptive as it makes the birds think that these are safe areas to fly. So what can be done to warn birds and prevent them from flying into objects that kill them? Dr. Roland Kolbe is an animal lover who has been intrigued by this question for a long time, to the extent that he started looking for solutions to the problem.

Bionics is the solution

Kolbe's research led him to a scientific paper published in 2002 in which the biologist Dr. Friedrich Buer described what he called a spider's web effect. Araneids have long known how to protect their webs against the likelihood of birds flying into them. The gossamers reflect ultraviolet (UV) light and the background of the webs absorbs UV light. As birds can see UV light very well, they can discern the spiders' webs and avoid colliding with them. The UV reflection of the spiders' threads thus prevents birds from colliding with the webs at the same time as protecting the web against destruction by birds.

Based on the model of nature, the scientist has therefore come up with the following solution for preventing birds from colliding with windows and other glass panes: a substance that absorbs UV light is applied to window panes, which only weakly reflect UV light. Just as birds recognize spiders' webs as richly coloured and rich in contrast, hence alerting them to an obstacle, they can also recognize the specifically treated glass panes as obstacles. In contrast, the UV-light absorbing substances cannot be perceived with the human eye.

Due to the differences in the physiology of vision between birds and human beings, birds can see UV light very well whereas human beings cannot. Humans have three specialized types of cone in their retina that are preferentially sensitive to blue, green and red light. Humans can see a colour when one or two of these wavelengths enter their eyes and an object is seen as white when all three cone types are stimulated simultaneously. In contrast to humans, birds have a fourth cone type that reacts specifically to UV light. It is assumed that birds see white when all four different cone types are stimulated and colours when one of the four colour components is missing.

The development of a product to protect birds against collisions with windows

Kolbe based his investigations on the spider's web effect and has developed two bionically inspired products to protect birds from fatal collisions with windows. One of the products is what Kolbe calls a "birdpen", a thick marker pen that contains a transparent UV light absorber. The pen is very easy to use. A stripe pattern is drawn on the exterior of the window and left to dry. "A big challenge was finding a way to apply a liquid layer on the glass pane that was as thin and regular as possible," said Kolbe. The solution to the problem was a type of felt that Kolbe purchases in Italy. The tubular jacket is produced in Germany and the cartridge that contains the liquid is produced in Korea. For Kolbe it was extremely important to only use substances that are nontoxic and solvent-free. The individual parts of the pen are assembled manually and dispatched in a shipping carton Kolbe designed himself.

Kolbe's second innovation is a so-called "birdsticker", a transparent adhesive shaped like a bird of prey that is glued to the exterior of the window. In contrast to the black bird-of-prey stickers that are commonly used and not very effective, the "birdsticker" does not obstruct people's view. The sticker is based on the same bionic principle as the "birdpen". In contrast to the "birdpen", the advantage of the sticker is that it lasts a long time. Once on the glass, it does not need to be replaced for eight years and is very effective in preventing birds from colliding with the window. The disadvantage of the "birdpen" is that the stripes have to be reapplied every time the windows are cleaned. Kolbe spent a lot of time looking for a suitable UV-active sticker foil and he finally selected a high-quality foil from the USA. His technical training as an engineer helped Kolbe a lot in dealing systematically with the challenges associated with the development of the two products.



Human beings cannot see the birdsticker (left) whereas birds perceive it as an obstacle.
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Kolbe has also had many periods of doubt, not about the idea itself, but about its feasibility and technical implementation. "You need quite a bit of idealism and patience when it comes to developing products like these," said Kolbe. But his success is proof that he was right. The effectiveness of the product has been scientifically proven, and is quite high; the pens and stickers have a success rate of around 70 per cent and there has been positive feedback from people who have purchased the products. Kolbe hopes that the public will become increasingly aware of the problem of bird strikes, and that many people will follow his example and support him in his effort to save birds from dying as a result of collisions with windows and other glass panes.

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