



How Does Nature Deal with Humans?

Ornela De Gasperin explores how animals adapt to cope with human activities

WELCOME TO THE ANTHROPOCENE: a new geological epoch that scientists are proposing to describe the time span on which human activities have had a significant ecological impact. Human activity has changed the Earth so rapidly that new rocks have been observed to form out of plastic, and the amount of plastic on the oceans is estimated to be around 269,000 tonnes. Moreover, during the last 500 years, at least 322 animal species have gone extinct as a direct result of human activity. In general, animals living near human settlements have smaller home ranges compared with non-urban areas, and behavioural changes of all sorts have been documented as a result of human presence. As worrying as this is, many animal species are adapting their behaviour to cope with this dominating human influence.

A man-made landscape



As urban areas, airports and highways spread across the land, noise pollution has become ubiquitous and most species are exposed to it. Many animals use noises, songs and/or calls to communicate. Therefore, scientists have begun to investigate how urban noise influences communication in different animal species.

Birds use songs and calls in a variety of social contexts: to attract potential mates, to advertise and

defend their territories from rivals, to locate their chicks, and as alarm calls when predators are nearby. Urban noise can interfere with all of these social processes; however, birds still remain living in cities and urban areas. Has this noise interfered with their social interactions and how have they managed to cope with it?

In 2003, a study developed by Hans Slabbekoorn and Margriet Peet at Leiden University in the Netherlands, asked exactly this question by studying the calls of 32 male great tits across the Netherlands. Their results showed that males living in very noisy locations sing at a higher frequency (pitch) to prevent their songs from being masked by urban noise, as opposed to the singing pitch of tits living far away from cities. Noises in cities tend to have a low frequency; therefore, by singing at a higher frequency their songs can still be heard by individuals of the same species. Similar studies have shown that other bird species, like song sparrows, the Northern cardinal and blackbirds do this as well. Besides changing the frequency of their song, birds can also change their singing schedules to avoid urban noise contamination. Robins, for instance, start singing earlier than dawn, presumably because at this time of the day there is less noise from the city.

This phenomenon is not restricted to avian species; frogs and squirrels have been shown to increase or decrease the frequency of their songs or the number of vocalisations as a response to human noise. Sometimes these changes only occur during the noisiest part of the day and the animals maintain their normal habits outside these hours. A similar study was conducted on orca whales. Whales live in social groups and they use sound to communicate between one another. Researchers from the University of Durham, UK, wondered whether or not whale-watchers influence their subjects' communication. The researchers compared the vocal communication of orcas in the

presence and absence of whale-watchers in the US State of Washington. Surprisingly, they found that these whales produced longer calls while whale-watchers were present, which suggests that whales also change their behaviour according to humans' presence.

Perhaps more surprisingly, birds have learnt the speed limit of streets and highways, and they have adjusted their behaviour accordingly in order to avoid danger. This startling result was found by Pierre Legagneux from the University of Quebec and Simon Ducatex from the University of McGill in Canada. They performed an experiment in France by driving on roads that had different speed limits (20, 50, 90 and 110 km/h). They also varied their own speed from the posted speed limit and registered how long it took the birds on the street to fly away from the car. They recorded the time from the moment the bird started to fly until the car reached the spot where the bird had been, and they calculated the distance at which the bird



initiated the flight. Presumably, the sooner a bird flies away from an approaching car, the less likely it is from being hit by it, but if the bird flies away too soon too often, it may not manage to get enough food. What they found was remarkable: birds adjusted their flying distance from cars according to the speed limit of the highway - they flew away from the approaching car sooner on roads with higher speed limits. Interestingly, the actual speed of the vehicle did not affect their flying distance.

Animals have also changed their behaviours to incorporate human-made materials. For example, many birds build nests that they use to lay their eggs. Parasites develop in these nests too, which can be detrimental for the chicks. Parent birds change the composition of their nests to reduce parasite loads, for instance, by bringing into the nest plants with volatile components that reduce parasitic growth. Recently, birds have started to bring cigarette butts into their nests, and an experimental study performed by Montserrat Suarez and collaborators in Mexico City showed that smoked butts act as an insect repellent. Unfortunately, while there are short-term benefits of bringing smoked cigarettes into a nest, there are also costs. Birds exposed



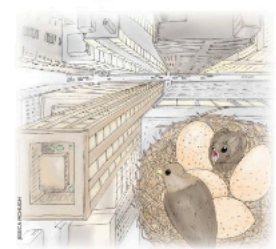
Insects and birds incorporate human-made materials such as plastic into their nests

to more butts from smoked cigarettes had higher levels of genotoxicity in their blood, so the positive effect may be counterbalanced by long-term costs.

Bees are also starting to use human-made materials to build their nests. Bees live in complex societies within large colonies. A queen lays her eggs, which are tended by worker bees. Worker bees then construct the chambers where the eggs develop and pupate. These chambers, called brood cells, are hexagonal and are usually made out of organic matter. However, two species of bees in Ontario, Canada, have been observed to collect pieces of plastic bags, which were then used to construct and close brood cells. These cells were used by the queen, and the eggs and larvae fully developed and successfully emerged as adults.

These types of behavioural changes may be what animals need to do in a world where humans have become omnipresent. So, although humans are having major impacts on wildlife, at least some animals are adapting themselves to our presence and learning how to cope with us.

Birds follow the speed limit of streets and highways



Animals adapting to the urban environment

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