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Device that emits natural warning calls reduces train-animal collisions

Animal-train collisions are an important cause of animal mortality. This study tested the ability of a device that emits natural warning calls to reduce risk of animals being hit by trains in central Poland. Animals, including roe deer (*Capreolus capreolus*), red fox (*Vulpes vulpes*) and brown hare (*Lepus europaeus*) escaped in most cases. The authors say the device is an effective means of risk reduction as it allows animals to escape train tracks earlier and more often.

Although travelling by rail is generally thought of as better for the environment, rail transport can be dangerous for nearby animals, which can fatally collide with trains. Several sound emitting devices have been invented to deter animals from railway lines. However, animals tend to become accustomed (or habituated) to high frequency sound waves, making them ineffective in the long-term. Devices that instead use natural calls made by animals are more promising, but little research has been conducted to test their efficacy in real-life situations.

This study tested an animal protection device called UOZ-1, which emits the natural warning calls of several animals, received as a warning of danger and threat to life. Signals from the railway system activate the device to emit these sounds, usually 60 seconds before a train arrives. The researchers tested the ability of the device to protect animals living near to railway tracks in central Poland.

The experiments were performed between August 2008 and November 2012 at two study sites along the E20 line, a frequently used line which runs between Minsk Mazowiecki (West Poland) and Siedlce (East). The area of study, which covers around 50 kilometres of track, is characterised by populations of hoofed mammals, including roe deer, as well as foxes and brown hares.

Using digital cameras, the researchers recorded animal activity 24 hours a day over an approximate 4 year period. The aim was to determine the reactions of mammals to the sound signals emitted by the device. The researchers compared the frequency and speed of reactions when devices were switched on with when they were switched off. Measuring the reactions of the animals in successive years also allowed the researchers to determine whether they became accustomed to the sounds.

In total, the researchers made 2262 observations of animals crossing or coming near railways, involving 2956 individual animals. When a train approached and the device emitted its sound, most animals were able to escape (between 85–93%, depending on the species).

As the most numerous species in the area, the researchers were particularly interested in the efficacy of the device for roe deer. The device allowed the deer to escape 16% more often. Their reaction time to oncoming trains was also three times (20 seconds) faster when the device was turned on.

The proportion of deer that showed no reaction to the device was similar in the first and last year of the study, suggesting that the animals did not become habituated to the warning signals emitted by the device.

These results suggest that UOZ-1 is more effective in reducing risk of train-animal collision than the sound of an oncoming train alone. The authors say the device provides acoustic stimuli in addition to that provided by the train, thereby acting as an additional and earlier warning signal, which is particularly important where high-speed trains are concerned. The researchers recommend using natural warning calls of several different animal species to reduce the risk of animal-train collisions. While this device is clearly effective, cost may be a barrier to its widespread implementation, as the average current installation cost for one device ranges from €7 200 to €12 000.

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