

## Ultrasonic animal repellents

### What are they?

Ultrasonic animal repellents are loudspeakers that produce different sound frequencies depending on the animal species to repel. Those devices not only transmit 'real' ultrasounds (with frequencies higher than 20 kHz/kilohertz), which should, in principle, be inaudible to humans, but also use high-frequency audible sound waves (with frequencies lower than 20 kHz). In some cases, depending on the type of the device and the animal species that it repels, the user can adjust the frequency.

### Complaints

The Product Policy Service of the Federal Public Service of Health, Food Chain Safety and Environment regularly receives complaints about nuisance caused by this type of device. In order to gather more information about this topic, this Service has commissioned two studies: on the one hand, the sound pressure of various types of ultrasonic animal repellents was measured and on the other hand volunteers were exposed to various frequencies of one type of device.

### Summary of the research results

The Product Policy Service has had several types of ultrasonic animal repellents tested by the expert company Vinçotte. Those tests show that some of those devices can produce rather high sound pressures from several metres away (more than 70 dB at 4 metres away). That is the limit recommended (at a frequency of 20 kHz) in order to prevent short-term effects as nausea and headache, and loss of hearing in case of long-term exposure. The risk of hearing loss is low because most devices are only activated by a movement detector. Some other devices (dog repellents or bark control systems) can exceed the most strictly recommended limit of 100 dB at a distance of one meter at a frequency of 25 kHz. The same conclusions can be drawn here because the devices are only activated when the user pushes a button or automatically when a dog barks. The sound pressure decreases rapidly with the distance.

As the sound pressure itself does not provide enough information about the nuisance that may be caused to some people, the Product Policy Service has conducted a study in co-operation with KU Leuven exposing young volunteers (18-25 years old) and middle-aged volunteers (46-58 years old) to the sound of an ultrasonic animal repeller. The age difference is important as young people are more sensitive to high sound frequencies than older people.

Some of the volunteers could hear the signal transmitted at 'ultrasonic modes' (frequencies higher than 20 kHz). This could be explained by the fact that the device transmits an accessory signal, i.e. an additional sound within the audible sound range caused by the functioning of the loudspeaker. Those who could hear the signal found it disturbing. During the study, there were no reports of nausea, headache or similar symptoms. The sound pressure varied between 60 and 75 dB depending on the frequency (on a distance of 6,5 m from the device).

## **Conclusions**

Some ultrasonic animal repellents can exceed the scientifically recommended sound pressure limit at a few meters distance. The risk of hearing loss is low but the sound can be disturbing.

The signal of an ultrasonic animal repeller can be audible or inaudible depending on the adjustment of the frequency. Its audibility also differs between individuals and depends on age and specific hearing sensitivity.

Despite the fact that pure ultrasonic sound frequencies are inaudible, the signal of an ultrasonic animal repeller can be audible to some people.

The complaints therefore deserve the necessary attention.

## **Recommendations**

Installing the device correctly may be a solution in some cases.

- Choosing a higher frequency might help if the frequency of the ultrasonic animal repeller can be adjusted. This may however affect the signal's repelling effect on some animal species.
- Bear in mind that children and adolescents have more sensitive hearing than adults: the older we get, the less sensitive our ears become to high tones. In addition, sensitivity also differs between individuals of the same age.
- It is also important to position the device correctly: do not direct it towards your neighbour's garden, the public highway or any area where someone could go near the device.

Alternative solutions (mechanical traps or in the worst case pesticides) may be suggested depending on the animal species causing nuisance.