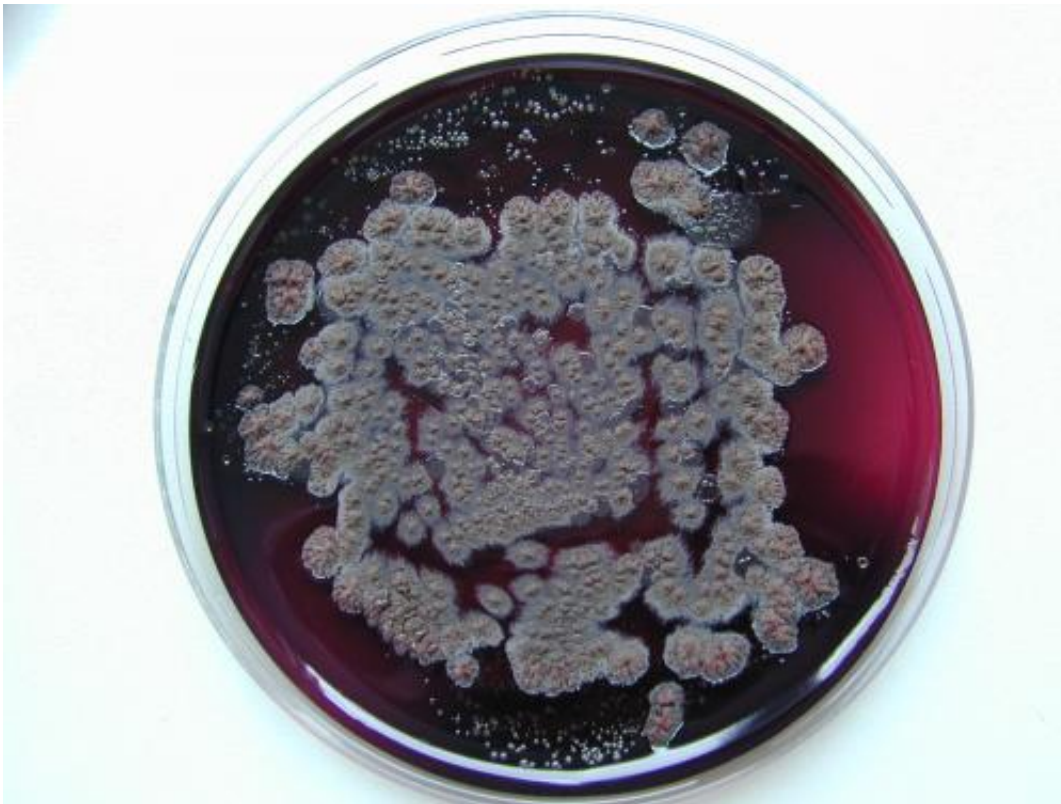


Investigating the "underground" habitat of *Listeria* bacteria

September 29 2014



The collected soil and water samples were analyzed in the laboratory for their identity. Credit: Beatrix Stessl/Vetmeduni Vienna

The literature describes *Listeria* as ubiquitous bacteria with widespread occurrence. Yet they only become a problem for humans and animals when they contaminate food processing facilities, multiply, and enter the food chain in high concentrations. An infection with *Listeria*

monocytogenes can even be fatal for humans or animals with weakened immune systems.

Listeria in soil or water are not dangerous

"Listeria in [soil](#) or water represent a relatively low risk to humans," explains study director Beatrix Stessl. "The concentrations are too low. The aim of our study was to ascertain where Listeria occur and which species and genotypes were prevalent there." Martin Wagner, head of the Institute of Milk Hygiene, adds: "This information can help us to better understand the mechanisms through which these bacteria are spread."

Flooding favours Listeria contamination

Over a period from 2007 to 2009, first author Kristina Linke and her colleagues collected nearly 500 soil and 70 water samples from three Austrian regions: the eastern Alps, the Donauauen National Park adjacent to the river Danube, and Lake Neusiedl. The study regions involved natural, non-agricultural areas. Of all samples, 30 percent were detected positive for Listeria. Of these, 6 percent were contaminated with Listeria monocytogenes, the only species that is potentially dangerous for both humans and animals. *L. monocytogenes* was detected especially near the rivers Schwarza and Danube. Particularly high rates of the bacteria in soil and water samples were registered in September 2007 during extensive flooding in the region.

In most regions, the researchers found only Listeria that are non-pathogenic to humans.

The species *Listeria ivanovii*, which is potentially dangerous for [animals](#), was found mainly in mountainous regions where the bacteria are presumably excreted by wildlife species. The non-pathogenic *Listeria seeligeri* was most frequently isolated in the region around Lake

Neusiedl, which is likely explained by the waterfowl population in this area.

No *Listeria* were isolated in high-altitude mountain regions. The researchers explain the greater contamination at lower altitudes with the proximity to farms, agricultural land and the urban environment.

Antibiotic-resistant *Listeria* in soil

Although *Listeria* that contaminate food are generally not considered to be resistant to antibiotics, Stessl and her team found several *Listeria* strains in soil samples which resisted treatment with antibiotics. The bacteria have developed resistance. Stessl sees the possible causes as follows: "A number of soil microorganisms, such as fungi, naturally produce antibiotics. *Listeria* which are constantly exposed to these substances in the soil probably develop resistance. We believe, however, that the development of particularly high-resistant strains of *Listeria* can be explained by the proximity to agricultural land and the urban environment."

More information: "Reservoirs of *Listeria* species in three environmental ecosystems," by Kristina Linke, Irene Ruckerl, Katharina Brugger, Renata Karpiskova, Julia Walland, Sonja Muri-Klinger, Alexander Tichy, Martin Wagner und Beatrix Stessl was published in the *Journal Applied and Environmental Microbiology*. [DOI: 10.1128/AEM.01018-14](https://doi.org/10.1128/AEM.01018-14) aem.asm.org/content/80/18/5583.long

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