

E. coli gets a boost from lettuce disease

July 31 2015, by Kim Kaplan



When lettuce is infected by downy mildew, it is easier for *Escherichia coli* O157:H7 to get a foothold, according to an ARS study. Credit: USDA-NRCS.

Escherichia coli O157:H7, a bacterium that causes foodborne illness in humans, is more likely to contaminate lettuce when downy mildew is already present, according to U.S. Department of Agriculture (USDA) scientists.

Downy mildew, a lettuce disease caused by the fungus-like water mold *Bremia lactucae*, is one of the biggest problems that lettuce growers must deal with.

But microbiologist Maria Brandl, with the USDA Agricultural Research Service's (ARS) Produce Safety and Microbiology Research Unit in Albany, California, has been investigating why so many *E. coli* O157:H7 outbreaks can be traced back to lettuce fields when *E. coli* O157:H7

sources are as diverse as undercooked beef, sprouts, raw dairy, shelled walnuts, fruits and vegetables. ARS is USDA's chief in-house research agency.

Lettuce leaves are actually a harsh place for microbes to survive. But the epidemiological evidence is indisputable about how often lettuce is the source of *E. coli* O157:H7 contamination.

In earlier research, Brandl found that *E. coli* O157:H7 preferred cut, injured and younger leaves to undamaged and older ones. Then, she collaborated with ARS geneticist and lettuce breeder Ivan Simko from the Crop Improvement and Protection Research Unit in Salinas, California.

They found that under warm temperature and on wet leaves, *E. coli* O157:H7 multiplied 1,000-fold more in downy mildew lesions than on healthy lettuce leaf tissue. Even on dry lettuce leaves, where most bacteria struggle to survive, *E. coli* O157:H7 persisted in greater numbers when downy mildew disease was present.

The researchers also found that *E. coli* O157:H7 did not grow as well in downy mildew lesions on the lettuce line RH08-0464, bred by Simko and a colleague to be less susceptible to the lettuce disease, as the bacteria did on Triple Threat, a commercial variety that is highly susceptible to downy mildew.

The exact factors that caused less growth of *E. coli* O157:H7 in the more resistant line still need to be carefully explored. But if a genetic hurdle to *E. coli* O157:H7 colonization could be bred into commercial lettuce varieties along with [downy mildew](#) resistance, it would add a new defensive line to contamination of lettuce, helping farmers to improve the microbial safety of their crop as well as control their number-one plant disease problem.

More information: agresearchmag.ars.usda.gov/2015/jul/lettuce/

Provided by Agricultural Research Service

Citation: E. coli gets a boost from lettuce disease (2015, July 31) retrieved 24 April 2024 from <https://phys.org/news/2015-07-coli-boost-lettuce-disease.html>

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