An interdisciplinary team of scientists from Nanyang Technological University, Singapore (Singapore) has identified, for the first time, a key mechanism by which a dangerous plant can infect crops.

The Xanthomonas bacteria, known as the “crop killer”, is a globally prevalent bacterium infecting 400 different plant species. It causes bacterial spots and blights in the leaves and the plants it infects. In some cases, once the disease takes root, a farmer’s only recourse is to down and burn the entire crop of plants to stem the spread of disease.

The NTU researchers identified the exact cellular-level mechanism by which the bacteria penetrate and hijack a plant’s immune system, therefore leaving them vulnerable to infection.

The Xanthomonas bacteria infects and damages plants by injecting toxic proteins into the plant cell. These proteins hijack and take over the plant’s normal biological processes, preventing the plant from mounting an immune response.

The research team discovered that the toxic proteins interacts with plant cells like liquid glue allowing the bacteria protein to “glue” onto the plant cell and merge into it. This lets the Xanthomonas bacteria infiltrate and invade the plant cell, leaving it vulnerable to infection.

Understanding exactly how plants and crops are infected by bacteria is a crucial step in developing methods to prevent their infection and produce crops that can resist the disease.

The team has obtained a provisional patent for a toolkit they have developed that allows to replicate the infection process. This will allow researchers to test potential solutions for strengthening crop immunity in laboratory settings. It also has potential applications for synthetic biology and agri-food technology.
Infection method behind ‘crop killer’ bacteria revealed | Mirage News

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