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Plant disease

When the chips are brown

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A new bacterium may be responsible for turning potato crisps a nasty colour

POTATO crisps—or chips, to those ignorant of the pleasures of a bag of real chips, with lashings of salt and vinegar, after a night in the pub—are the world's most-nibbled snacks. But that may change if a bizarre, new disease becomes widespread. "Zebra chip", as this disease is known, causes crisps to develop stripes, and growers and crisp-makers alike are worried. The pattern renders chipping potatoes unsaleable and some farmers have lost much of their crop as a result.

Zebra chip was first noticed in Mexico, in 1994. By 2000 it had spread to Texas. It has subsequently appeared in other states, including Arizona and California. The disease also exists in Guatemala and has now turned up in New Zealand.

Though it brings no known risk to human health, this is bad news. What seems to be happening is that bands of cells within each potato tuber are having their starch converted into sugar, and that the sugar caramelises when the tuber is cooked. What no one is sure about is what is doing the conversion.

Part of the answer is an insect called the potato psyllid. Last year Joe Munyaneza, an entomologist at the Yakima Agricultural Research Laboratory in Washington state, found that tubers from plants exposed to these insects showed typical zebra-chip symptoms, while those from unexposed plants had none. But the potato psyllid is merely the vector. The actual pathogen is still elusive.

The most likely culprit is a newly discovered bacterium. Earlier this year researchers in New Zealand began investigating a psyllid infection in glasshouses growing tomatoes and peppers (plants closely related to potatoes). They identified a previously unrecorded species of *Candidatus*, a group of disease-causing bacteria that infect many sorts of plant. In June

Dr. Joseph E. Munyaneza



Have potato crisps had their chips?

Biosecurity New Zealand, the government agency charged with protecting the country's crops from such threats, announced that this new bacterium had also been detected in potato crops. Genetic markers for the bacterium were sent to America and the Animal and Plant Health Inspection Service confirmed in July that the same form of *Candidatus* had been found in potatoes from two fields in Texas that were exhibiting zebra-chip symptoms.

Work is now under way to discover more about it, and to establish if it really is the cause of zebra chip. It appears to be related to a bacterium transmitted by the potato psyllid's relative, the citrus psyllid. This older species causes "citrus greening" or huanglongbing disease, and is extremely damaging to citrus farms.

Officials in New Zealand say they have no idea how the new species arrived in their country. But psyllids are light and can travel on the wind, so they could simply have been blown there. That raises concerns that zebra chip could turn up in other areas. If it spreads much further, and no countermeasures can be developed, then the potato crisp itself could become an endangered species.