# Healthy grain fibre helps barley resist pests

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Research at the University of Adelaide's Waite campus has shed light on the action of the serious agricultural pest, cereal cyst nematode, which will help progress improved resistant varieties.

Published in the journal *New Phytologist*, the researchers showed how the composition of the cell wall that surrounds the feeding sites of these tiny parasitic worms in the plant roots differs between resistant and susceptible varieties of barley.

"A type of fibre that we usually associate with wholegrain and healthy foods — beta-glucan — accumulates in the cell walls surrounding nematode feeding sites in the resistant variety Chebec, but not those of the susceptible variety Skiff," says corresponding author and University of Adelaide ARC Research Fellow Dr Matthew Tucker.

The research is a collaboration between the University of Adelaide-based ARC Centre of Excellence in Plant Cell Walls and the South Australian Research and Development Institute (SARDI). It is led by Dr Tucker and Professor Diane Mather, the JAT Mortlock Chair in Crop Improvement

Cereal cyst nematode is a microscopic parasitic worm that lives in soils and infects the roots of cereal crops such as barley, wheat and oats. This affects root growth and leads to poor nutrient uptake, a reduction in crop yield and, in susceptible varieties, more worm eggs in the soil for ongoing infection.

"Fortunately many barley varieties carry genetic resistance to cereal cyst nematode; in these cases, worms enter the roots, but relatively few females develop to maturity. By comparing the cyst nematode infection cycle in resistant and susceptible barley varieties, we can identify changes that might be part of natural defence strategies," says Dr Tucker.

Crop losses associated with parasitic cyst nematodes have been estimated at around 10% worldwide, contributing to approximately $100 billion worth of annual global crop damage. In Australia alone, losses due to cereal cyst nematode have been estimated to be $84 million per year, but could be as high as $600 million if current control measures aren't used.

"We think that altered beta-glucan abundance around the nematode feeding sites of barley roots may influence nutrient flow into the feeding site and subsequently into the nematode," says Dr Tucker.

"We also identified several new genes that are influenced by nematode infection and may influence beta-glucan levels as a response to infection in barley roots. We aim to use this information to identify varieties with different cell wall composition in the roots and determine the impact on resistance, possibly leading to new targets for resistance strategies in barley and other cereal crops."

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Provided by University of Adelaide