

Establishing the role of IAA and related plant indole compounds in nematode infection

Rosane Curtis, Katarzyna Dybal, Peter Hedden, Tony Miller, Susan Smith, Alice Teillet

Plant parasitic nematodes are major constraints for crop productivity worldwide and significantly reduce resource use efficiency causing yield reductions valued at \$100 billion each year despite control measures. Most control strategies for these pests involve the use of crop rotations, chemicals and plant resistance but in many situations such measures are impractical. Host recognition processes are poorly understood and few methods have been studied that affect the ability of nematodes to locate their hosts. Plant parasitic nematodes have developed the capacity to sense and respond to chemical signals of host origin and the ability to orientate towards plants enhance their chances of survival. We were the first to demonstrate that plant signals present in root exudates, trigger a rapid alteration of the surface cuticle of sedentary plant parasitic nematodes and that phytohormones can act as cues that affect the orientation of infective nematode juveniles. The key objective of this proposal is to understand how the infective stages of root-knot nematodes detect and respond to IAA and related indole compounds and we will test the following hypotheses during the life of the project:

- 1) IAA and indole compounds are perceived by nematodes as host cues and nematodes follow an IAA gradient during their invasion of plants
- 2) the hormone status of the root determines nematode infection and establishment
- 3) plant IAA signals the presence of food to nematodes by inducing changes in their gene expression. Therefore, this proposal seeks to provide an understanding of the mechanisms involved in host-recognition in the early events of nematode infection of plants. Understanding the signalling and perception occurring in such interactions will reveal targets for chemical or genetic intervention.



Image of root invasion by juvenile nematodes

Project Sponsor: BBSRC

Start date: January 2009 (duration three years)