

Title: Visualising plant structures using Diffraction Enhanced Imaging
Subtitle:

Authors: Lester Young, Martin Reaney, Dean Chapman, Zhong Zhong and Chris Parham

Abstract:

X-rays have been used to visualise plant structures in the past, however poor contrast has limited radiographic imaging in plants. A relatively new technique, Diffraction Enhanced Imaging (DEI), has demonstrated great potential for the examination of plant anatomy and some physiological events. The high level of contrast in DEI is a result of X-ray diffraction and scattering at density boundaries (i.e. between tissues) and allows observation of structures not possible using conventional radiography. We have used DEI to examine canola seeds and have observed different anatomical structures. We have also examined germinating canola and wheat seeds over a time course and see density changes corresponding to physiological events that are known to occur but have never been observed directly. DEI has great potential to further our understanding of plant anatomy and to investigate the interaction between structure and physiology.

Lester Young received his PhD in Plant Molecular Physiology from the University of Saskatchewan in 2003. Currently he is a NSERC Visiting Fellow at Agriculture and Agri-Food Canada with Martin Reaney and Neil Westcott. Dr. Young is developing novel techniques that will be of use to plant genomics researchers requiring high-throughput analytical and phenotypic screening data, as part of Genome Prairie's "Enhancing Canola Through Genomics" programme. A substantial portion of his work is investigating the use of synchrotron radiation to examine seed composition and anatomy.