



Mapping 3D Tree Canopy for Precision Management

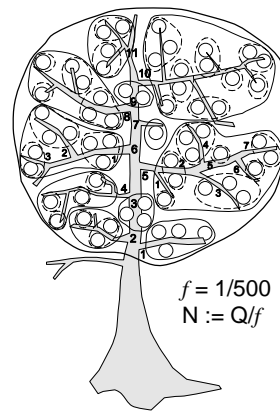
Associate Professor Dvorlai Wulfsohn dw@kvl.dk
(Principal Investigator)

Our goal is to develop practical stereological sampling methodologies for estimating the total number of flowers (or berries, fruit, leaves, ...) and their 3D spatial variation in tree and orchard.

We aim to develop increasingly automated methods so that sampling is rapid and detailed enough for purposes of precision management.

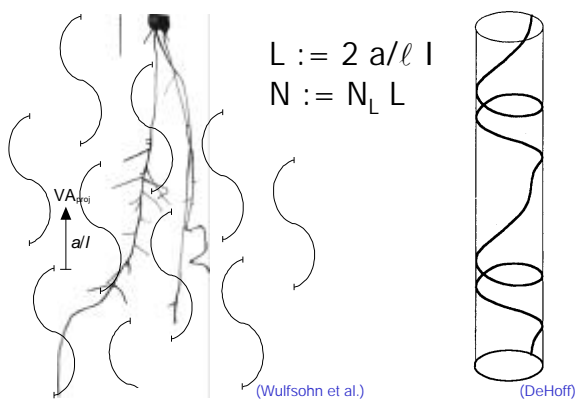


Hypotheses

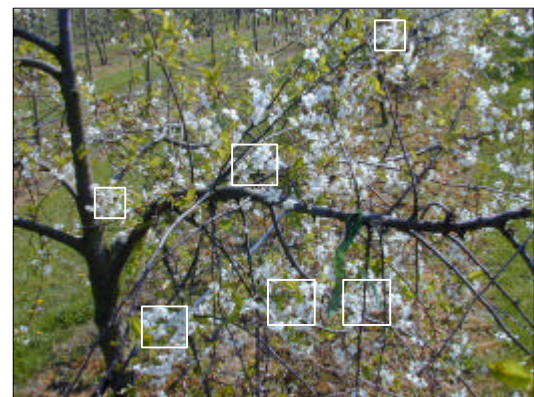


Spraying of apples (l) and fertilization of sour cherries (r) can be optimized using knowledge of flower numbers

'Fractionator' design—an application of nested cluster sampling, is most suitable for manual sampling



'Vertical' designs allow systematic sampling of trees in 3D using 2D pictures and 1D beams



Non-uniform (weighted) designs can be used to optimize sampling according to flowering spatial structure

Objectives (2003–2005)

- ❑ Development and testing of sampling protocols
 - Fractionator design for manual sampling
 - Vertical designs for (semi-)automation
 - Weighted and adaptive sampling versions
- ❑ Integrate with Agrotechnology research robot
- ❑ Investigate feasibility of technologies for automation
 - Multi-spectral imaging
 - Thermal imaging
 - Lasers

