



Digital images for assessing soil cover of crop plants

Jesper Rasmussen &
Michael Nørremark



7TH WORKSHOP - PHYSICAL AND CULTURAL WEED CONTROL



Conclusion

- **Crop soil cover can easily be estimated from digital images, which means that visual assessments should be avoided in future**
 - We have developed an automated digital image analysis procedure
 - We have developed a standard for the capture of images



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Crop soil cover

- the percentage of the above ground crop parts that are buried in soil due to harrowing



What is the crop soil cover?
- the immediate impact on the crop

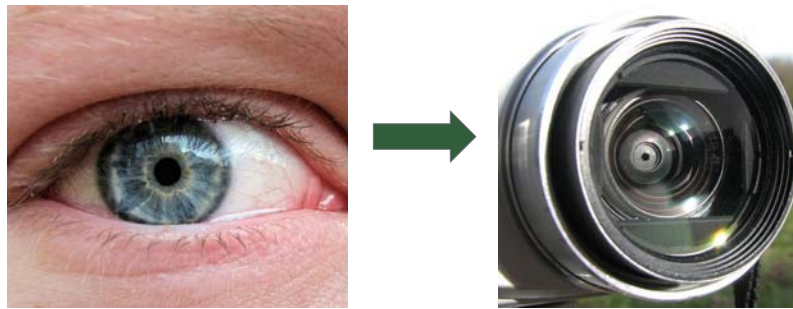


52% crop soil cover



Assessment of crop soil cover

From visual to digital
From biased assessments to objective
assessments



Two methodical challenges

How to acquire the pictures?

How to analyse the pictures?



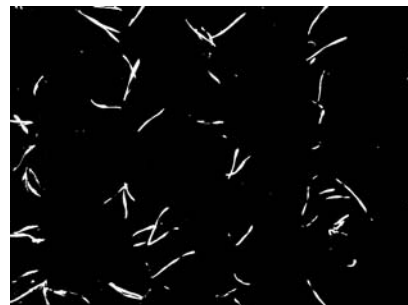


The images
What about light conditions?
What about?



Digital image analysis output: Leaf cover
-the proportion of pixels in digital images determined to be green

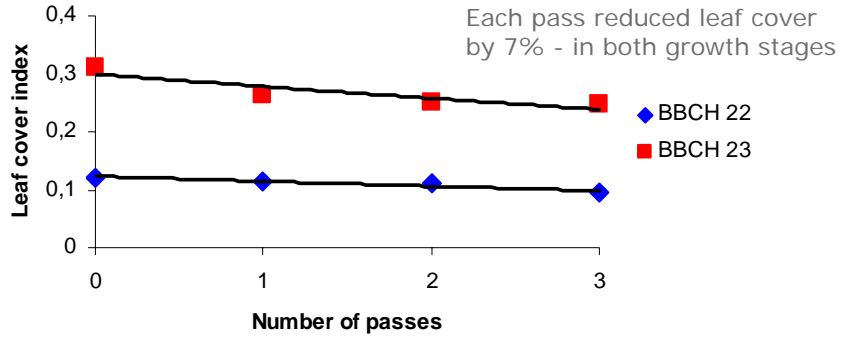
Leaf cover = 2,57%





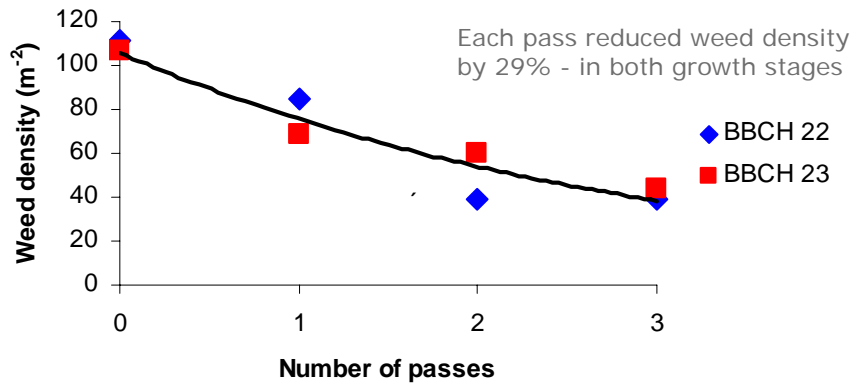
Impact on leaf cover

Increasing number of passes in winter wheat



Impacts on weeds

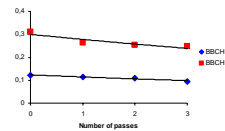
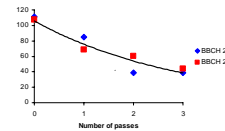
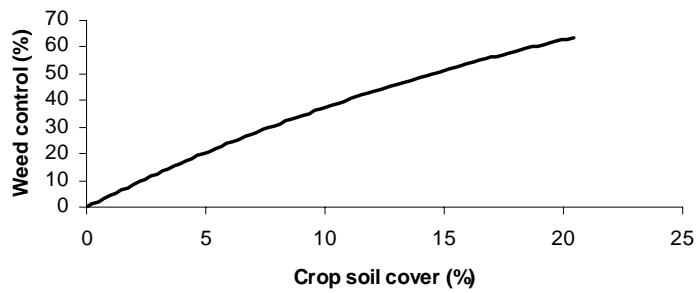
Increasing number of passes in winter wheat





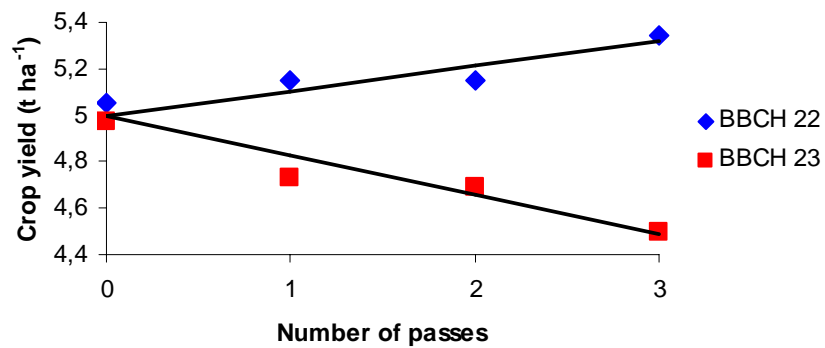
Selectivity estimated from previous curve-parameters

Estimated selectivity curve for both growth stages



Impact on crop yield

Increasing number of passes in winter wheat





New concepts

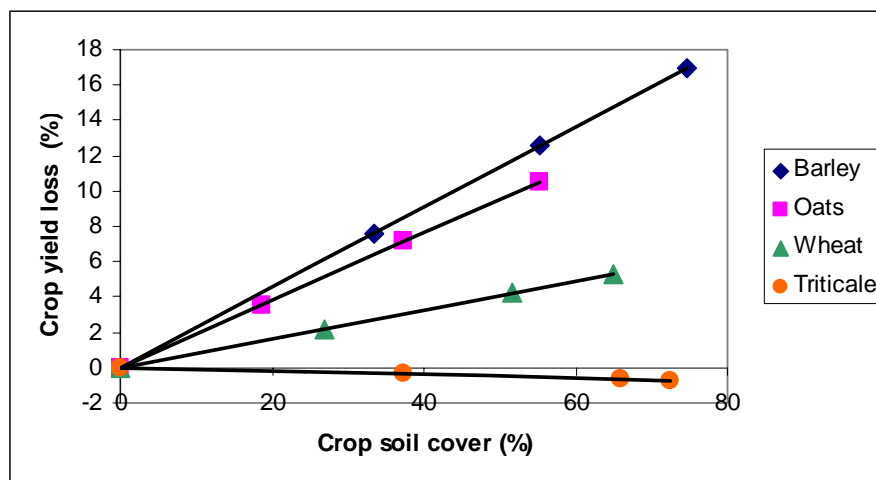
Resistance – the ability of the crop to resist soil cover

Recovery – the ability of the crop to recover from crop soil cover

The combined effect: Crop tolerance



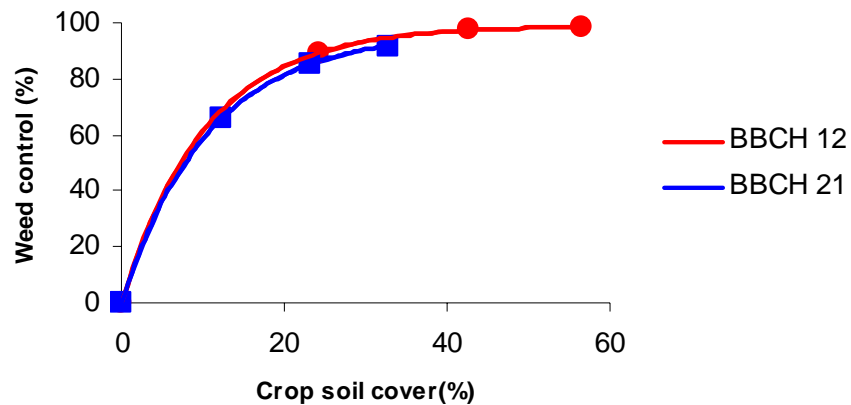
Recovery curves in four species of spring cereals expressed as crop yield loss relative to crop soil cover. Estimated values.





Selectivity and growth stages in spring barley - estimated values

Increasing number of passes in spring barley



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Conclusion

- **Crop soil cover should be estimated from digital images in future**
- **Crop resistance and recovery are important parameters in order to understand crop tolerance to weed harrowing**
 - Influenced by timing
 - Influenced by species
 - Influenced by ?

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Future aims and perspectives

- To develop a user friendly interface (digital image analysis)
 - hopefully free software
- To develop statistical procedures for data analysis
 - free software
- To suggest a research strategy in the perspective of the availability of objective crop soil cover assessments