Digital images for assessing soil cover of crop plants

Jesper Rasmussen &
Michael Nørremark

FACULTY OF LIFE SCIENCES
UNIVERSITY OF COPENHAGEN

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

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

52% crop soil cover

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Assessment of crop soil cover

From visual to digital

From biased assessments to objective assessments

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Two methodical challenges

How to acquire the pictures?

How to analyse the pictures?

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The images
What about light conditions?
What about ….?

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

Leaf cover= 2,57%

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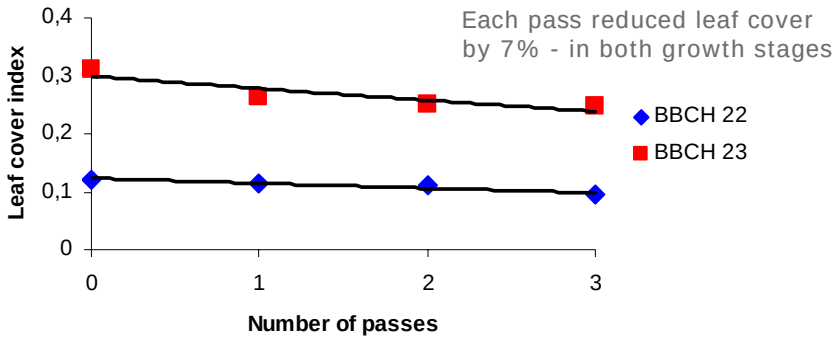
Impact on leaf cover

Increasing number of passes in winter wheat



Each pass reduced leaf cover by 7% - in both growth stages

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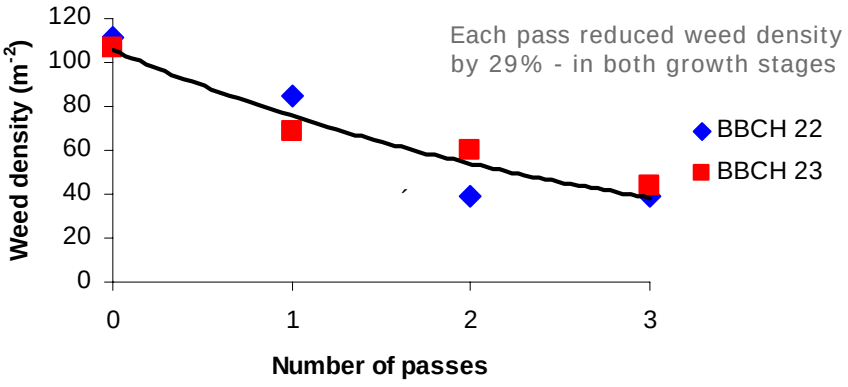
Impacts on weeds

Increasing number of passes in winter wheat



Each pass reduced weed density by 29% - in both growth stages

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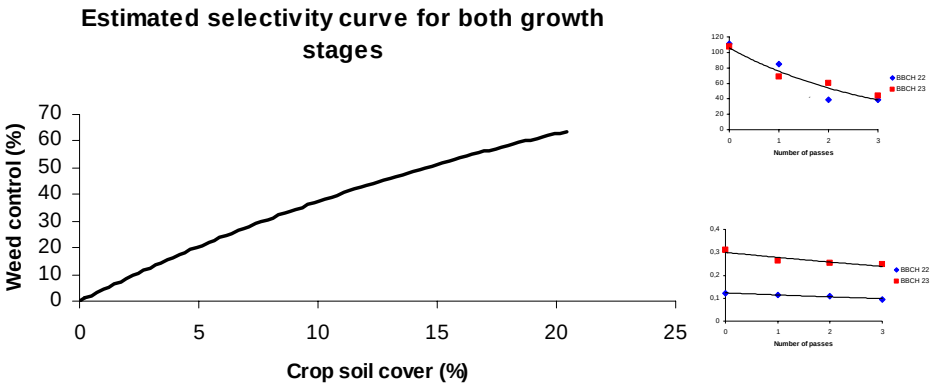
Selectivity estimated from previous curve-parameters



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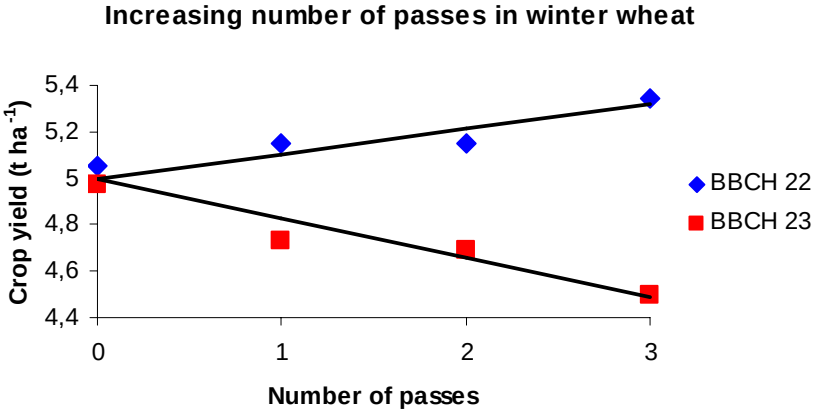
Impact on crop yield



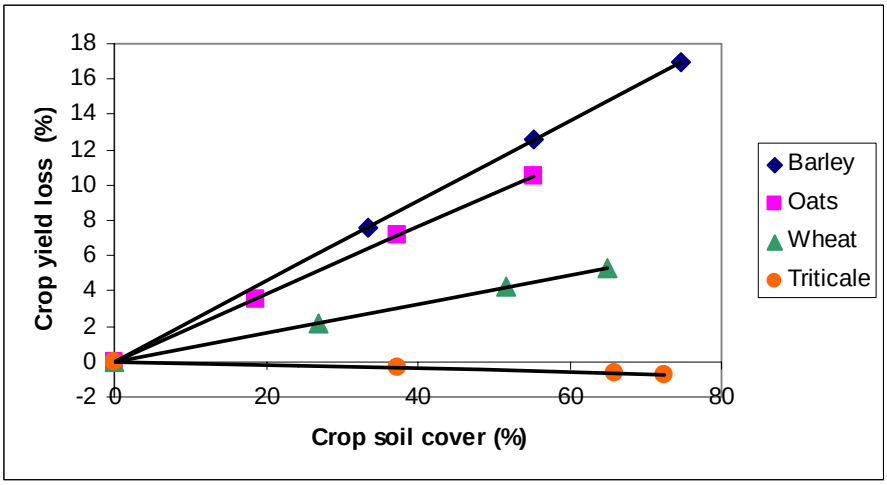
New concepts

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.



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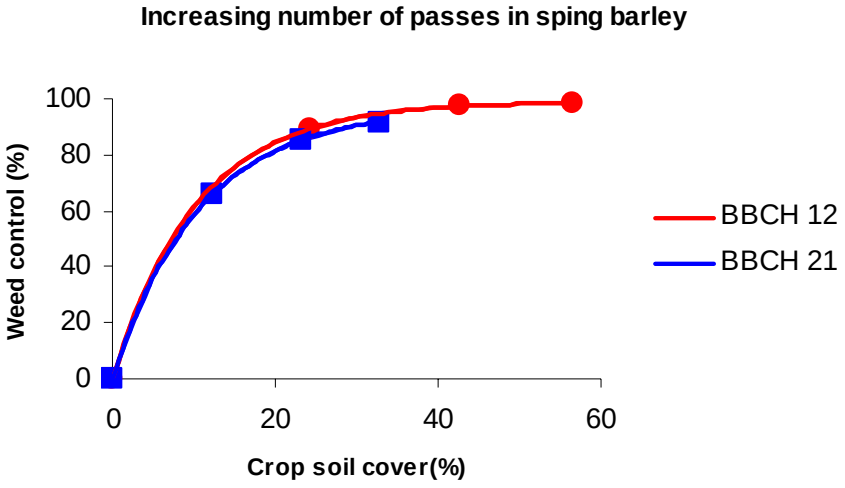
Selectivity and growth stages in spring barley - estimated values



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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 ?**

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