Rhizoctonia and Crown Rot status of Western Australian paddocks can be managed with crop rotation

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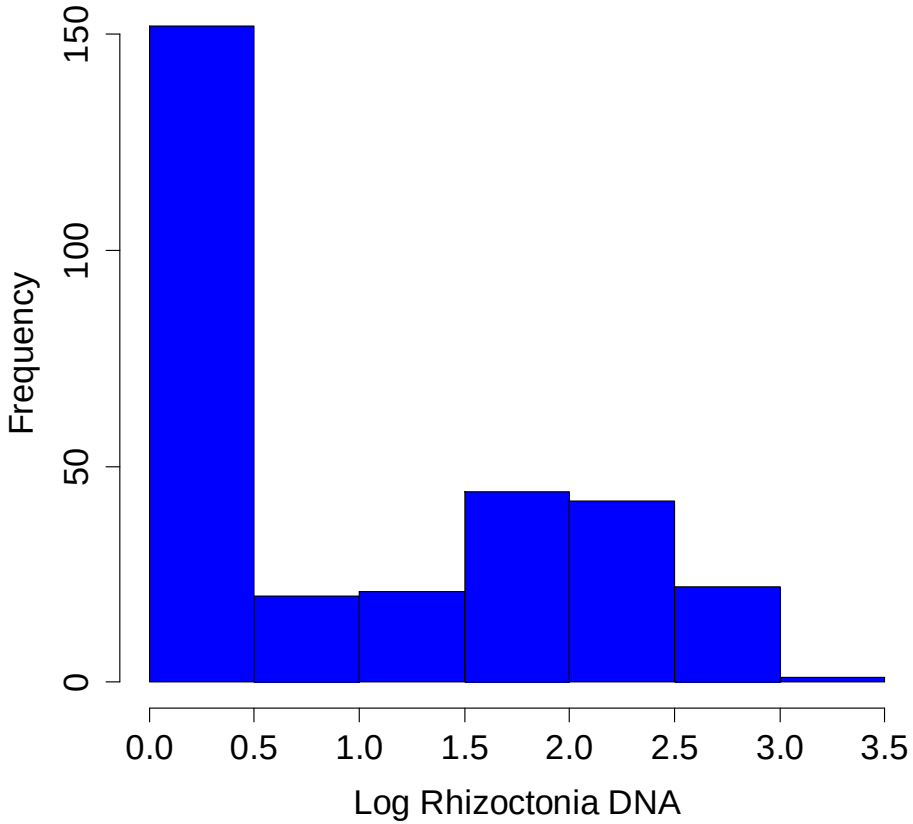
Why worry about Crown rot and Rhizoctonia?

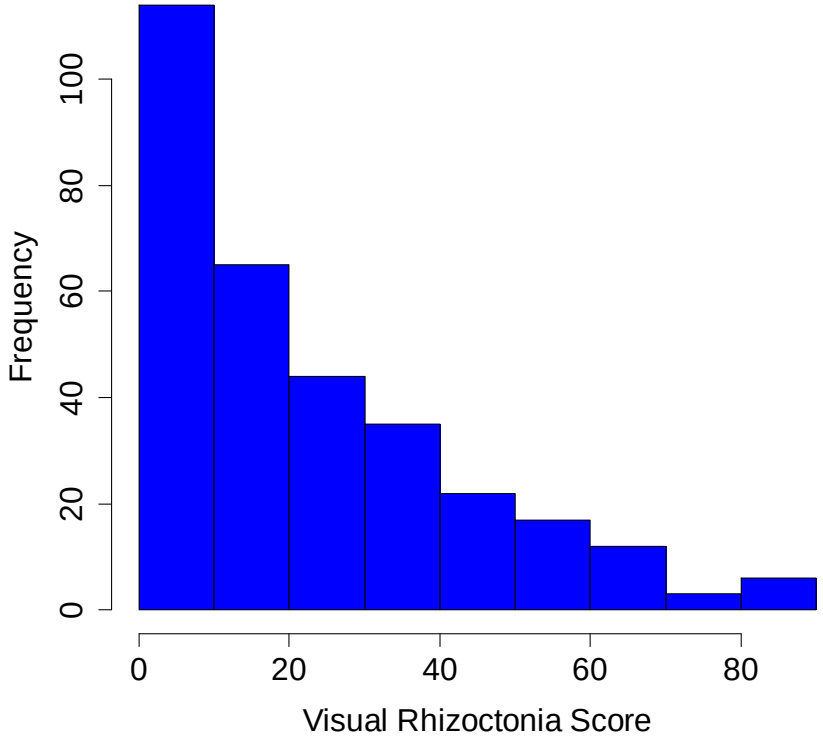
- 60% of paddocks cropped are wheat (Harries et al 2015)
- 12% are Canola and Pasture
- 6% are Lupins and Barley

- Wheat Wheat Wheat was the rotation in 23% in the Northern Agricultural Region!

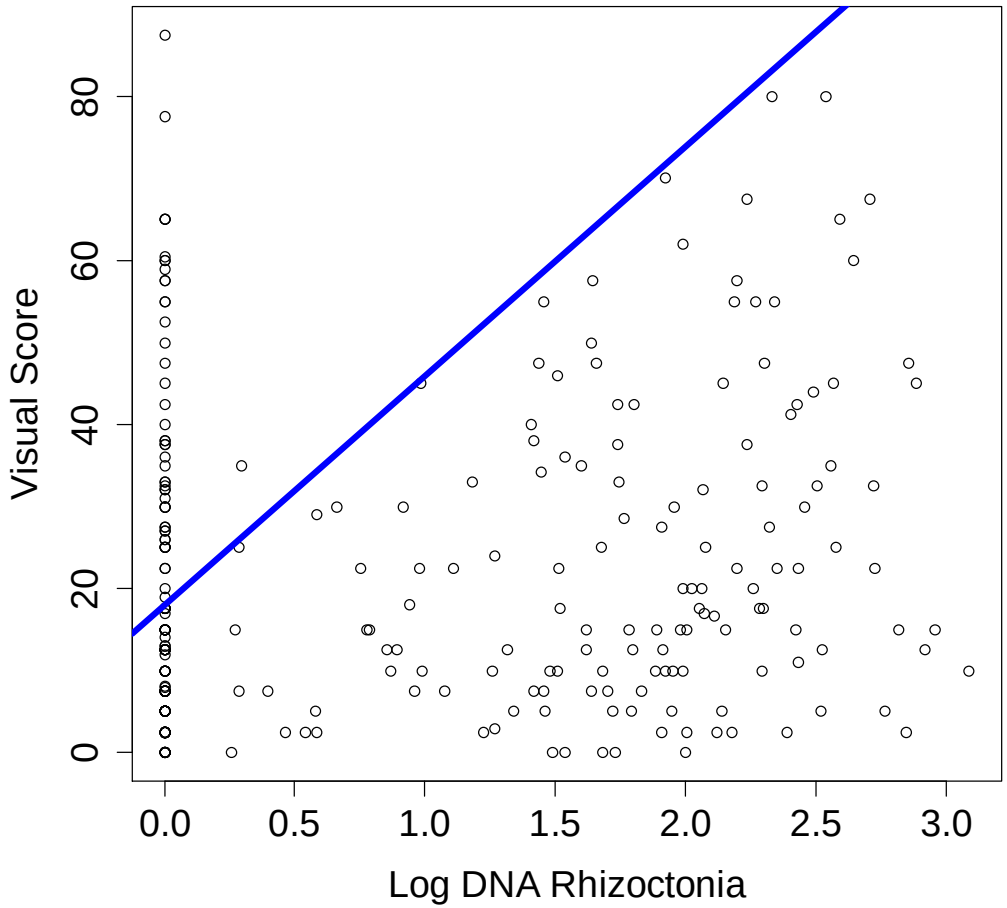
- Wheat Wheat was the rotation in 61% of paddocks in the NAR!

Distribution of Rhizoctonia (DNA and Visual Score) in wheat

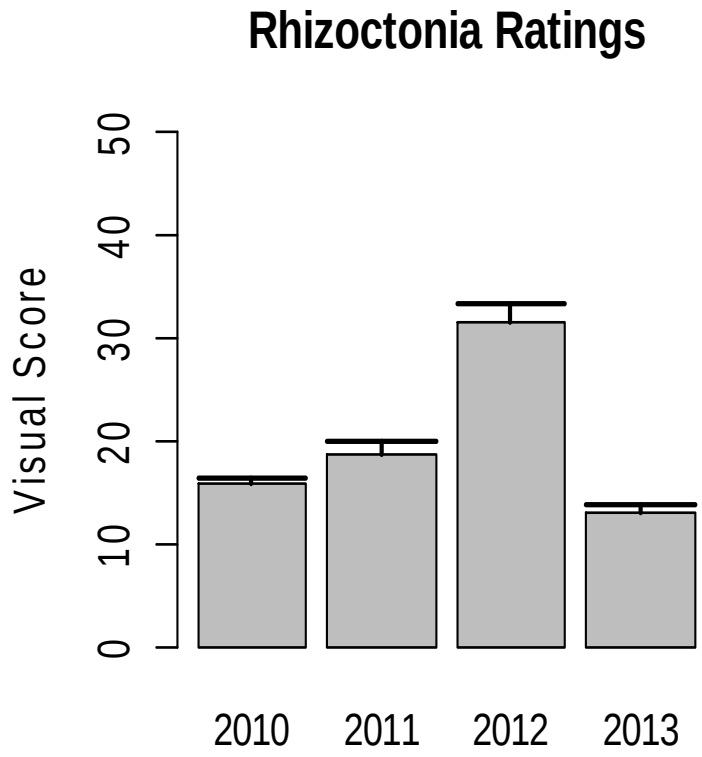




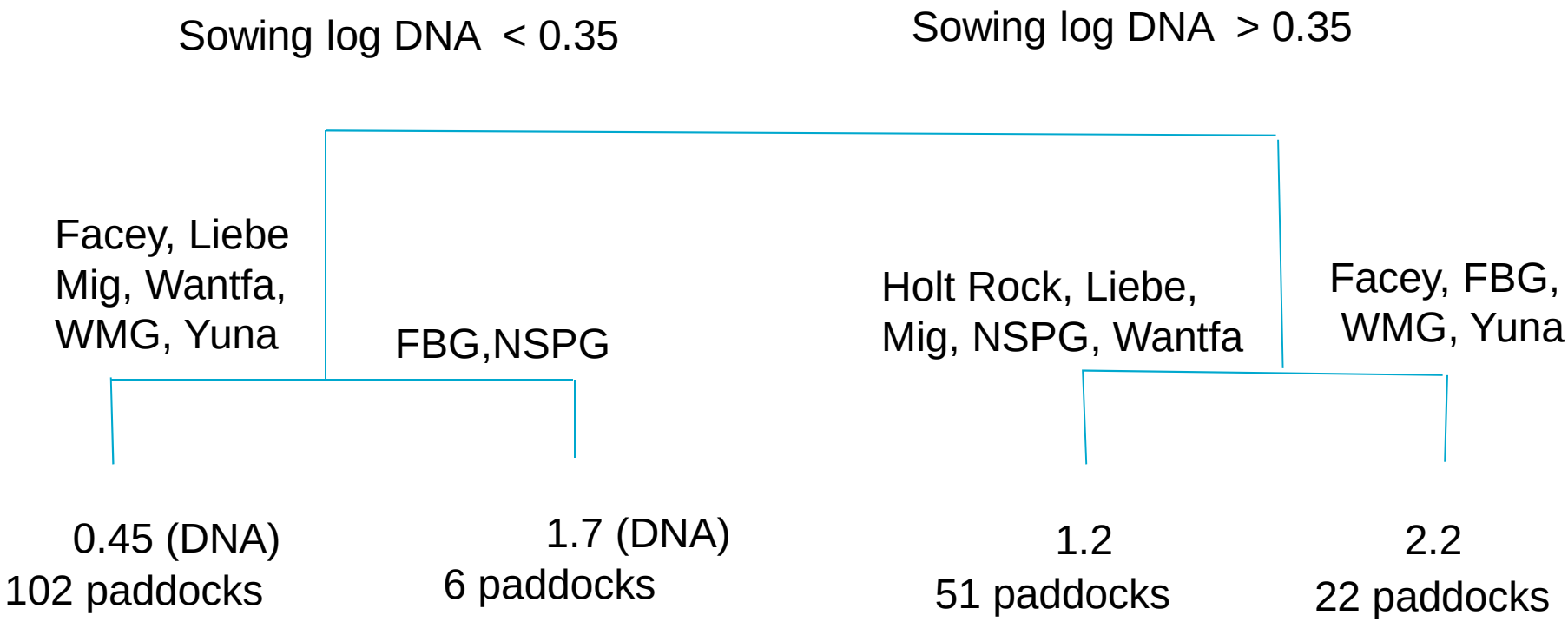
Visual Score vs DNA - Rhizoctonia



Trends in Rhizoctonia (all paddocks)



Predicting Rhizoctonia DNA at anthesis (wheat)



What causes increase in Rhizoctonia from 1 year to the next (2013 to 2012)

Barley, Oats and Wheat grown in 2012 Rhizoctonia declined by 0.37 units in 2013, when break crops grown.

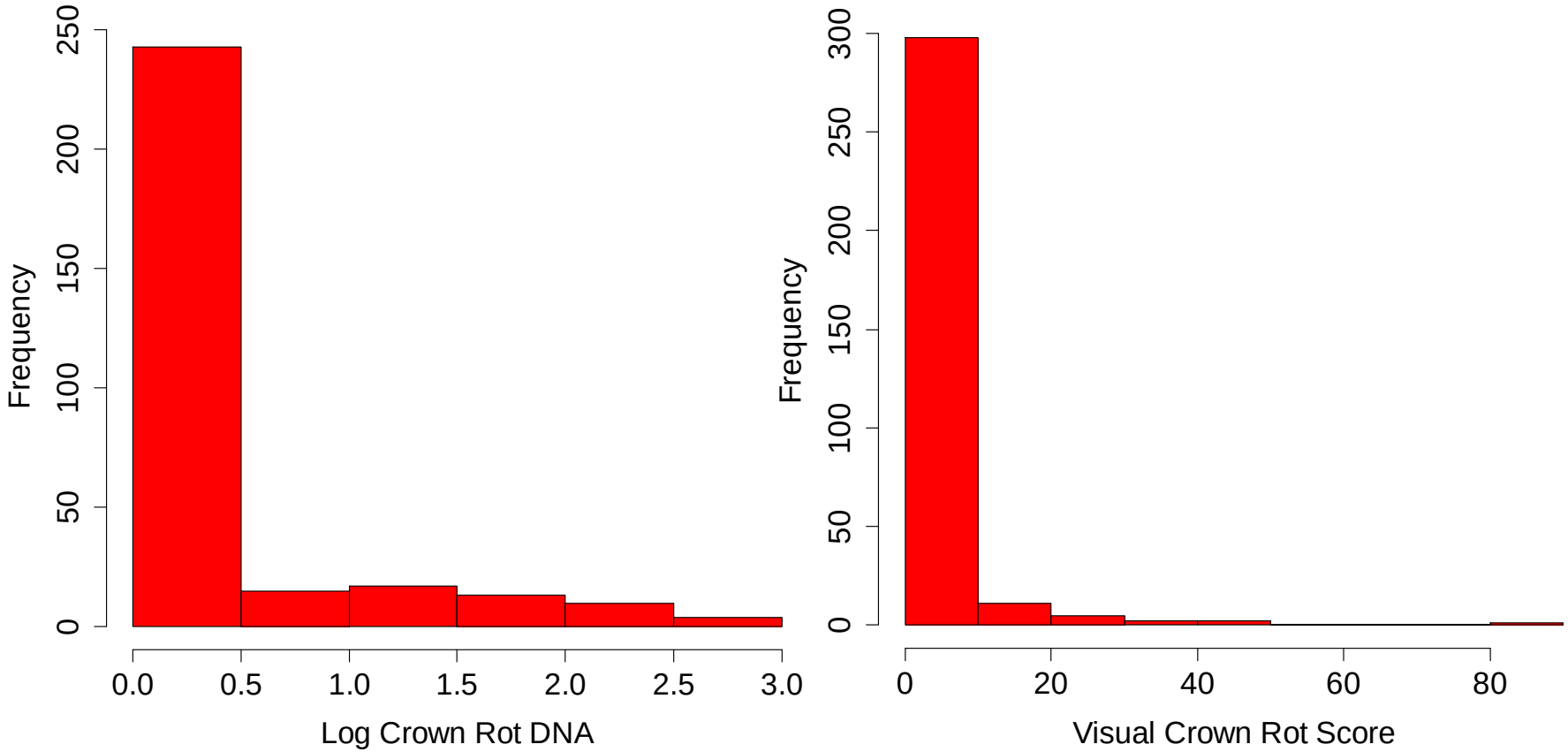
All other crops and pastures in 2012 resulted in an increase 0.36 units of Rhizoctonia in 2013 when cereals were grown.

One interpretation is that break crops are lowering the Rhizoctonia in season by anthesis (or indeterminate crops version of anthesis)

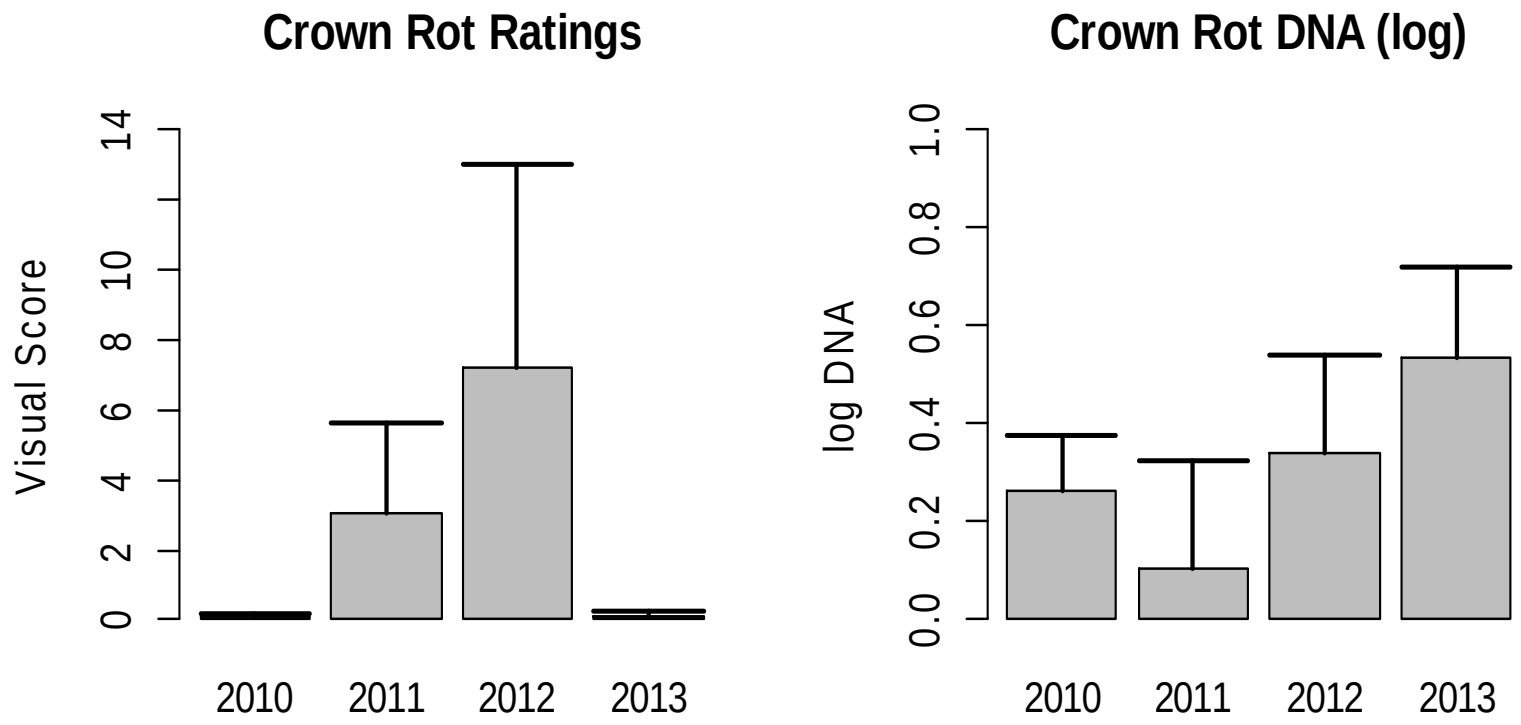
Implication - break crops bring about a decline in Rhizoc (~ 0.7 units) relative to cereals.

Summary correlations with soil type and nutrients, implying soil processes and biology do matter.

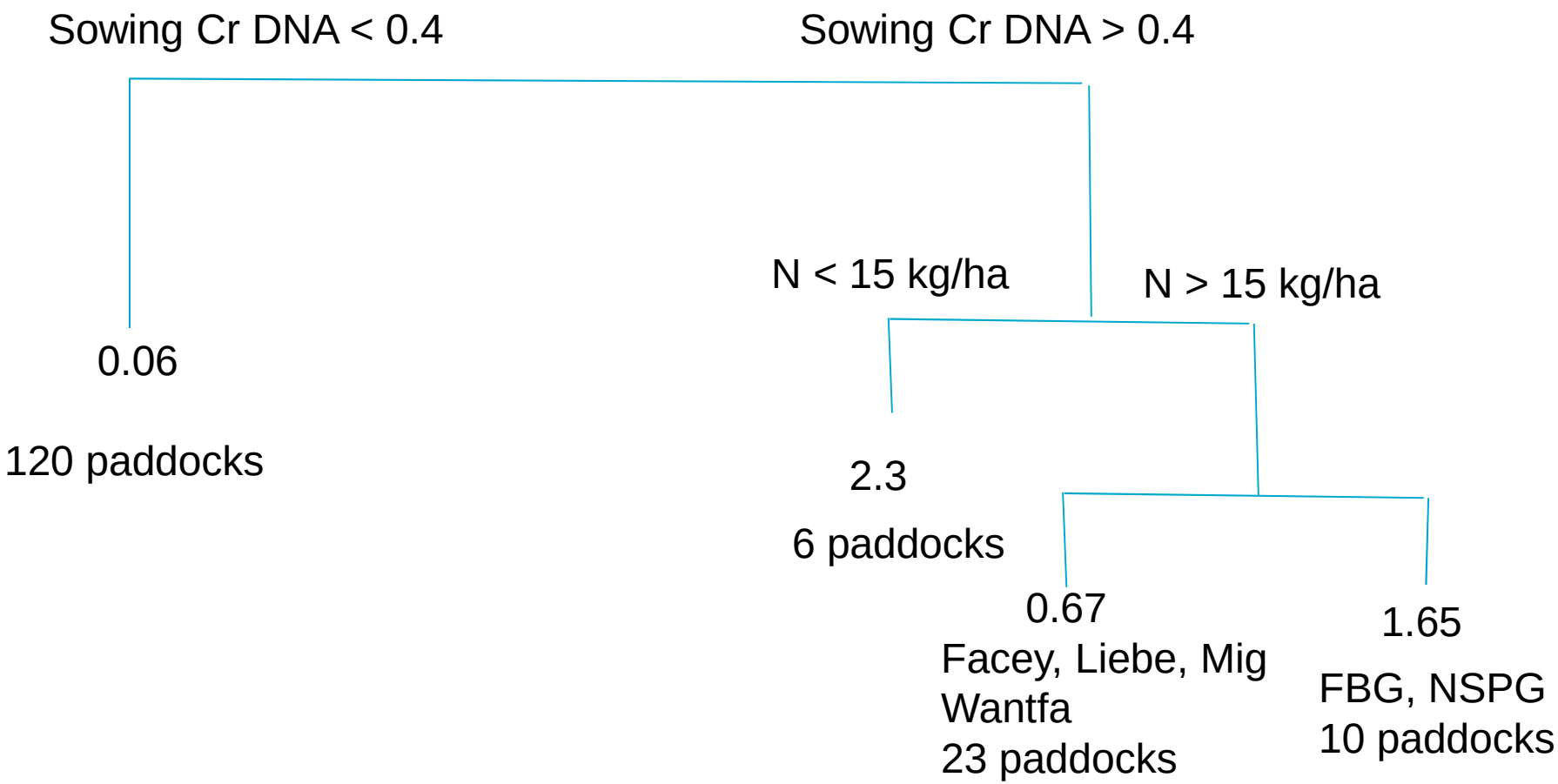
Distribution of Crown Rot DNA (log) and Visual Score in wheat



Trends in Crown Rot (all paddocks)



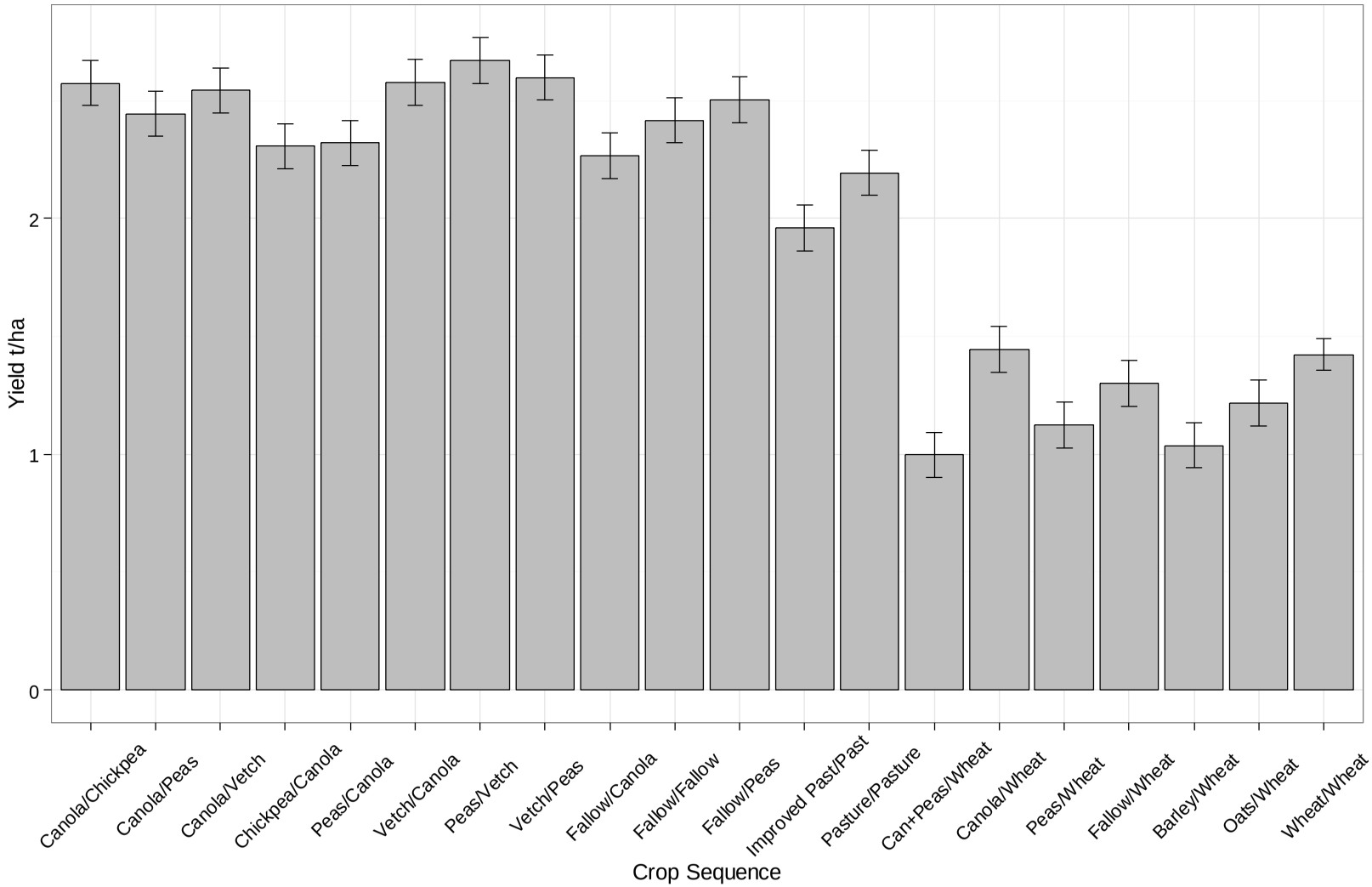
Predicting Crown Rot DNA at anthesis



Cause of Crown Rot increase from 1 year to the next.

- 2012 landuse = canola,lupin, pasture decrease of 0.15 in 2013
- 2012 landuse = wheat and barley, increase of 0.22 in 2013
- Opposite signal to Rhizoctonia.
- Differences may not materialise as quickly as Rhizoctonia, ie a break down of crown rot does not happen by anthesis.
- Sampling regimes need work.
- Similar correlations with nutrients and soil type.
- Very few data to work with

Double break crop effect on wheat yield in low rainfall environments



Conclusions

- Diseases are an emerging problem in systems dominated by wheat.
- This mimics problems emerging in SA and Victoria
- Result of an over reliance on wheat, corrected by rotation
- Survey data need to be augmented with experiments located on disease affected paddocks, to evaluate practical management strategies.
- Sampling strategies of surveys and of crown rot need refining