

Growers' Needs and Industry Wants: A Retrospective of Two Decades in the Trenches in the Battle with FHB

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Industry Wants

Stable supply of HRSW with adequate grain protein and test weight and little to no DON at **no extra cost.**



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Growers' Needs

A positive net return for every acre he or she farms with **a crop** that fits in their respective agro-ecological niche.

(and don't think for a minute that they can afford to be loyal to wheat, durum or barley)



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My Roots

- I'm the product of Van der Plank, Zadoks, and Parlevliet:
 - Scouted dad's winter wheat for EPIPPE
 - Disease breeding major @ Wageningen



I should have remembered....

‘Son....do you plan to graduate and get your degree.’

Don McVey, Fall of 1991




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Desperate Times...

- In response to the 93 and 94 FHB epidemics
- Initially a 3-year appointment
- Access to me expected and I approached Extension as a **full contact** sport





Fusarium Head Blight or Scab

Wheat and Barley's Armageddon?

Foliar Fungicides

- Labels:
 - **Wheat:**
 - Folicur (tebuconazole)- section 18 label;
 - Benlate (benomyl) + Mancozab -section 2ee label;
 - **Barley:**
 - Folicur (tebuconazole)- section 18 label;
- Limitations:
 - **Price;**
 - **Efficacy & application technology (at best 50% suppression);**
 - **Inability to predict epidemics.**

Genetics

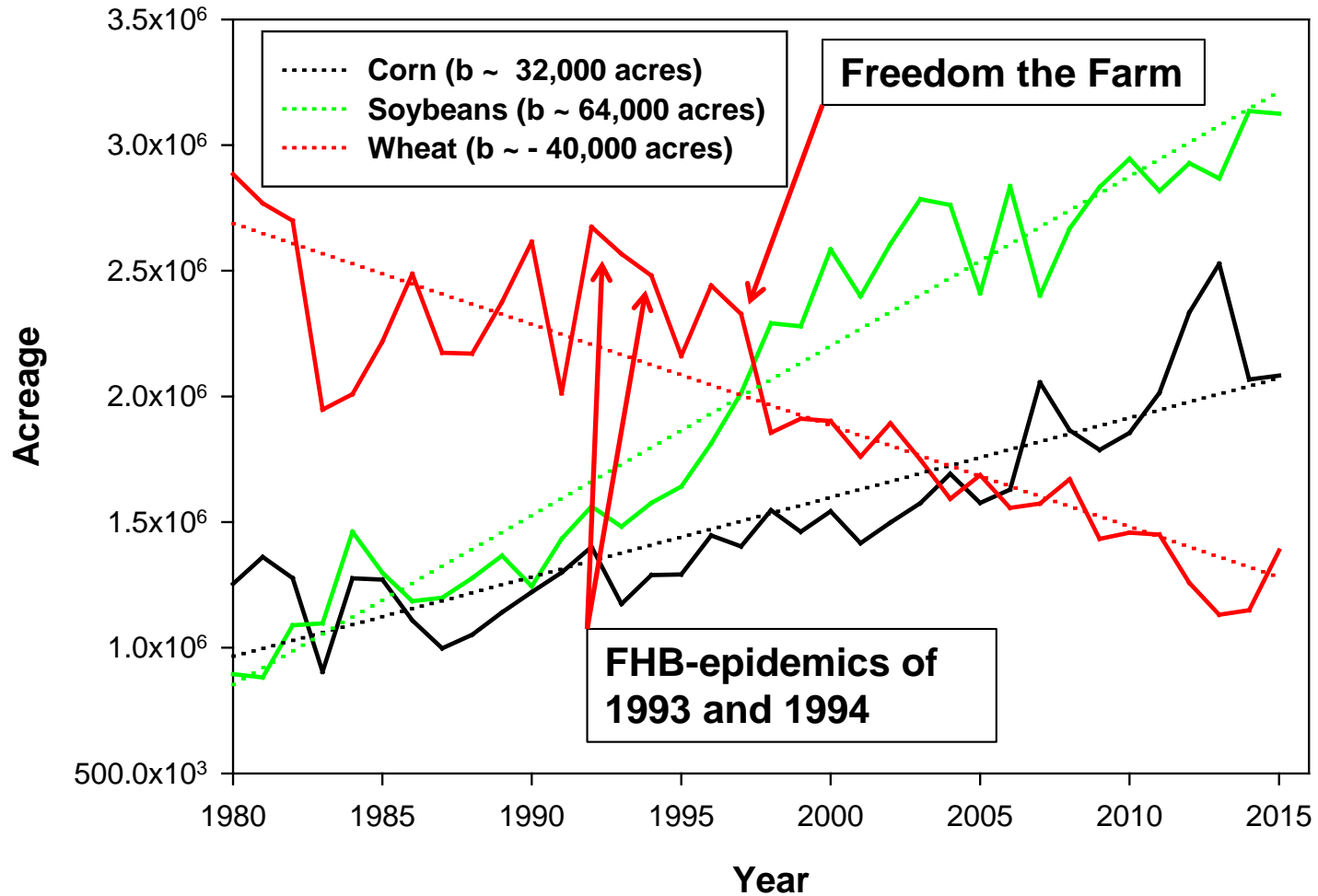
- In 1929 J.J. Christiansen, E.C. Stakman and F.R. Immer concluded that “the only effective method of controlling wheat scab is to grow resistant varieties”;
- Limitations:
 - No resistance to the initial infection/immunity found within the species (yet);
 - Long-term approach;
 - Intermediate products will have (severe) deficiencies in other key areas.

Stop Gap Measures

- P2375 dominant for nearly a decade
- Burn residue/ Moldboard plow
- Bacup, McVey, Sharpshooter
- Soybeans (but we can't blame scab for the rise in acreage alone)



The Slow Slide

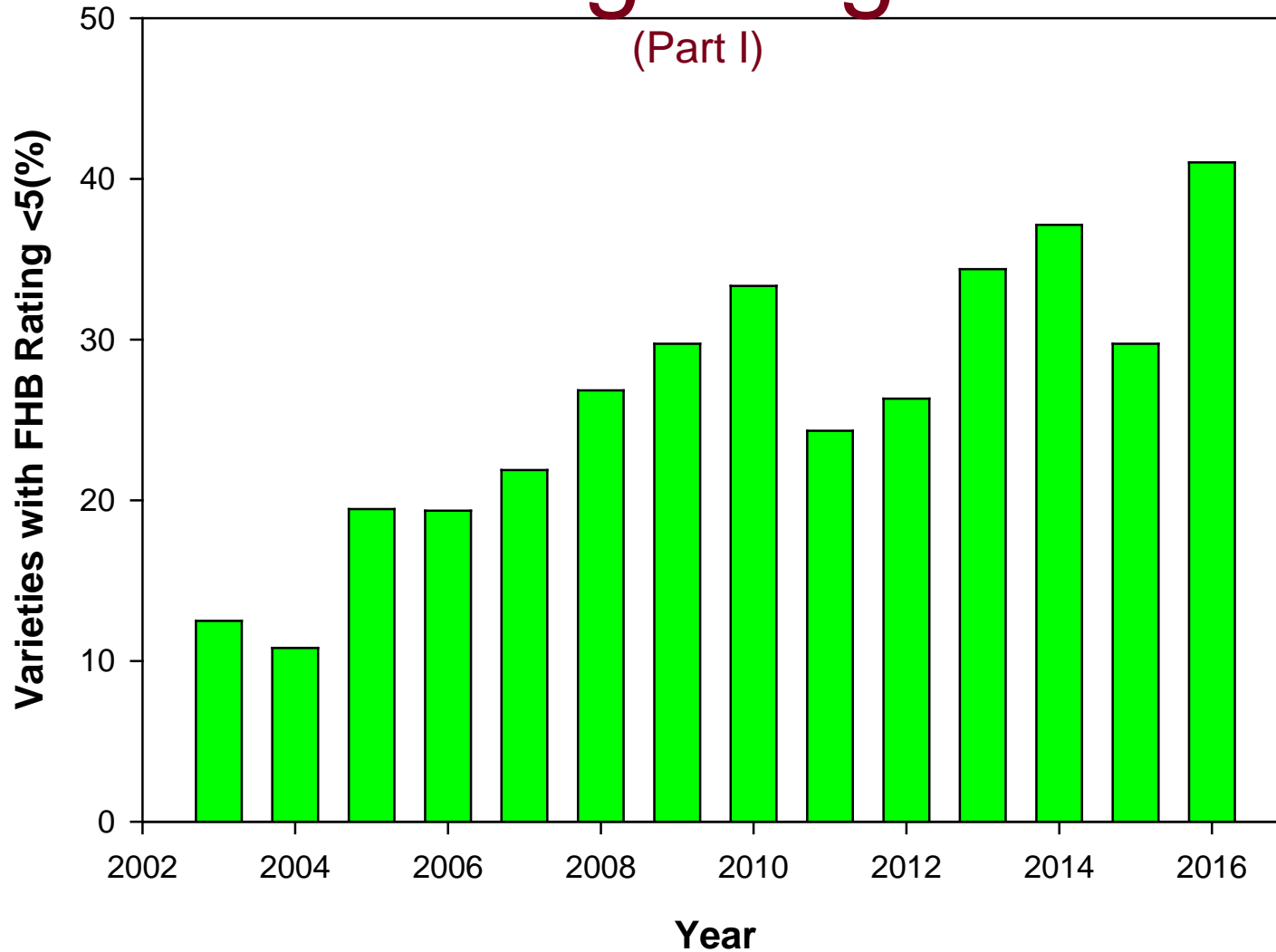


Turning into Nozzle Heads

- PTSD (post traumatic scab disorder)
 - Everything was blamed on scab even when it clearly wasn't the cause
- Applications at F10.51 (slowly) being adopted.
 - Expected return greatest barrier to adoption (FHB is mono-cyclical).



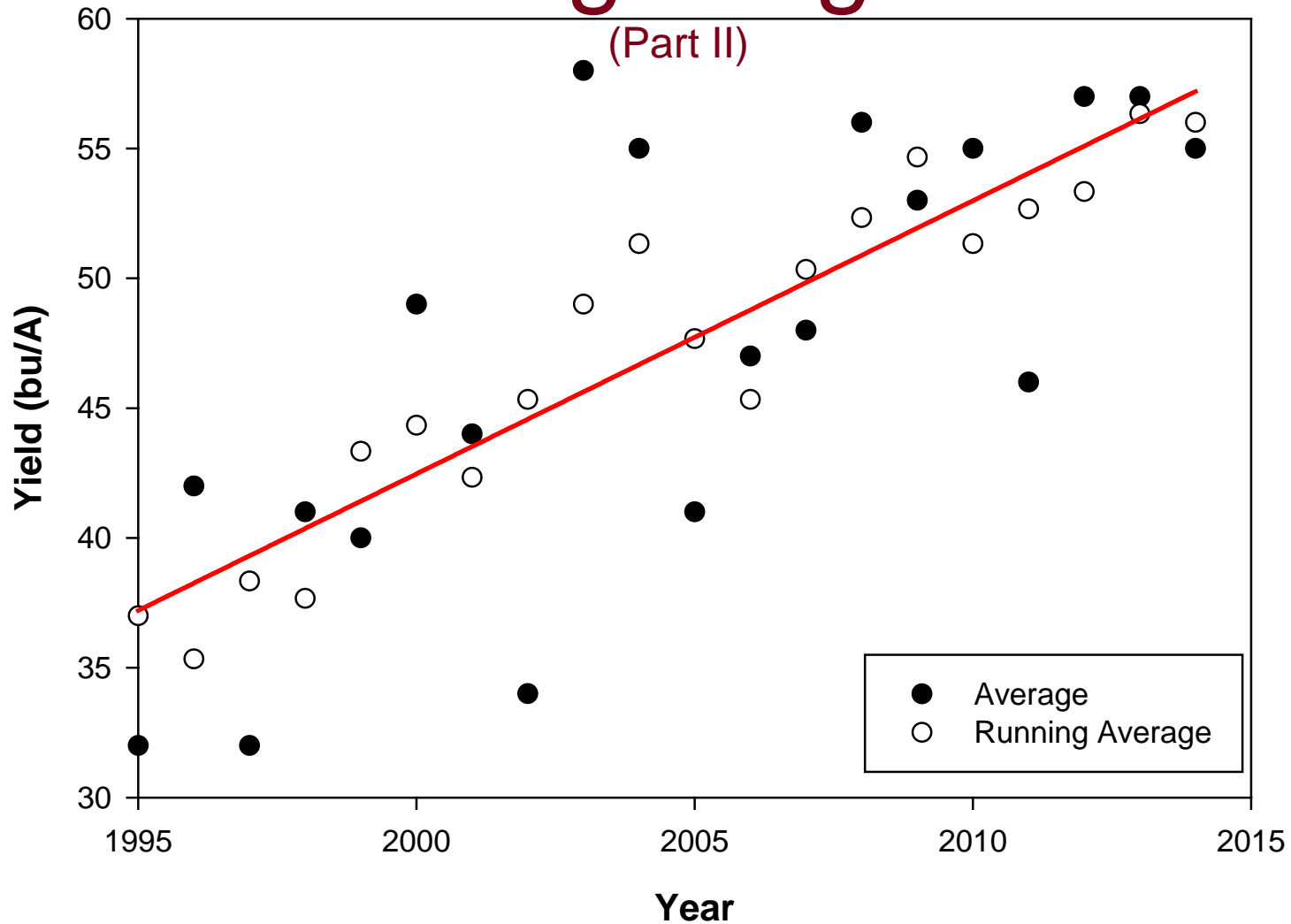
Making Progress



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Making Progress



Towards the Whole Picture

- Len Francl's adaptation and expansion of Zadoks' EIPRE to RRV has been a crucial learning /validation tool for disease risks (**PLURAL**)
- Wiersma, J.J. and C.D. Motteberg. 2004. Evaluation of five fungicide application timings for control of leaf spotting diseases and Fusarium Head Blight in Hard Red Spring Wheat. Can. J. Plant Pathol. Vol. 27: 25-27.

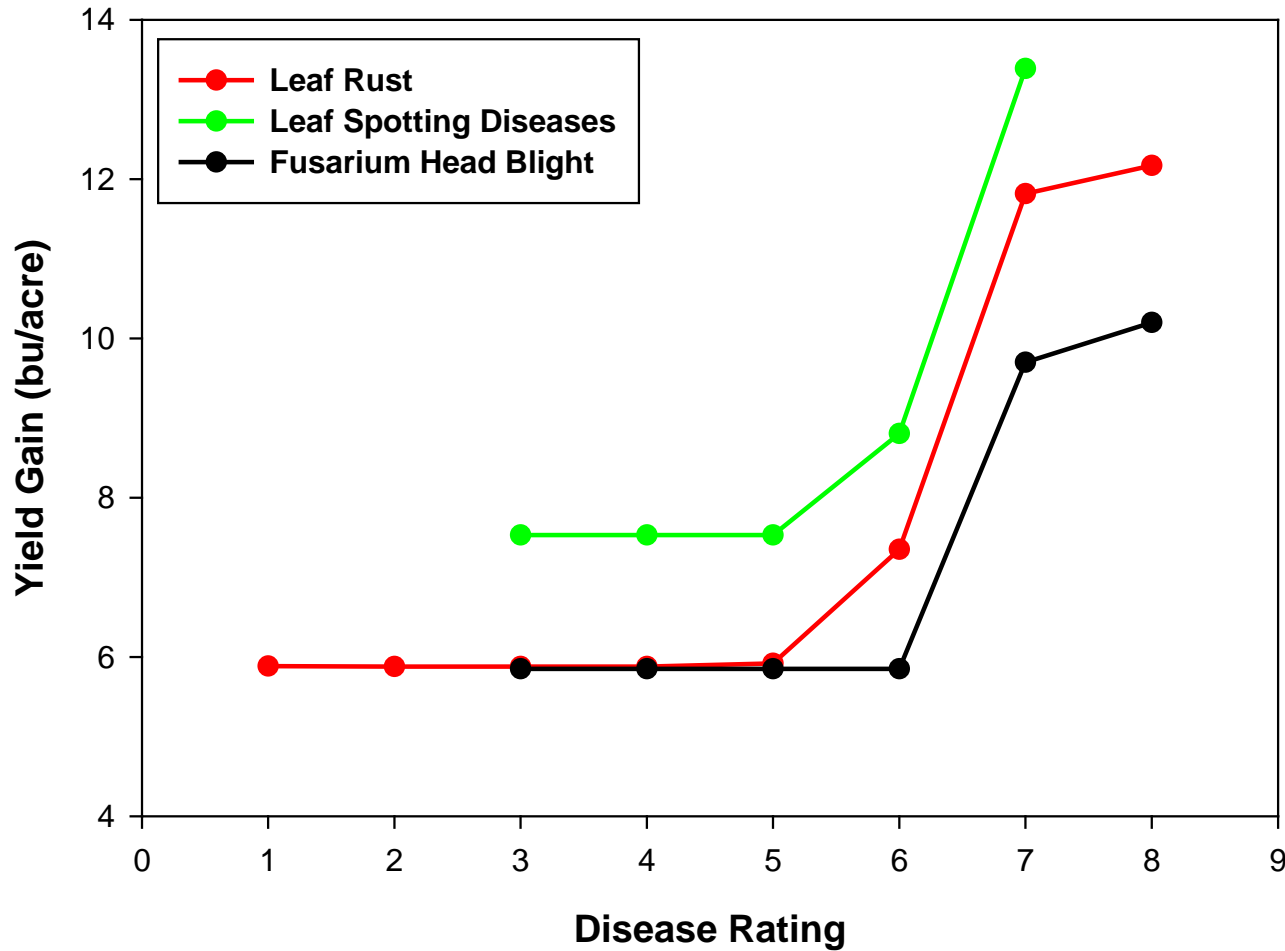


Warning: Messy Data Ahead

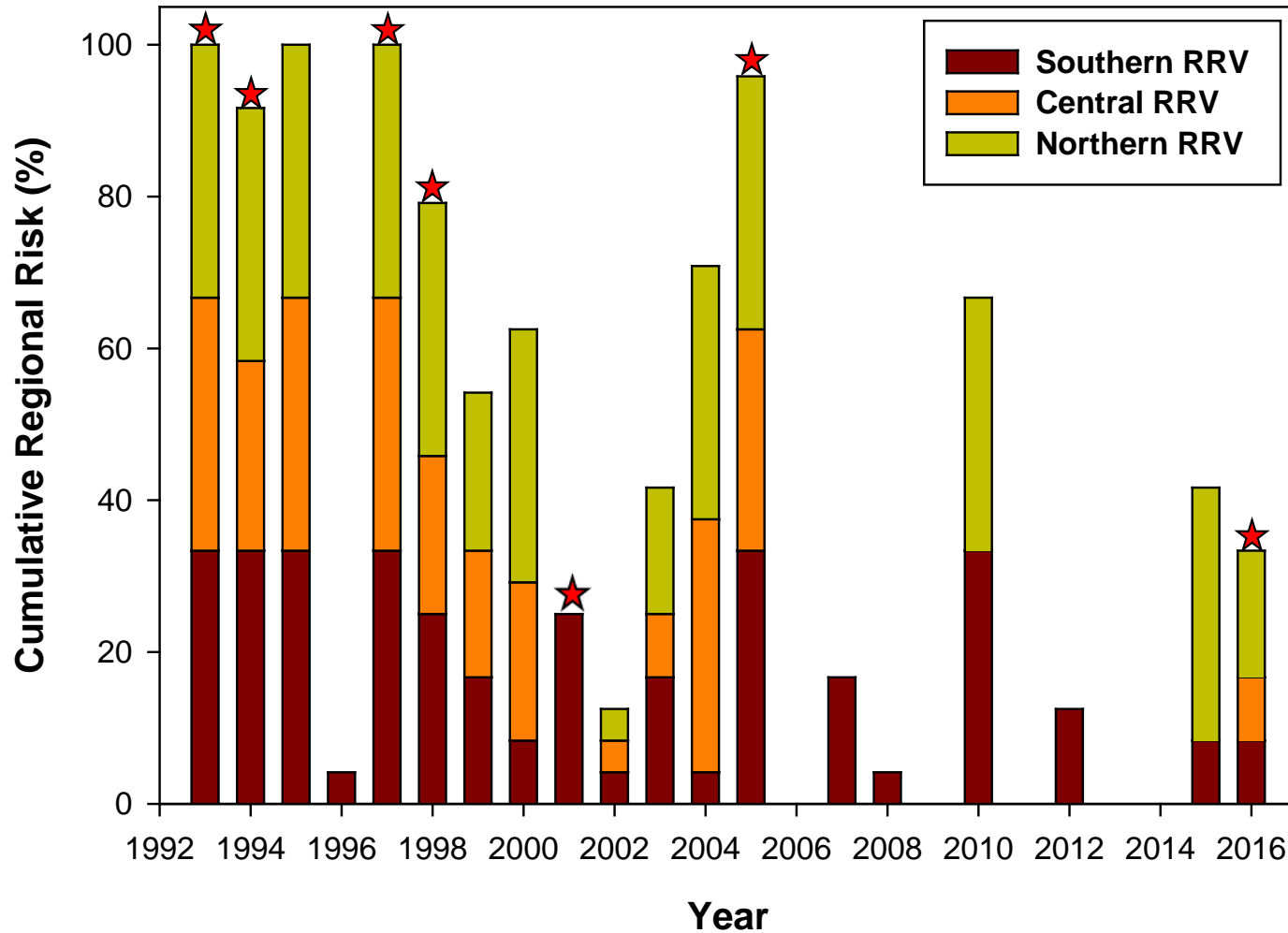
- Paired VT at 4 locations since 2004
 - No fungicide (conventional)
 - Fungicide @ F5, F9, F10.51 (intensive)
- $\Delta_{\text{yield}} = \text{Yield}_{\text{Intensive}} - \text{Yield}_{\text{Conventional}}$
- 4 parameter logistic regression on the $\bar{\Delta}_{\text{yield}}$ per disease
 - Highly unbalanced dataset makes that I need to use means across varieties and environments



Bang for My Buck



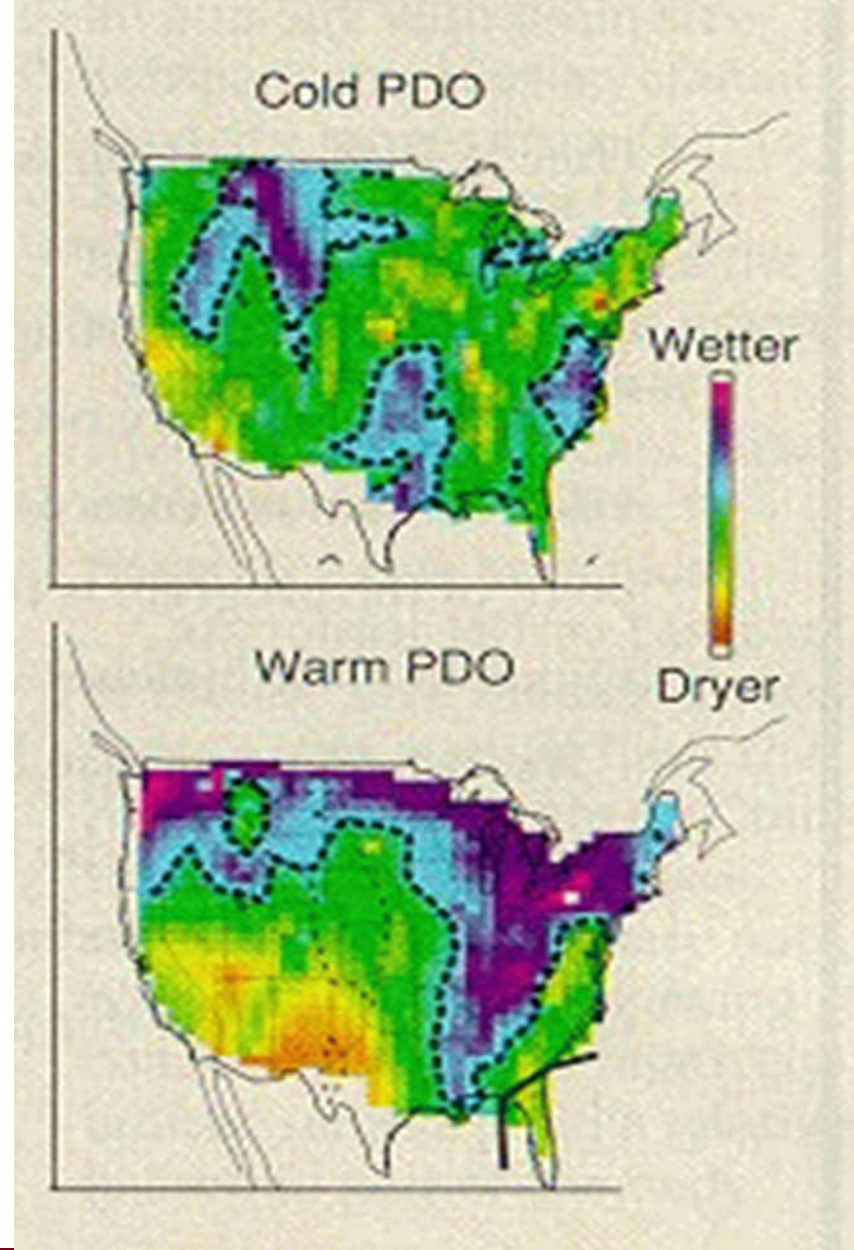
The Rearview Mirror



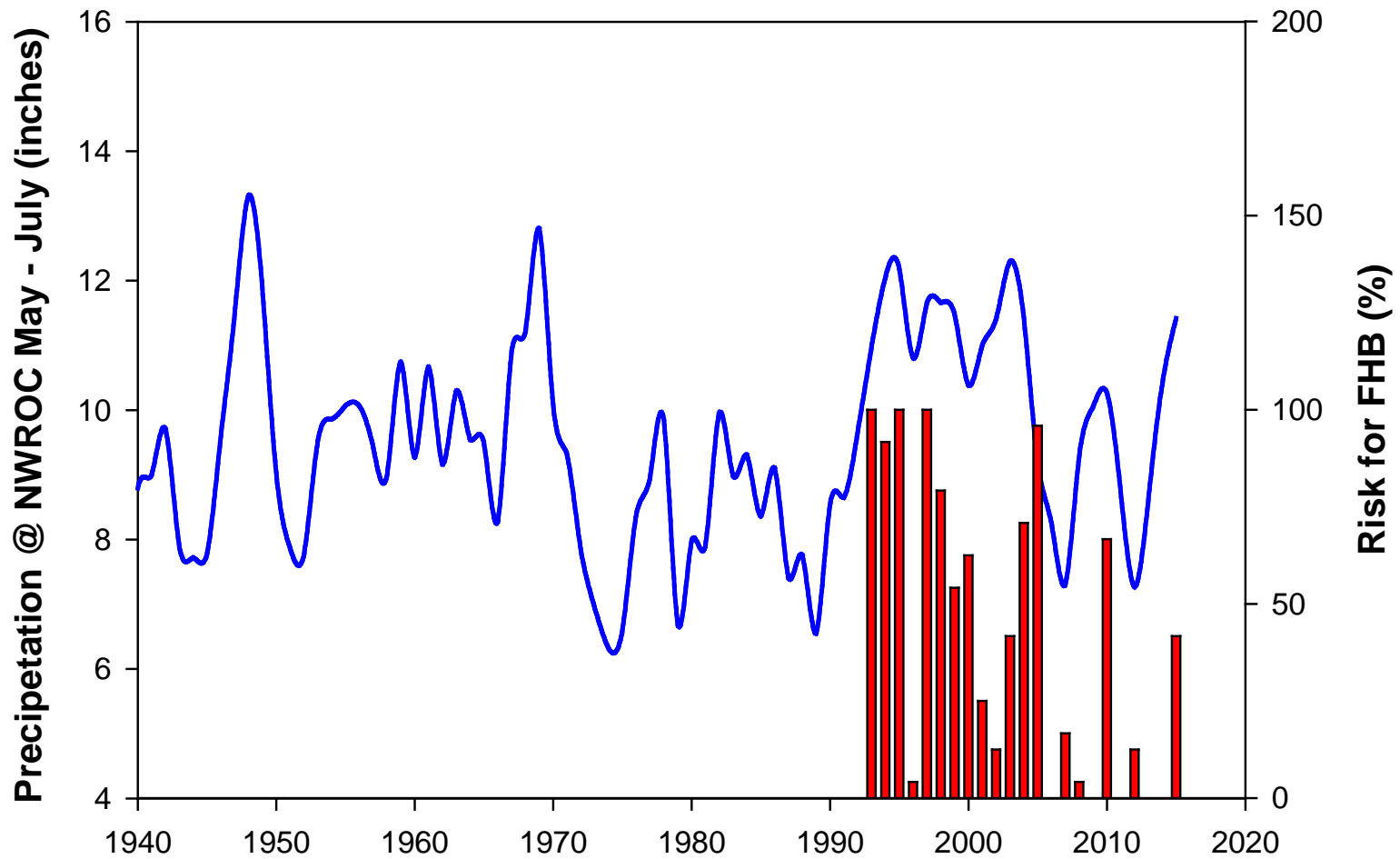
What Worries Me

(Part I)

- Pacific Decadal Oscillation
 - Wet vs. dry cycles in Northern Great Plains
 - Explains, for example, the rise and fall of Devils Lake



The Long View

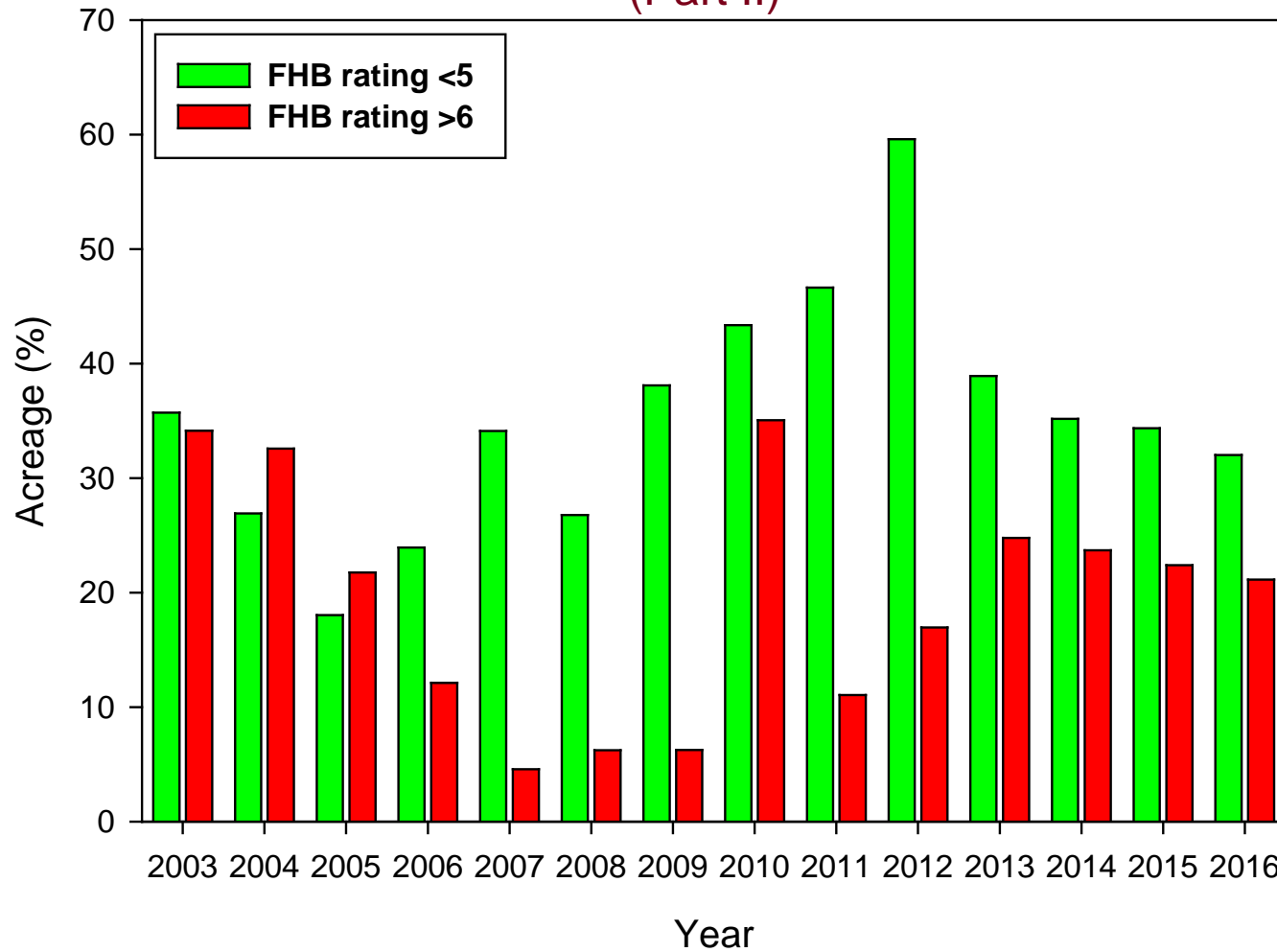


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What Worries Me

(Part II)



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Take Home

(Part I)

- Misted and inoculated nurseries **absolutely essential** to maintain current level of FHB resistance
- FHB will always be here and rise to the occasion:

The next wet cycle will show us whether we truly have made progress



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Take Home

(Part II)

- Farming is managing risks and a producer's priorities are:
Bushels>Straw Strength>Grain Protein>Diseases
- Nearly ubiquitous use of fungicide as a management tool was probably driven as much by **other diseases** as it was by FHB:

**Focus on whole crop / production system
not just FHB**



A Big Thank YOU!

- Andrew Friskop
- Leon Osborne
- David Torgerson
- Madeleine Smith
- Jim Anderson

