

The DuPont logo, featuring the word "DUPONT" in a red, stylized font inside a red oval.The Pioneer logo, featuring a green icon of a wheat stalk inside a green circle, followed by the word "PIONEER." in a bold, green, sans-serif font.

IMPACT OF PRIVATE WHEAT BREEDING ON FUSARIUM HEAD BLIGHT RESISTANCE – NORTH AMERICA

The Bad and the Good



Susceptible variety



Resistant variety

Brief History of FHB

- The early years – 1920's to 1970's
 - Just bad luck
- The 1980's
 - Frequency increases
- Since 1990
 - Annual issue

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Private and Public Breeders Face a Common Foe



■ The Goal – Incorporate FHB resistance and low mycotoxin levels into elite soft wheat varieties for the eastern U.S.

- Not all of the story.

Where do we start?

Screening methodology

- inoculum production
- screening environment
- what symptoms to evaluate



Types of resistance to FHB

- Type I - resistance to initial infection
- Type II - resistance to disease spread
- Type III - resistance to kernel infection
- Type IV - tolerance
- Type V - resistance to toxin accumulation



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Genes for resistance to FHB

'Major' genes for resistance

Fhb1 – Sumai 3BS Anderson, et al TAG 102:1164-1168 2001

Fhb2 – Sumai 6BS Cuthbert et al TAG 114:429-437 2007

Fhb3 – L. racemosus T7AL.Lr#1S TAG 117:1155-1166 2008

Fhb4 – Wangshuibai 4BL Xue et al TAG 121:147-156 2010

Fhb5 Wangshuibai 5A Xue et al TAG 123:1055-1063 2011

Another major gene on 5AL from PI277012 Chu et al TAG
123:1107-1119 2011



Where we are now

- Progress in finding resistance
 - Eliminating the worst
 - Public releases* – Foster, Roane, McCormick, Tribute, Neuse, Bess, Truman, Bromfield, Malabar
 - Private releases* – Patton, Hondo, Coker 9511, Pioneer brand varieties **25R18, 25R42, 25R35, 25R54, 25R51, 25R32, 25R46, FT Wonder, FT Action, Vienna**

* Griffey, C. 2005 "Identification and Incorporation of FHB Resistance in Winter Wheat: An Overview of Progress and Strategies." In: Proceeding of National Fusarium Head Blight Forum; 2005 Dec 11-13, Milwaukee, WI. East Lansing: Michigan State University. pp 31-34



Challenges and Opportunities

Undesirable linkages

- Grain yield, grain fill duration
- Stripe Rust
- Shattering
- Other pathogens

Opportunities / New Tools

- Fungicides
- Molecular markers
- Other major/minor gene identification
- Down regulation of susceptibility genes
- Transgenes