

Toward Positional Cloning of *Fhb1*, a Major QTL for Fusarium Head Blight Resistance in Wheat

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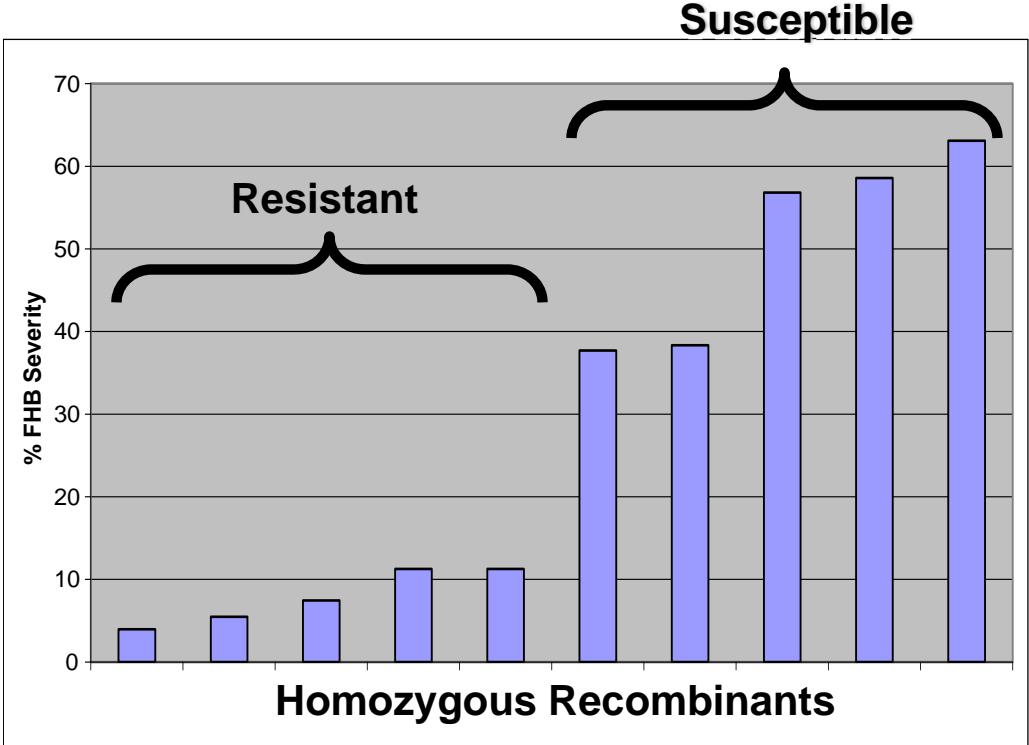
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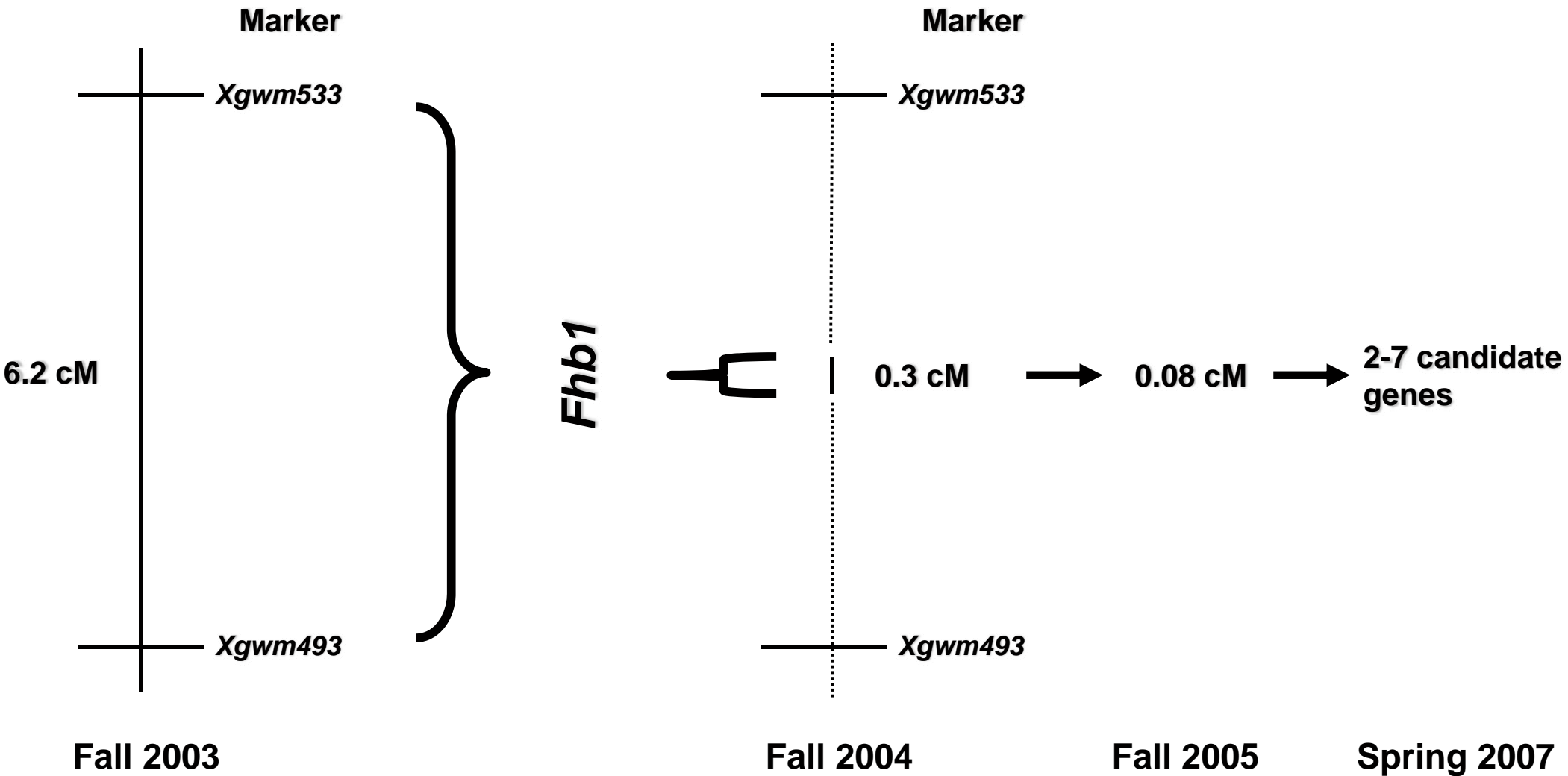
U.S. Wheat & Barley
Scab Initiative



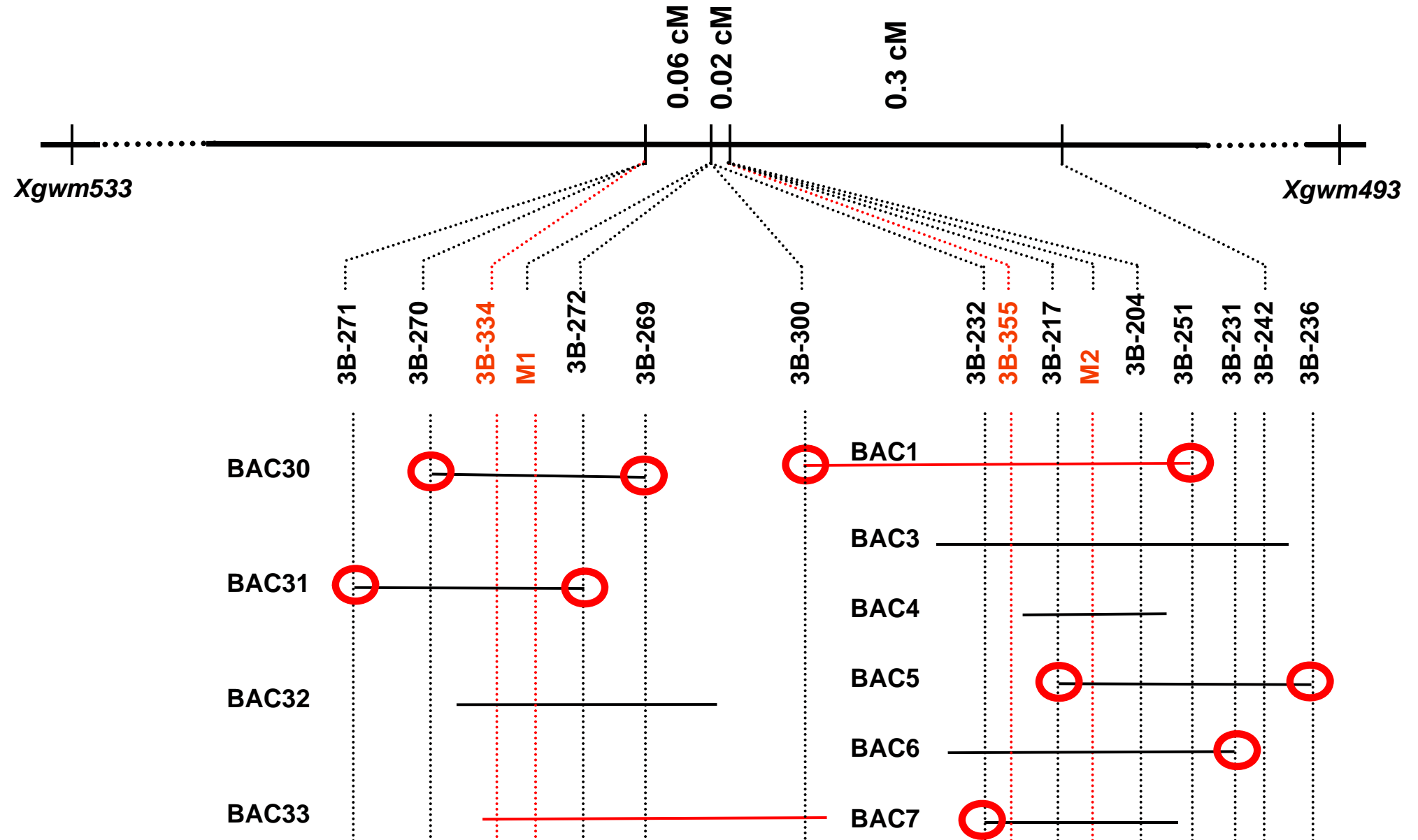
Fine Mapping *Fhb1* in Homozygous Lines from a Cross of Near-isolines



Closing in on *Fhb1*



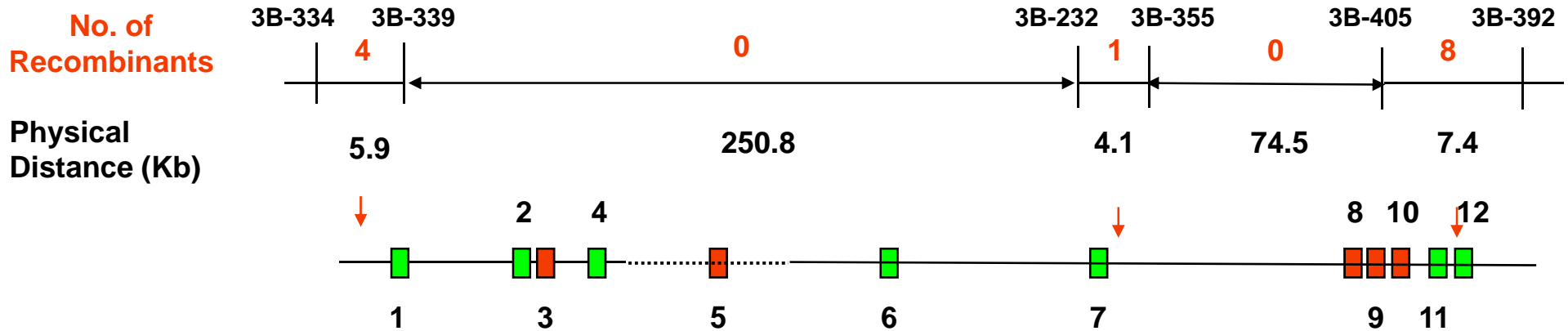
BAC Contig of *Fhb1* Region



BAC Sequencing

- Two BACs covering 352 kb sequenced
- Microsynteny with rice was complicated with gene insertions and inversions
- More than 10 genes identified
 - One with homology to a known disease resistance gene, but ruled out due to recombination

Candidate Genes in *Fhb1* Region



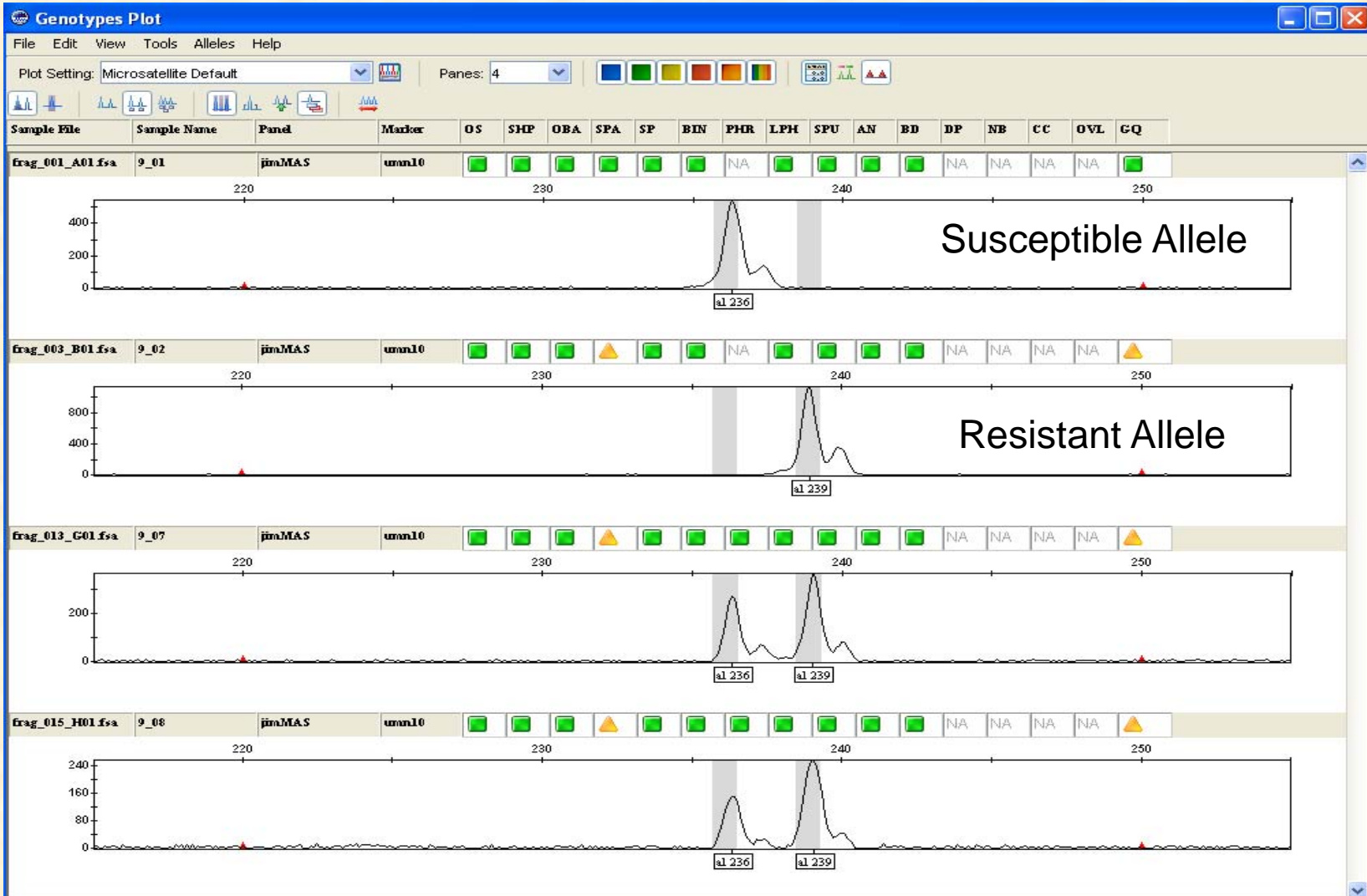
Candidate genes are numbered 1-7

Red = gene is in syntenous region in rice

Green = gene is in non-syntenous region in rice

UMN10

A co-dominant marker for *Fhb1*



Complementation Testing

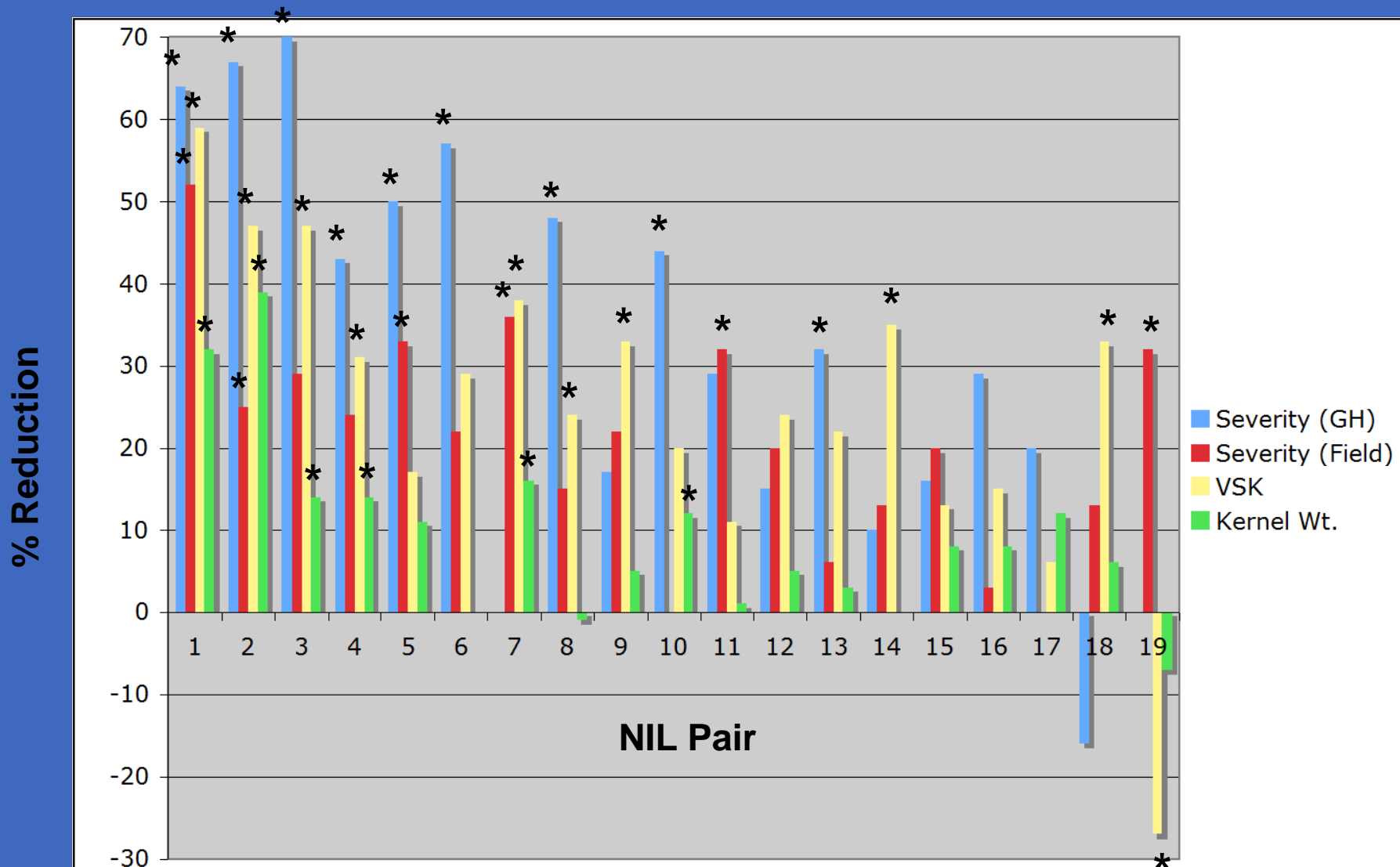
Sumai 3 Cosmid Clones used to Transform 'Bobwhite'

Candidate Gene	Clone Name	No. transgenic plants	Result
1	3E8	19	negative
2	6F6	9	negative
3+4	B11	3	negative
5	4E5	13	In progress
6+7	6B12	3	negative

Unexpected Results

- 'Bobwhite', the transgene recipient, was crossed with the resistant NIL: the F_1 was susceptible
- 2 of 3 $F_{2:3}$ families homozygous for *Fhb1* were susceptible to FHB, indicating that some factor in Bobwhite is inhibiting the expression of *Fhb1*
- All transgenes are being backcrossed into the susceptible NIL and will be re-evaluated for FHB resistance

Fhb1 Effect in 19 NIL pairs



***Fhb1*: Ongoing and Future Activities**

- **Complementation and Virus-Induced-Gene-Silencing (VIGS) to identify *Fhb1* (Trick, Pumphrey, Liu)**
- **Construct PCR pooled BAC library of Sumai 3 to compare gene content and organization in the *Fhb1* region (2007-2008) (Akhunov, Pumphrey, Liu)**
- **TILLING population (Pumphrey, Liu)**

Funding



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