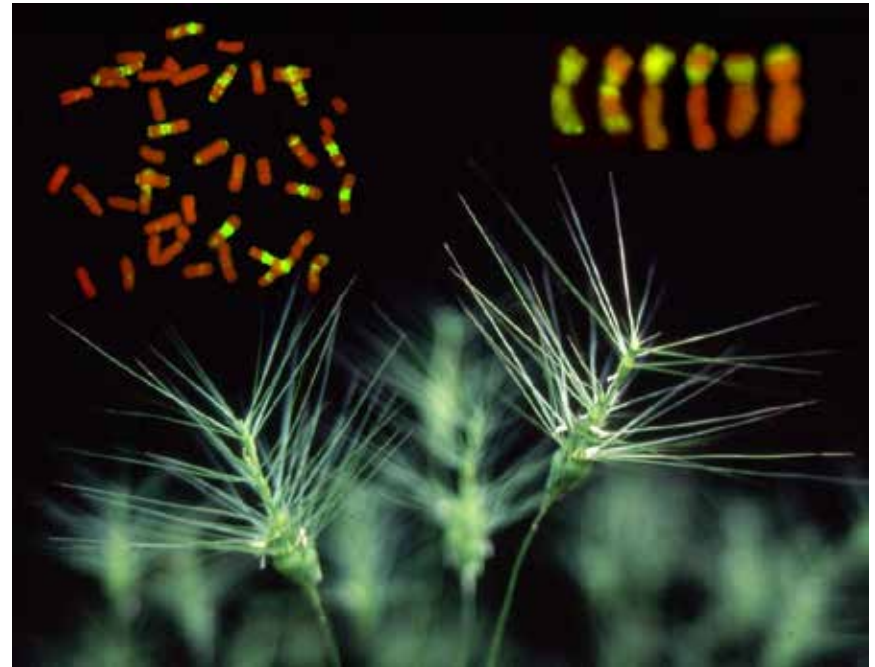


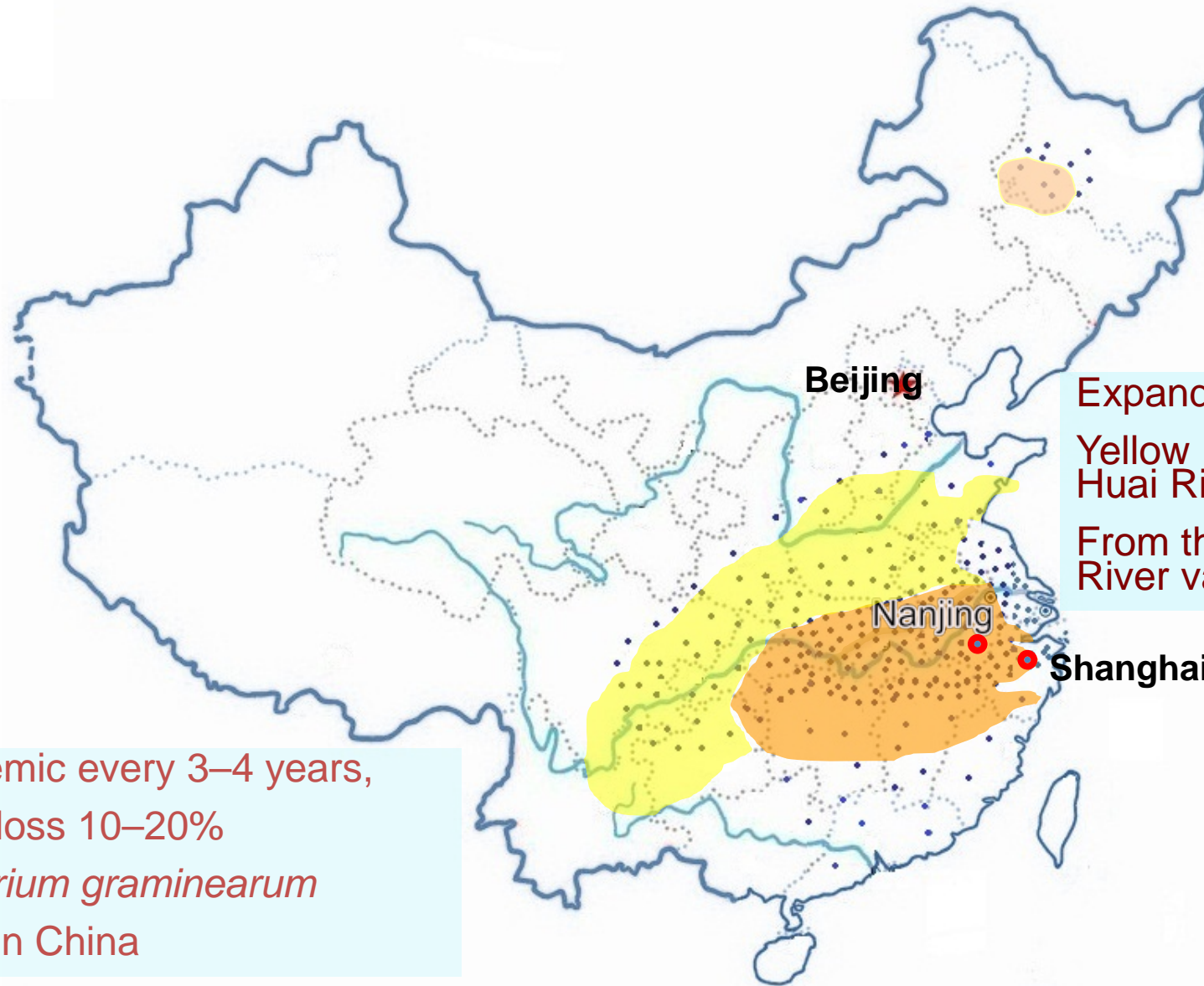
# Chromosome engineering and next generation sequencing assisted transfer and deployment of alien grass species resistance to FHB in wheat

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# Main epidemic region of wheat scab in China



Expanding into the  
Yellow River and  
Huai River Valley  
From the Yangtze  
River valley

Epidemic every 3–4 years,  
yield loss 10–20%  
*Fusarium graminearum*  
94% in China

# McKnight Foundation (NAU/KSU \$2.4M, 1994-2006)

## Project goals

- Discover, create, and characterize germplasm for scab resistance
- Molecular map the scab resistance genes from various sources and elucidate the genetic basis for scab resistance
- Characterize structurally and functionally the genes for scab resistance and explore the mechanisms underlying scab resistance
- Develop breeding strategies that can speed up the breeding process and are efficient in enhancing scab resistance and enriching genetic diversity

# First International Symposium on *Fusarium* Head Blight ( May 2000)



蘇州  
SUZHOU

南京  
NANJING

# Resistance found in alien species

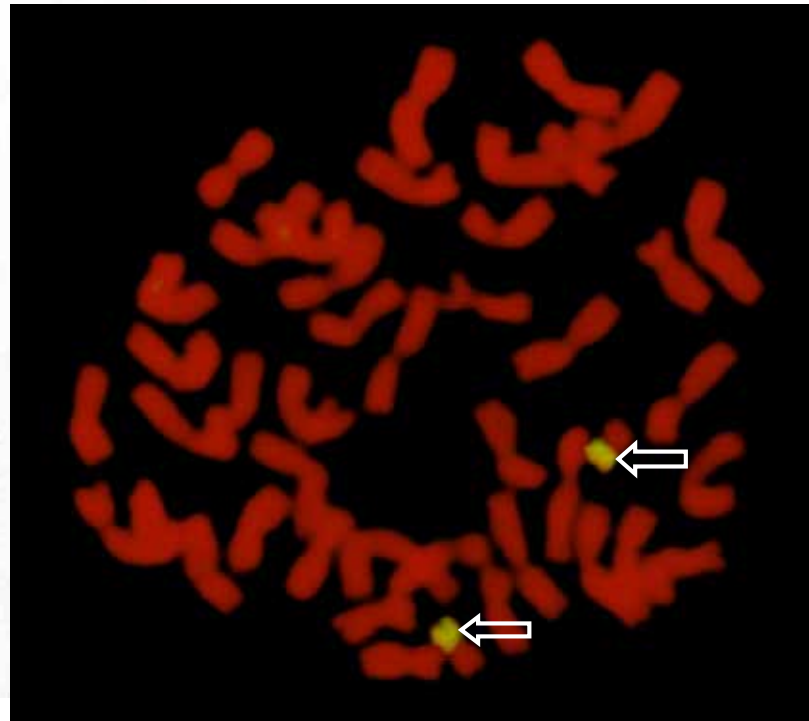
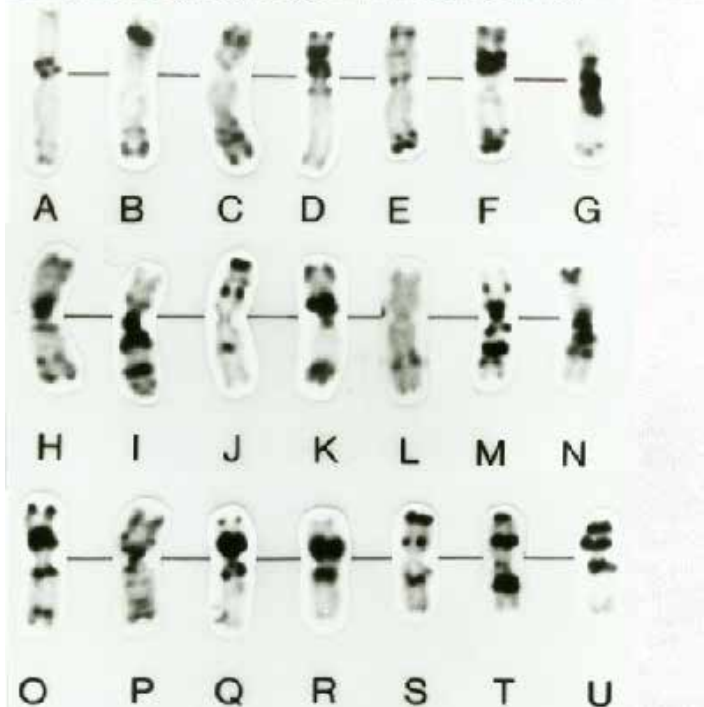
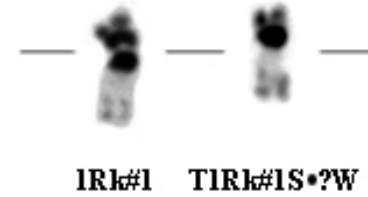
*Leymus racemosus* Lam (syn. *Elymus giganteus* L.  
2n=28, NNJJ)

*Roegneria kamoji* (Trin.) Nevski (syn. *Elymus tsukushiense*  
Honda. 2n=42, HHSSYY)

*Roegneria ciliaris* (Trin.) Nevski (syn. *Agropyron ciliare*  
(Trin) Franchet, syn. *Elymus ciliaris* (Trin) Tzvelev. 2n=28,  
SSYY)

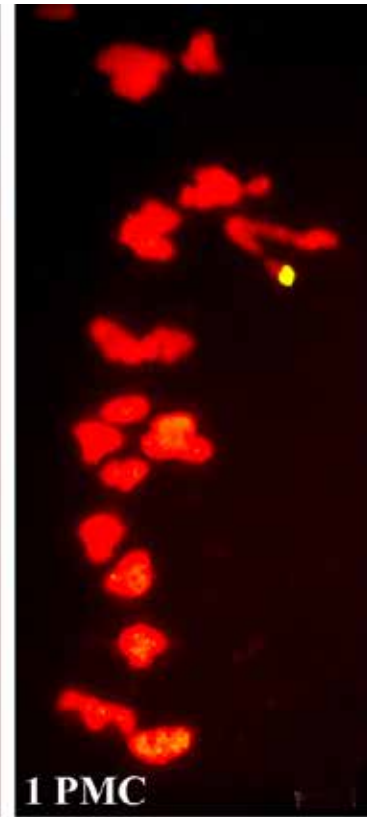
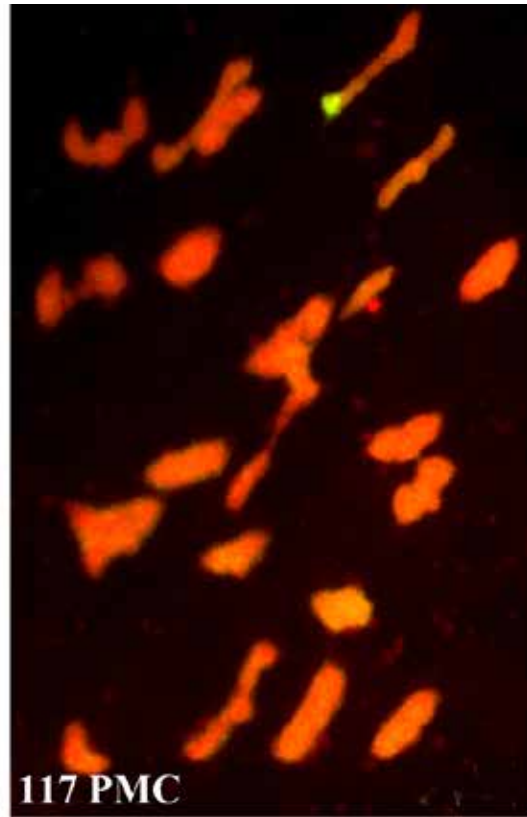
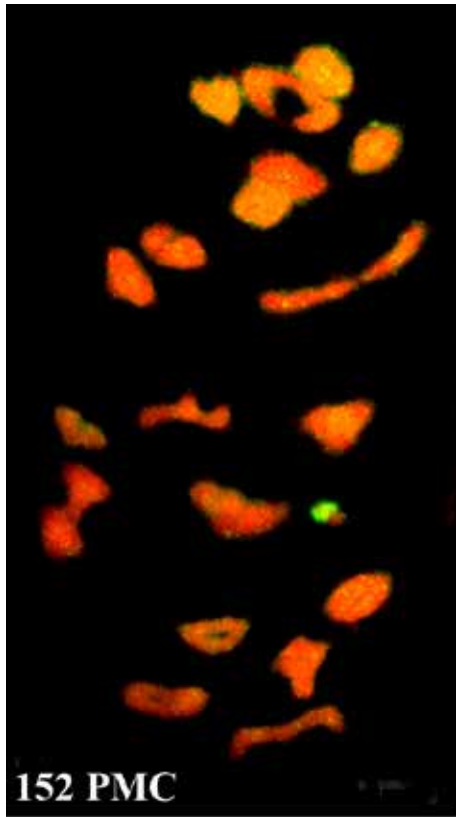


*Triticum aestivum*–*Roegneria kamoji* translocation line T1Rk#1S.W with *Fusarium* head blight resistance



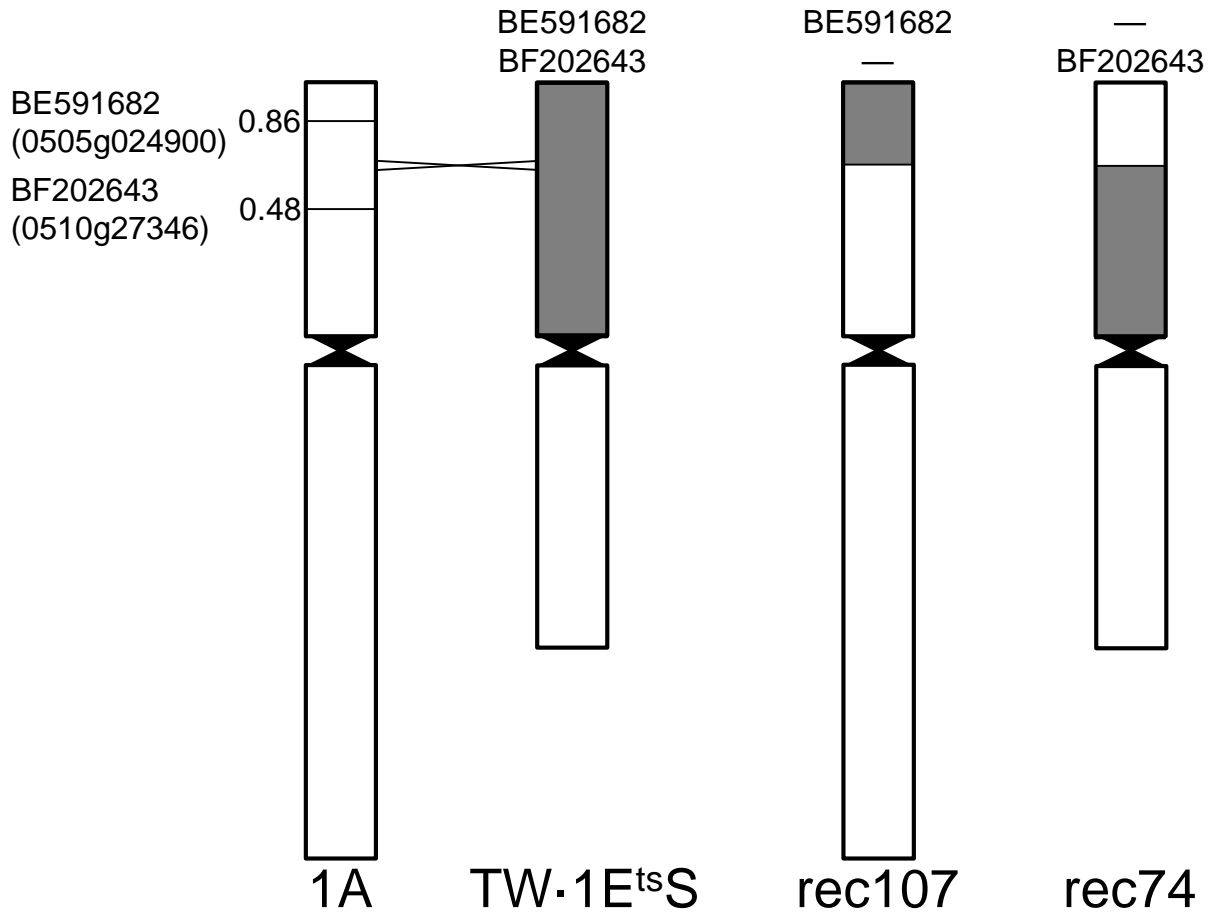
MS790- -9 RTC FISH

# *Fhb6* pairing



# Primer sequences for CAPS and SNP markers

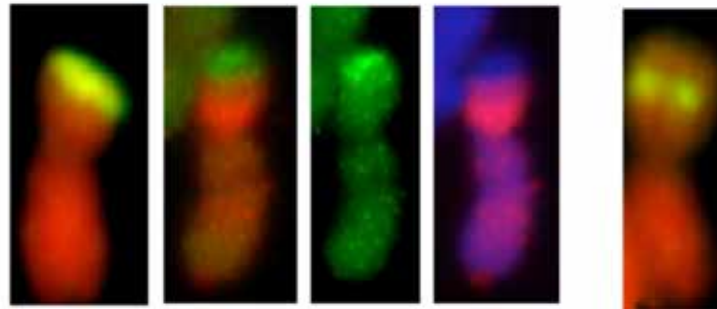




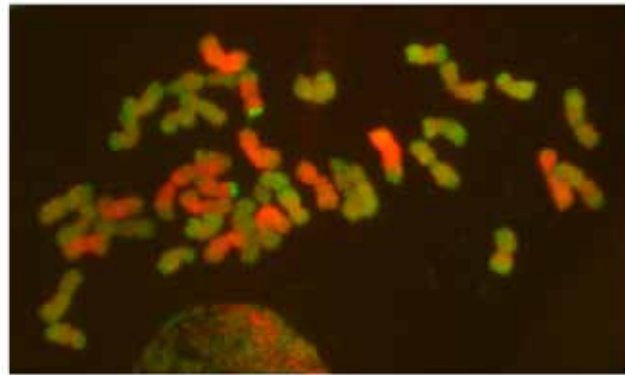
# *Fhb6* from *Elymus tsukushiensis*



KS14WGRC61



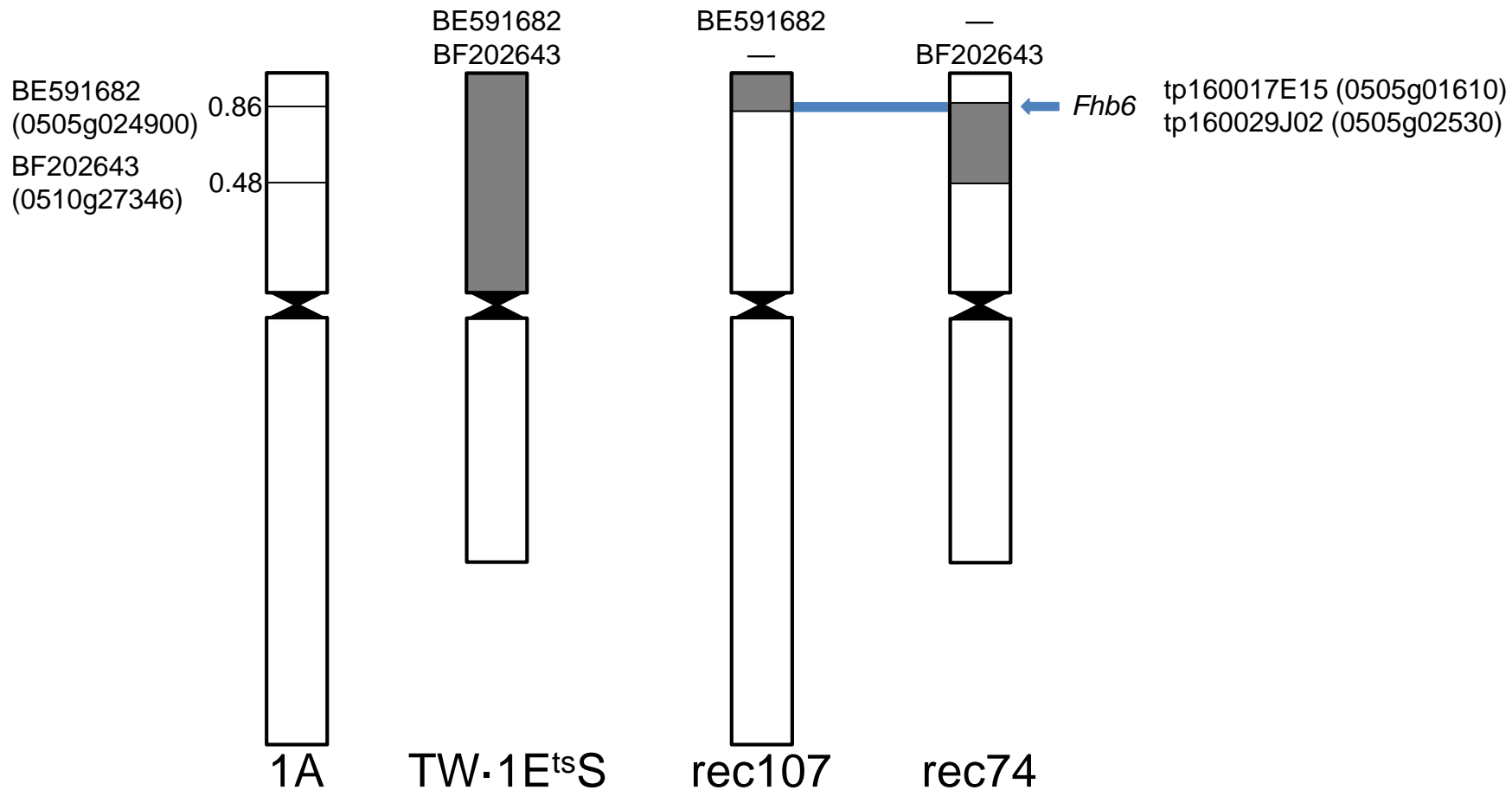
T1AL·1AS-1E<sup>ts</sup>#1S

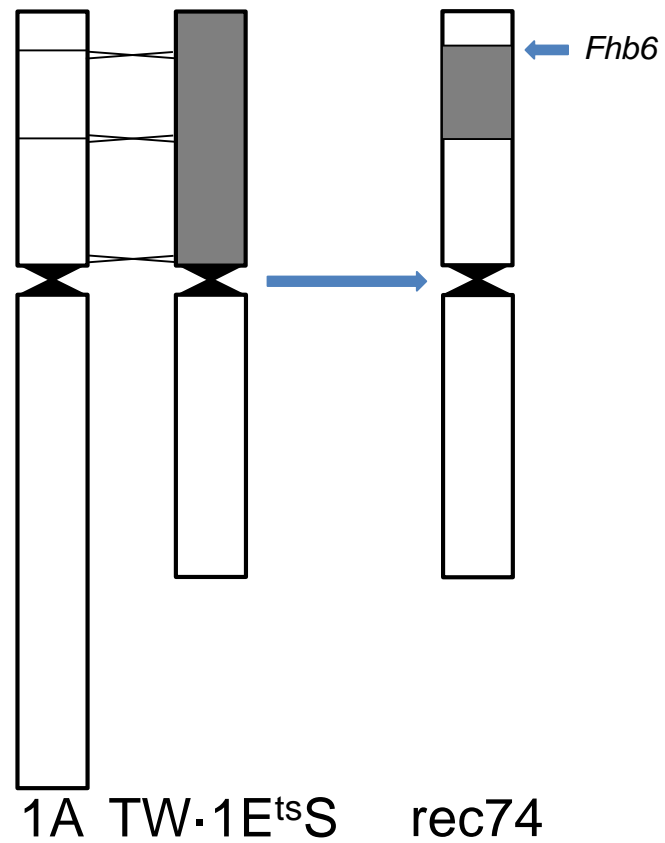
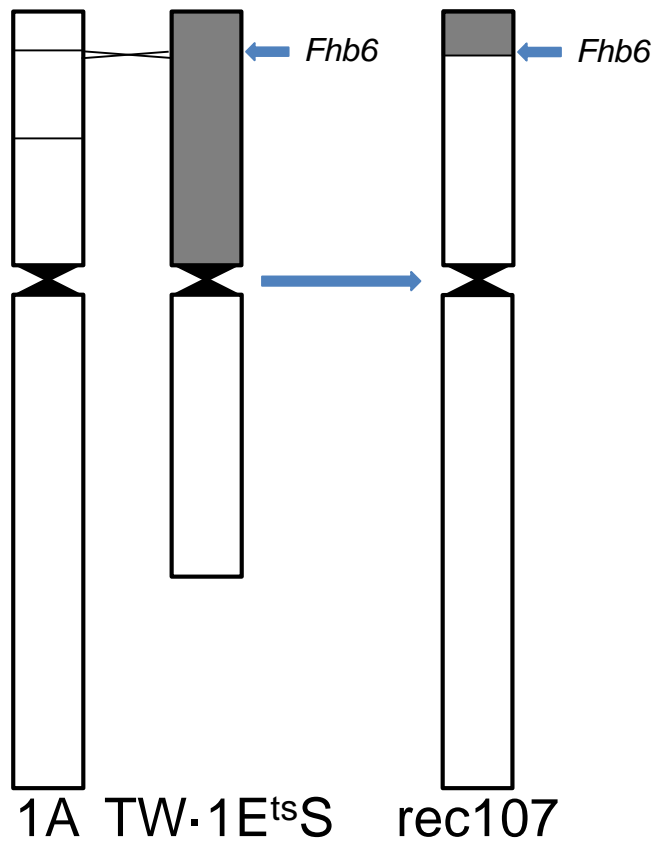


TWL·WS-1E<sup>ts</sup>#1S-WS

# Fusarium head blight ratings of wheat– *Elymus tsukushiensis* introgression lines

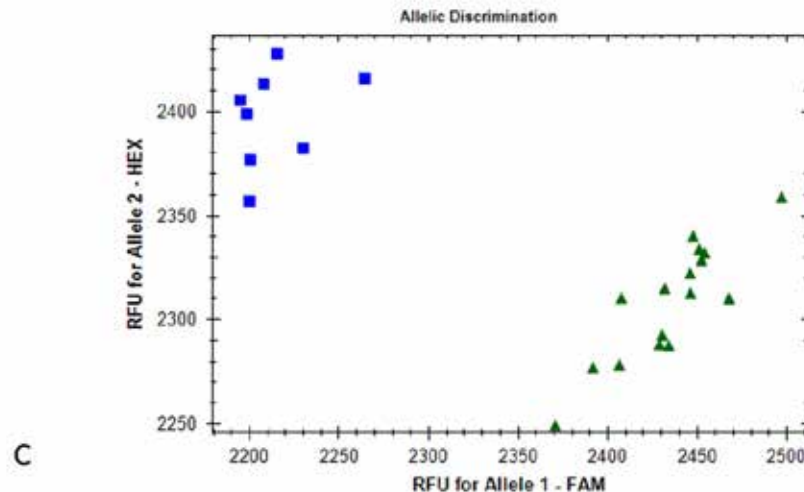
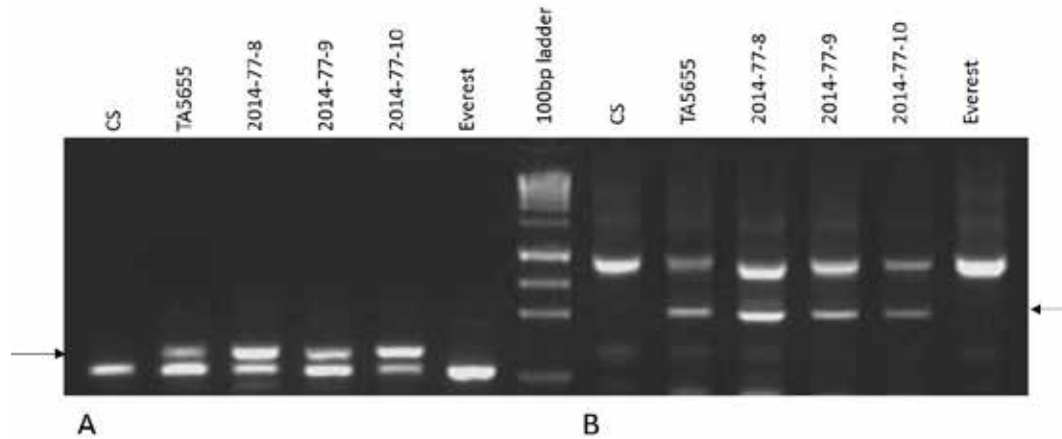
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# Primer sequences for CAPS and SNP markers

CAPS markers and KASPar SNP assay pattern in Chinese Spring, Everest, resistance source TA5655 (TW-1E<sup>ts</sup>#1S), and homozygous recombinants in an Everest background (2014-77-8, 2014-77-9, and 2014-77-10)



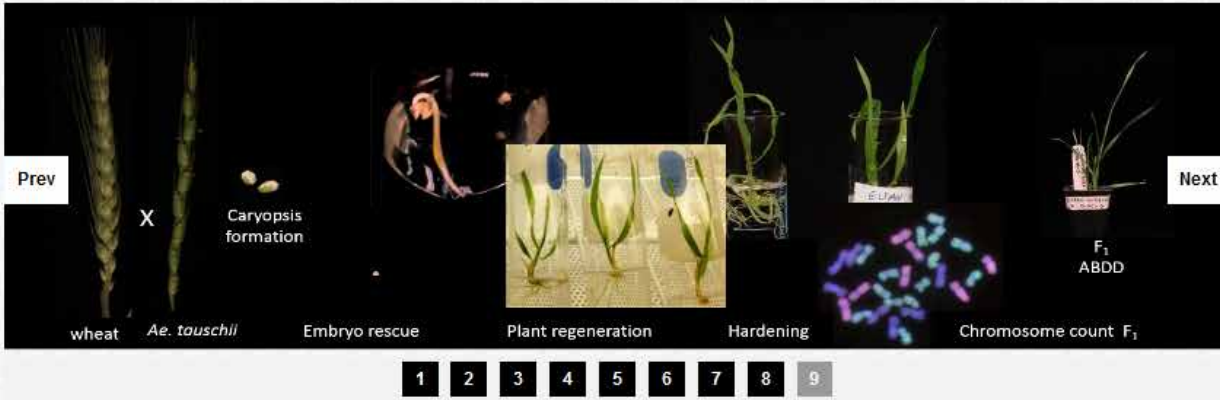
# Molecular mapping of the *Fhb6* region

- Flow-sorting and pair-end sequencing of TWL-1E<sup>ts</sup>#1S done, analysis pending
- Molecular mapping of overlapping *Fhb6* region using rec107 and rec74, ongoing
- TILLING library of rec107 for candidate gene validation, planned
- RH mapping of *Fhb6* using rec107, planned





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*without genetic resources there will be no gain -come be a partner*



At K-State we have set up an I/UCRC with the aim to enhance the genetic diversity of wheat with focus on developing abiotic stress tolerant winter wheat



