

# Dissection, characterization and utilization of disease QTL

Indonesia  
- *Bustamam*  
- *Utut*

IRRI  
- *Vera Cruz*  
- *Leung*  
- *Brar*

CSU  
- *Leach*

Rice

Maize

KARI  
- *Gethi*

Cornell  
- *Nelson*  
- *Smith*

NCSU  
- *Balint-Kurti*

Generation Challenge  
Program  
Project #8  
Update 2007

Understanding the trait

Synthesis maps

(Complementary) mechanisms

Insight on MDR

Published

NILs;  
Histopathology

Diversity panel;  
RS populations

dQTL  
discovery

dQTL NILs

dQTL  
expression

Disease panel  
Association panel

Diallel

Selection from diallel  
Selection from AB-QTL populations

Multiple strategies  
(poster 2.9)

Deletion analysis  
QTL dissection  
Association mapping  
NAM

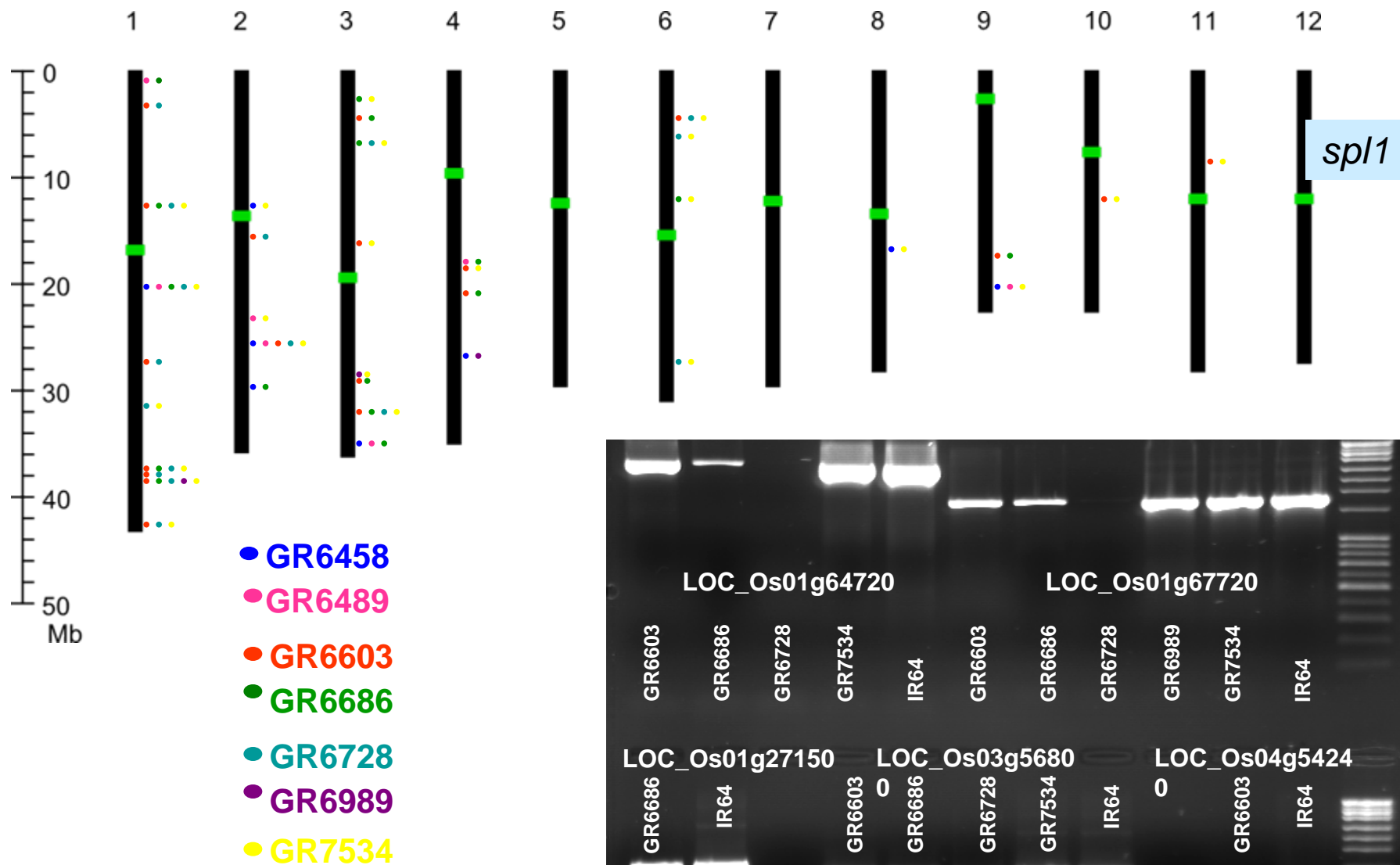
Linkage mapping  
Selection mapping  
AB-QTL mapping  
Mutant analysis

Array studies

(e) insights  
re: breeding  
pop

varieties

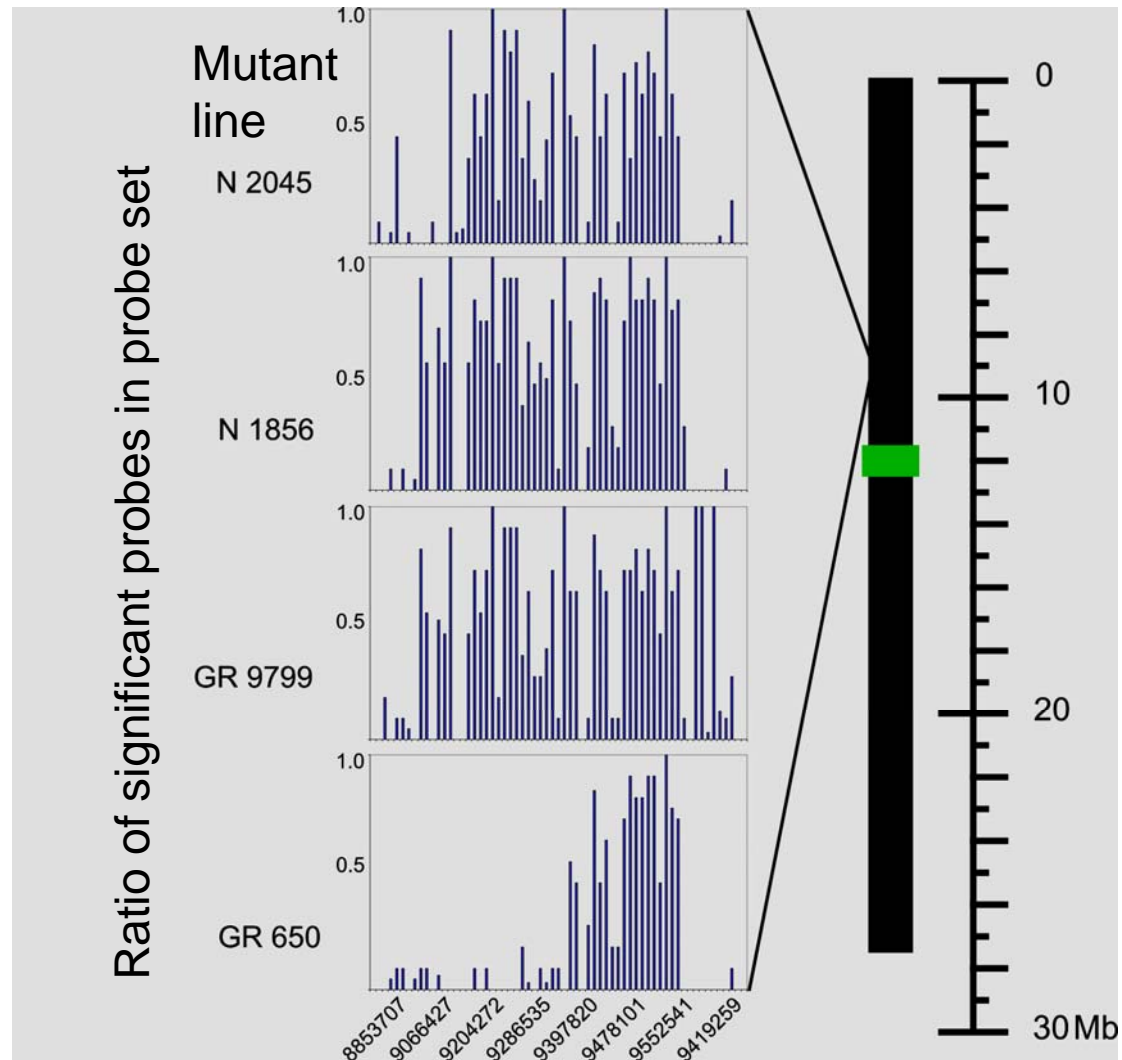
# Chip-analysis of loss-of-resistance mutants



# Allelic series of deletion mutants

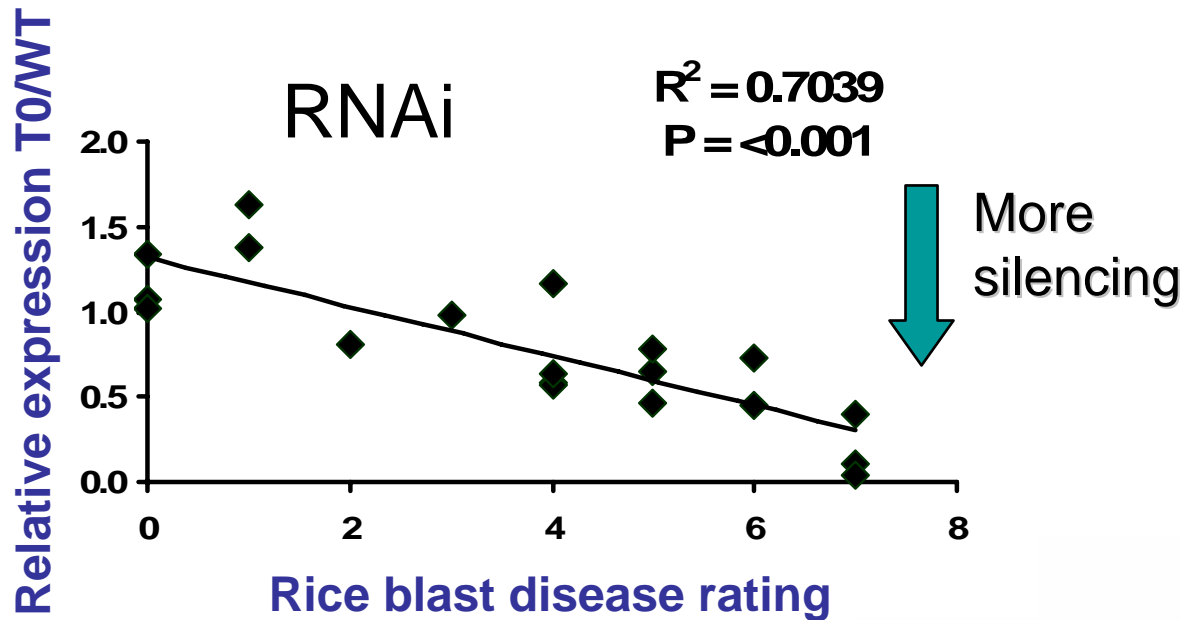
All mutants show *sp11* phenotype.

Two had been confirmed as allelic by complementation tests



Gene model position on chromosome 12

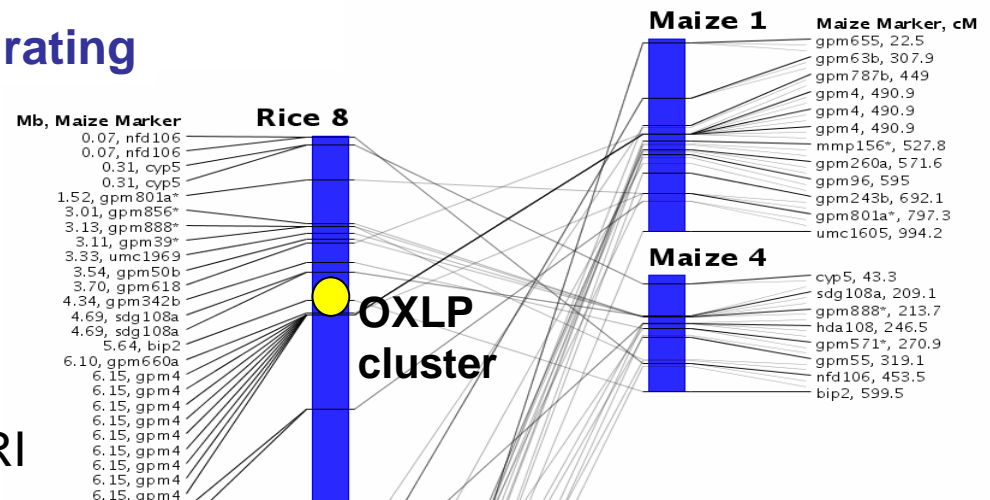
# Oxalate oxidase (germin-like protein)



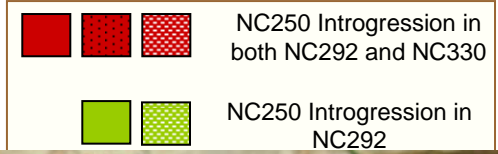
Increased silencing of Chr. 8 OsGLP genes in T0 rice correlates with increased disease

Manosalva and Leach, CSU

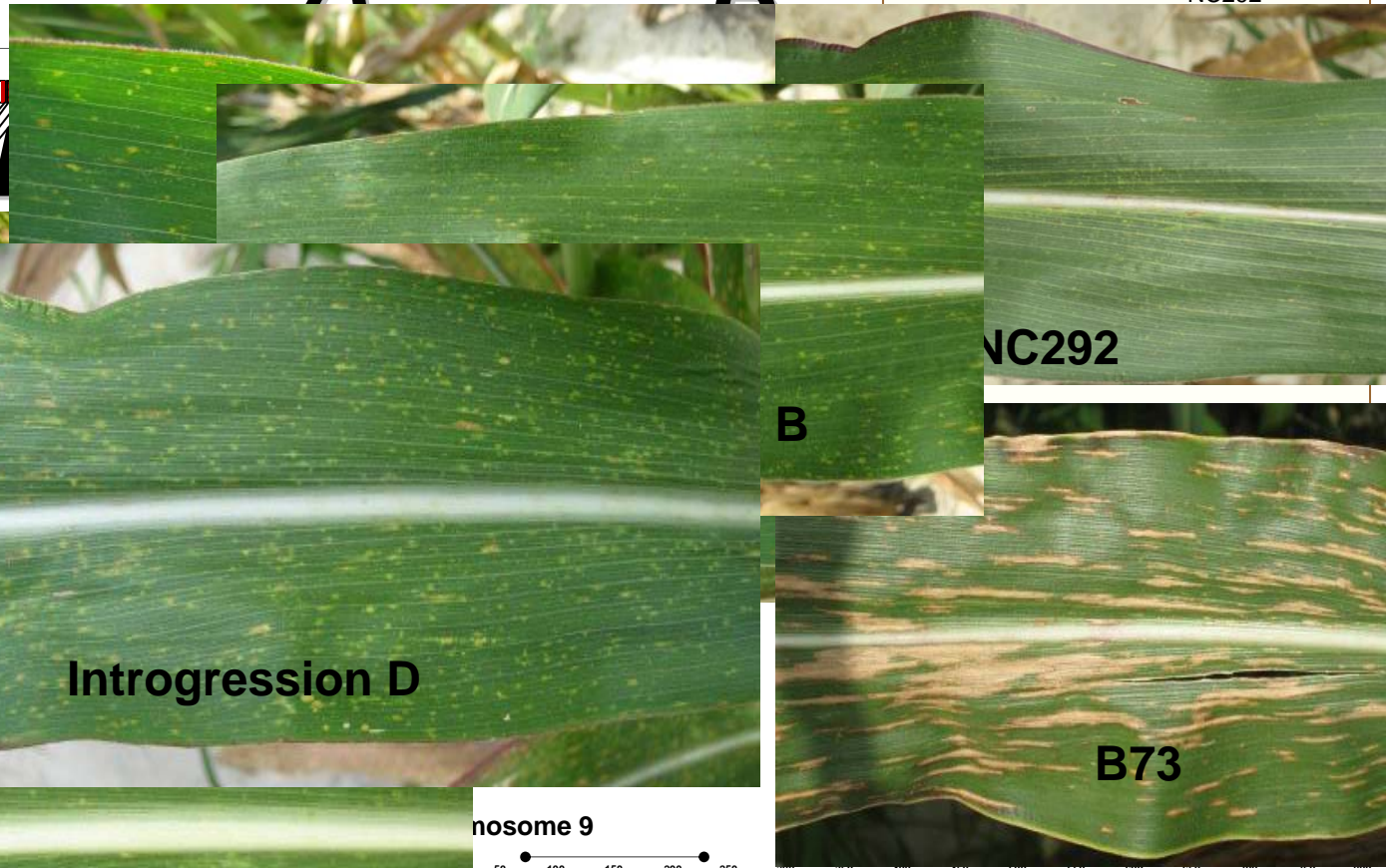
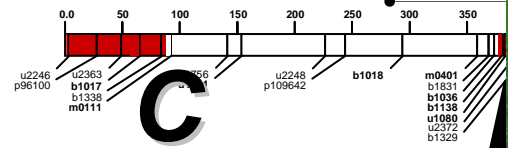
Carillo and Vera Cruz, IRRI



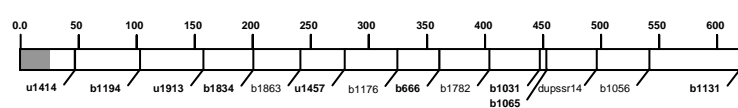
### Chromosome 1



### Chromosome 2



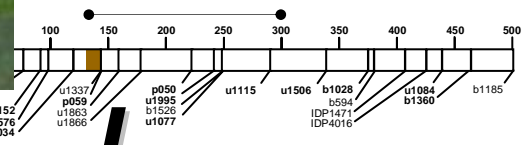
### Chromosome 8



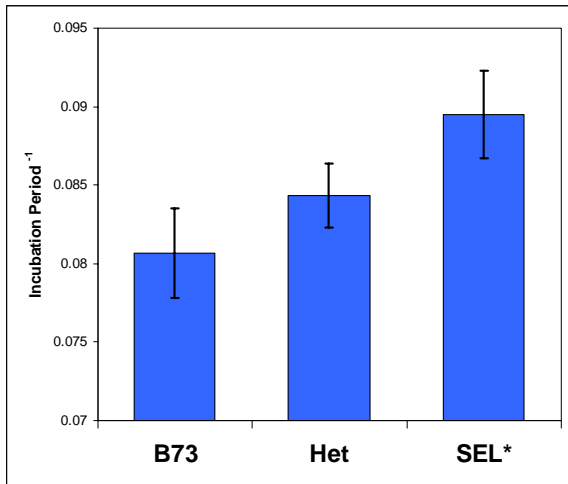
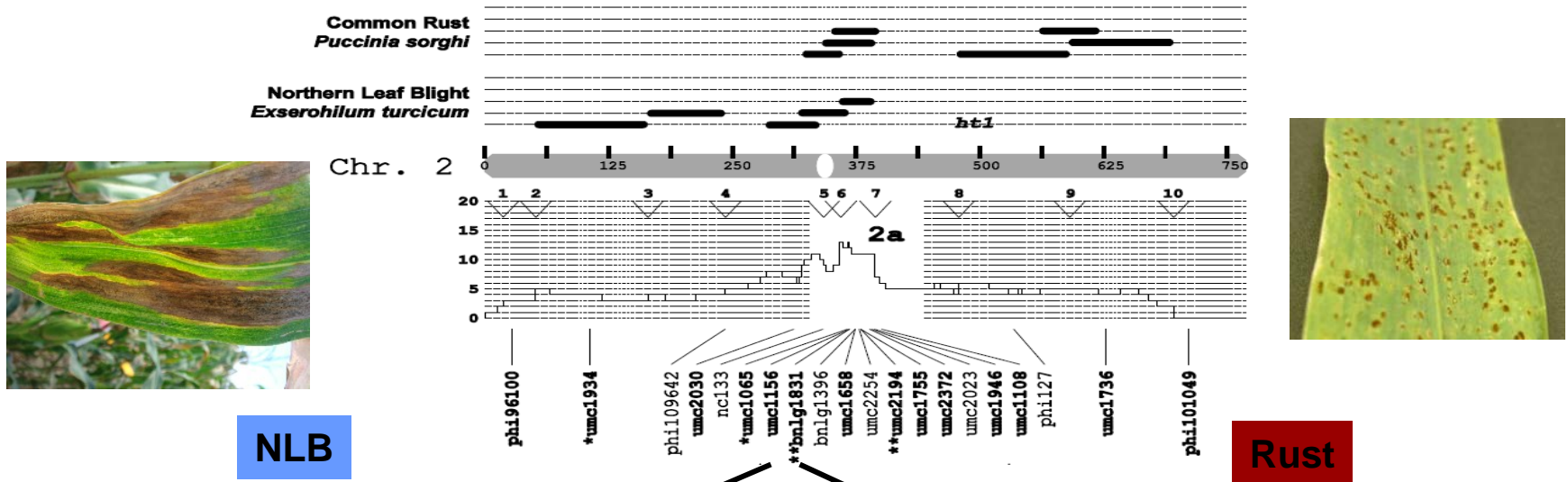
### Chromosome 9



### Chromosome 10



# Antagonistic reactions for NLB and rust resistance

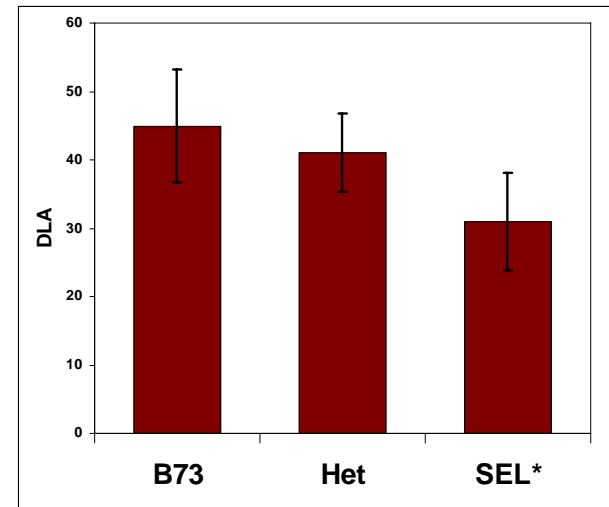


Increase in rate of lesion development

$p < 0.001$

$p = 0.01$

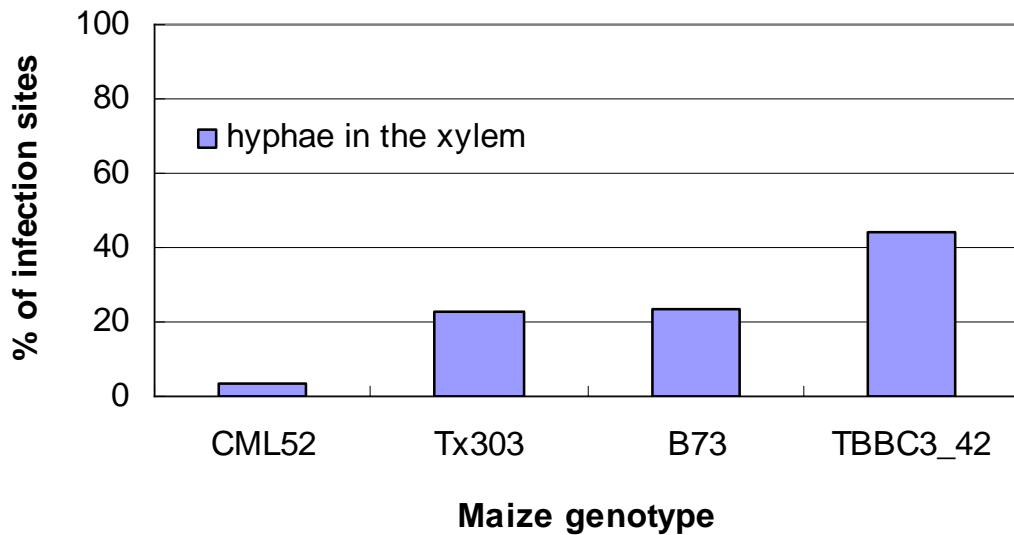
Selected allele



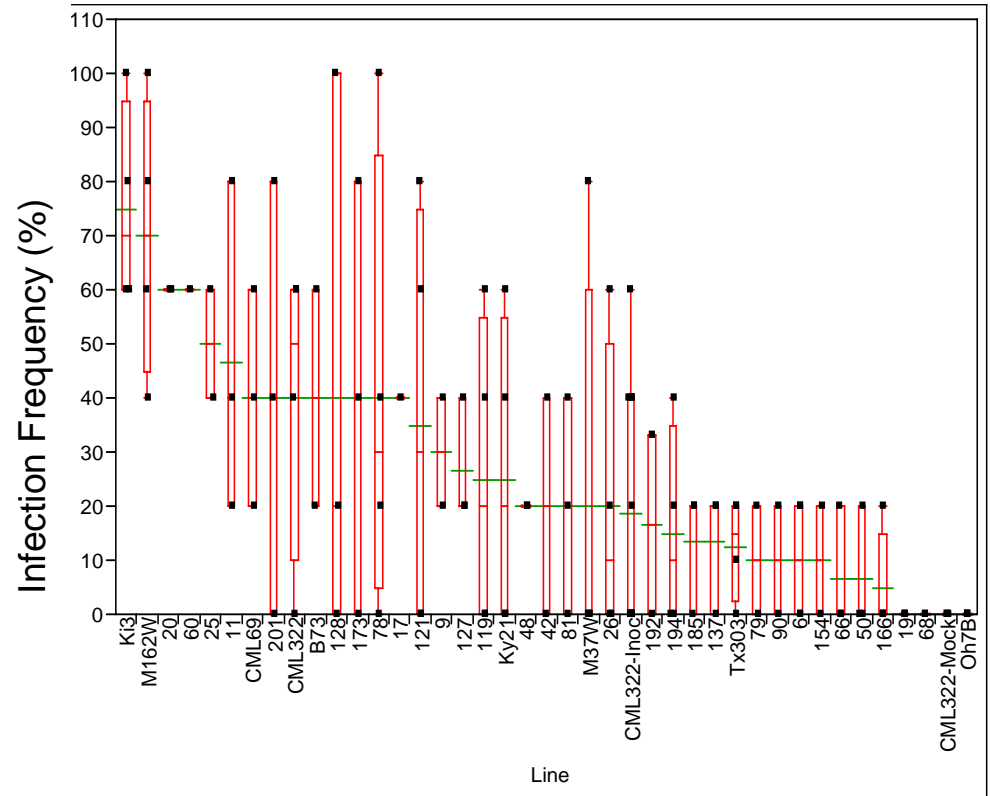
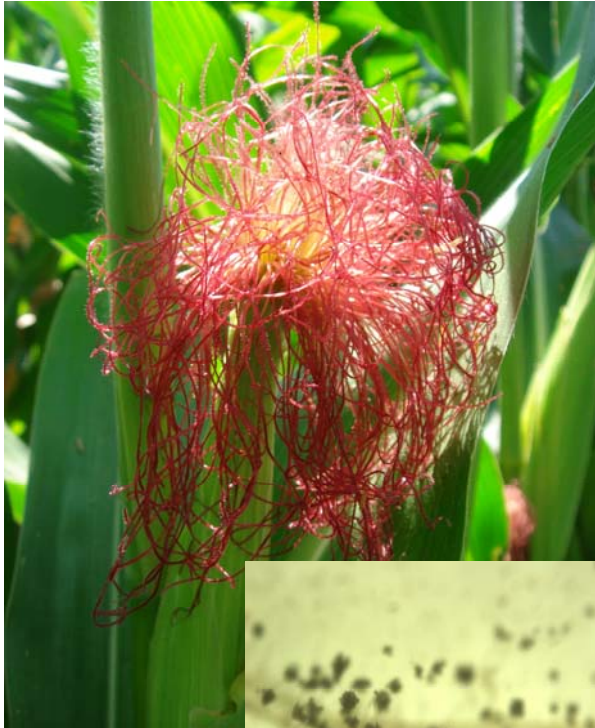
Decrease in rust severity



**Incidence of *E. turcicum* growing into the xylem on different maize genotypes (7 days after inoculation)**

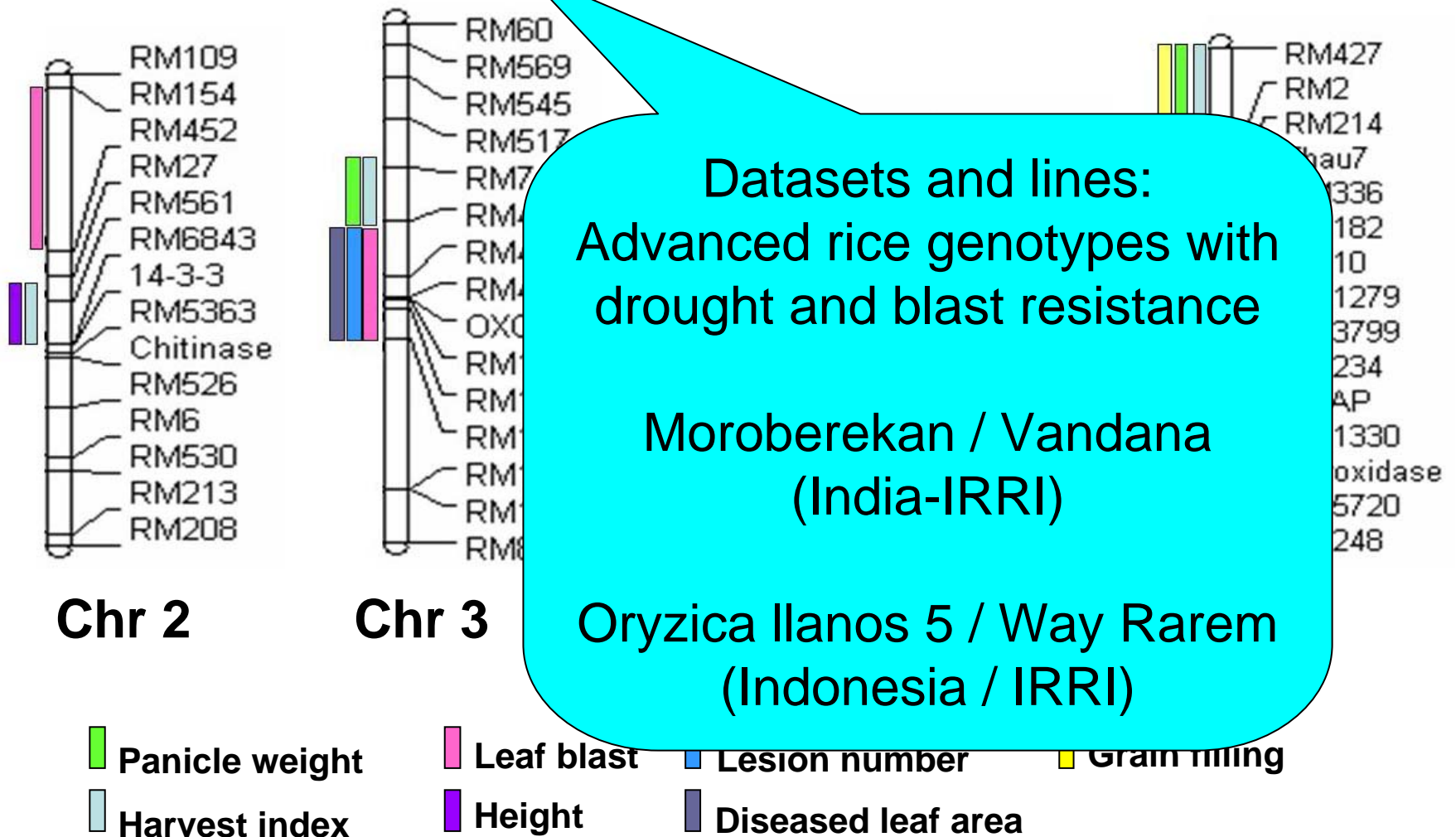


# Maize + drought = aflatoxicosis



Resistance to infection  
by *Aspergillus flavus*

# Mapping of QTLs for resistance to blast and drought tolerance in rice



Vandana / Moroberekan derivatives; IRRI & India

# Genetics + breeding



Parent 1&2	CML 312	CML 384	TZMi 102	TZMi 711	TZMi 712	CML 204	CML 373
CML 312	Self						
CML 384		Self					
TZMi 102			Self				
TZMi 711				Self			
TZMi 712					Self		
CML 204						Self	
CML 373							Self

Moderate x Moderate



- Diallel study of GLS resistance
- $F_{2:3}$  and  $BC_4F_4$  lines pending
- Promising hybrids identified

