

# Utilizing multi-environment trials to improve genome-wide association studies and our understanding of crop adaptation: a case study with lentil (*Lens culinaris* Medik.)

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Derek Wright, Sandesh Neupane, ... and Kirstin E. Bett. (2021) Utilizing multi-environment trials to improve genome-wide association studies and our understanding of crop adaptation: a case study with lentil (*Lens culinaris* Medik.). ???Journal???. .

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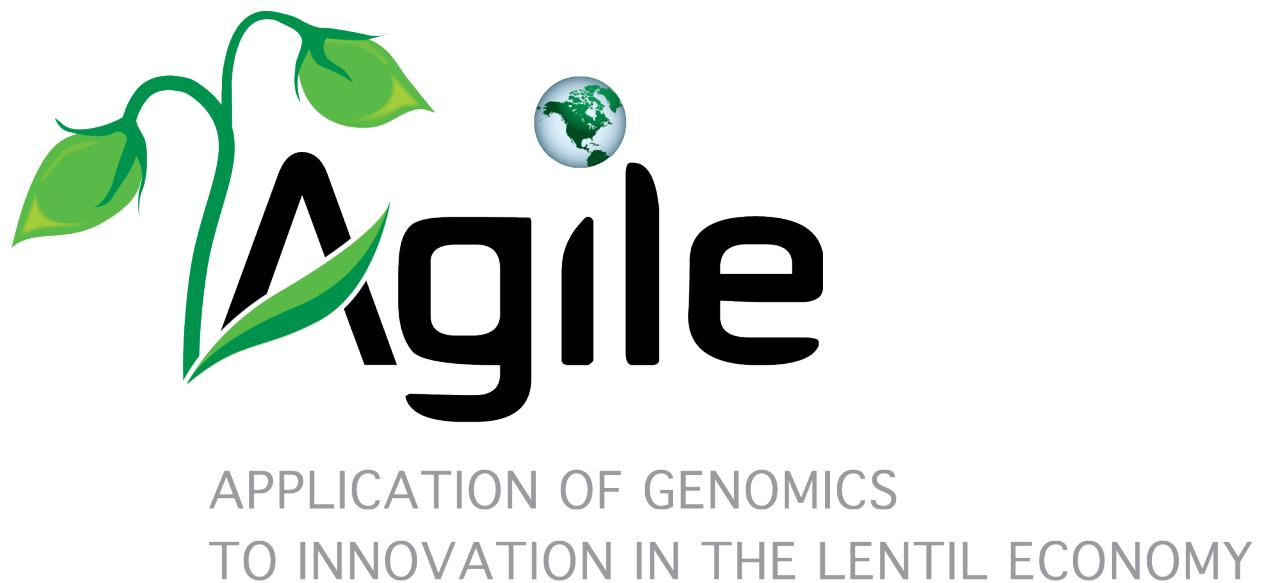
[View as pdf](#)

[Source Code Vignette \(GWAS\\_Phenology\\_Vignette.html\)](#)

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## AGILE Project



## **Collaborators**

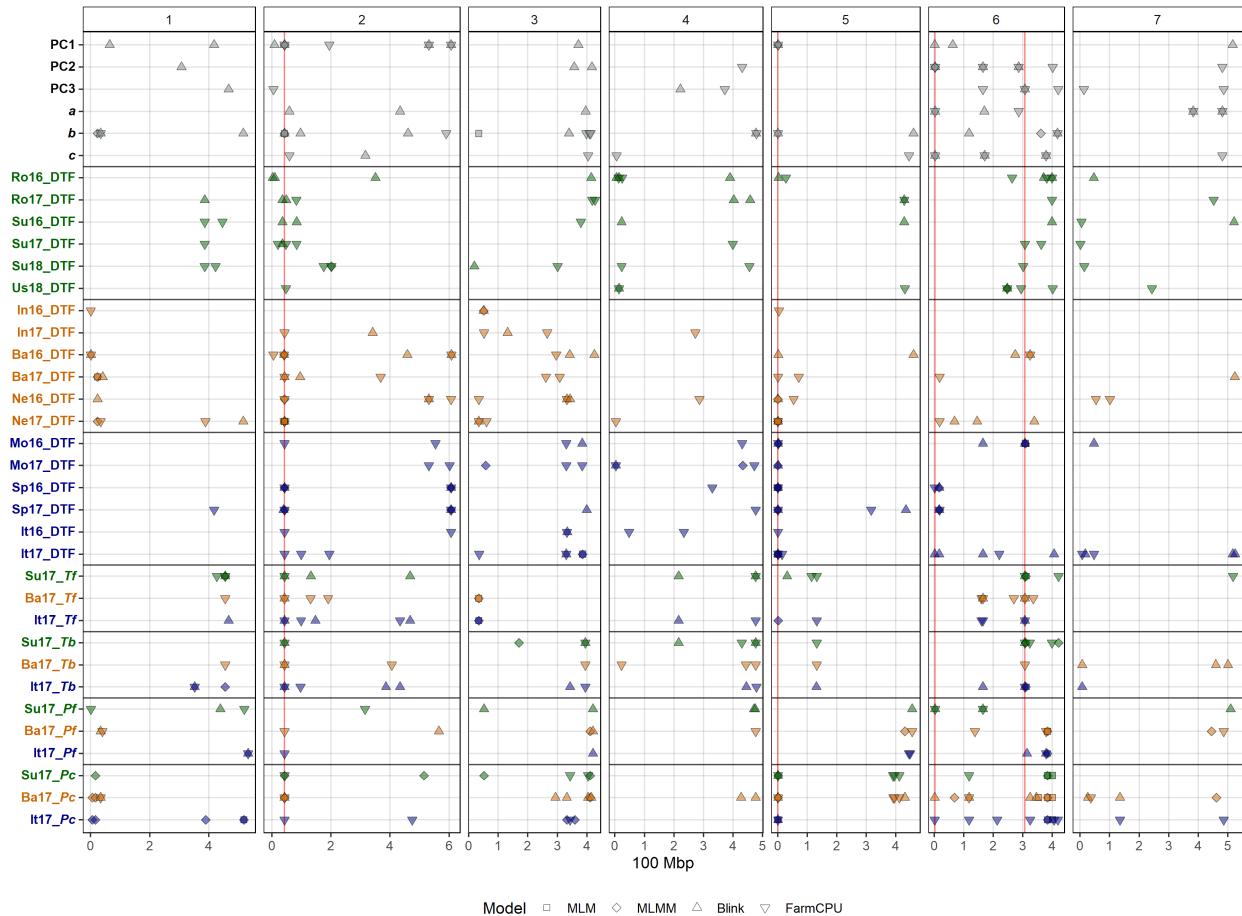
- Department of Plant Sciences and Crop Development Centre, University of Saskatchewan, Saskatoon, Saskatchewan, Canada
- UTAZ

## **Sponsors**

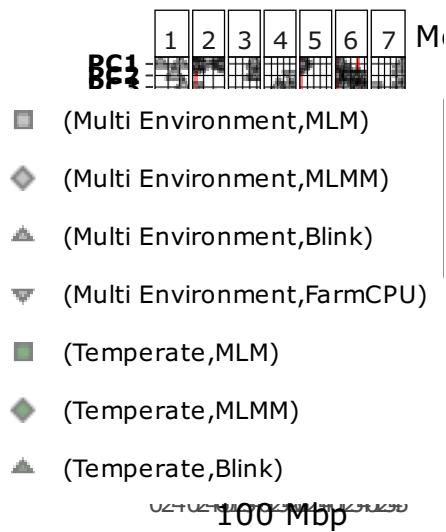
- 
- Saskatchewan Pulse Growers Association
  - Western Grains Research Foundation
  - GenomePrairie
  - GenomeCanada
  - Saskatchewan Ministry of Agriculture

# Figures

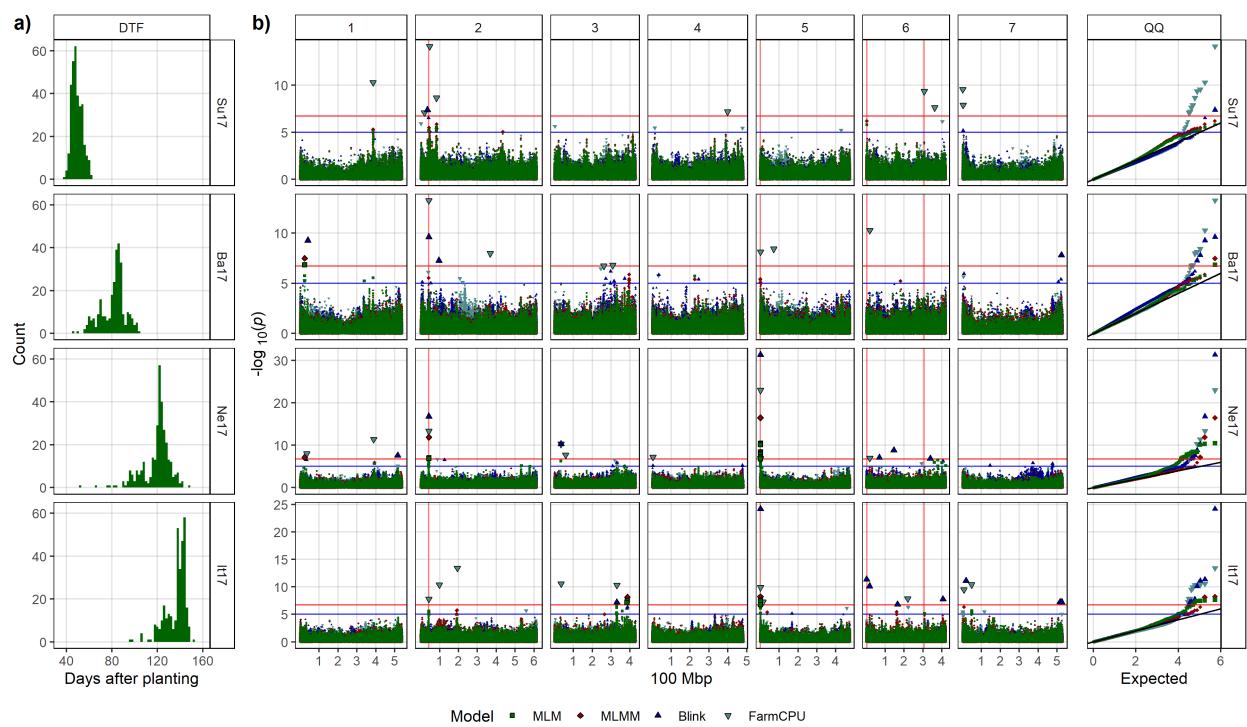
**Figure 1**



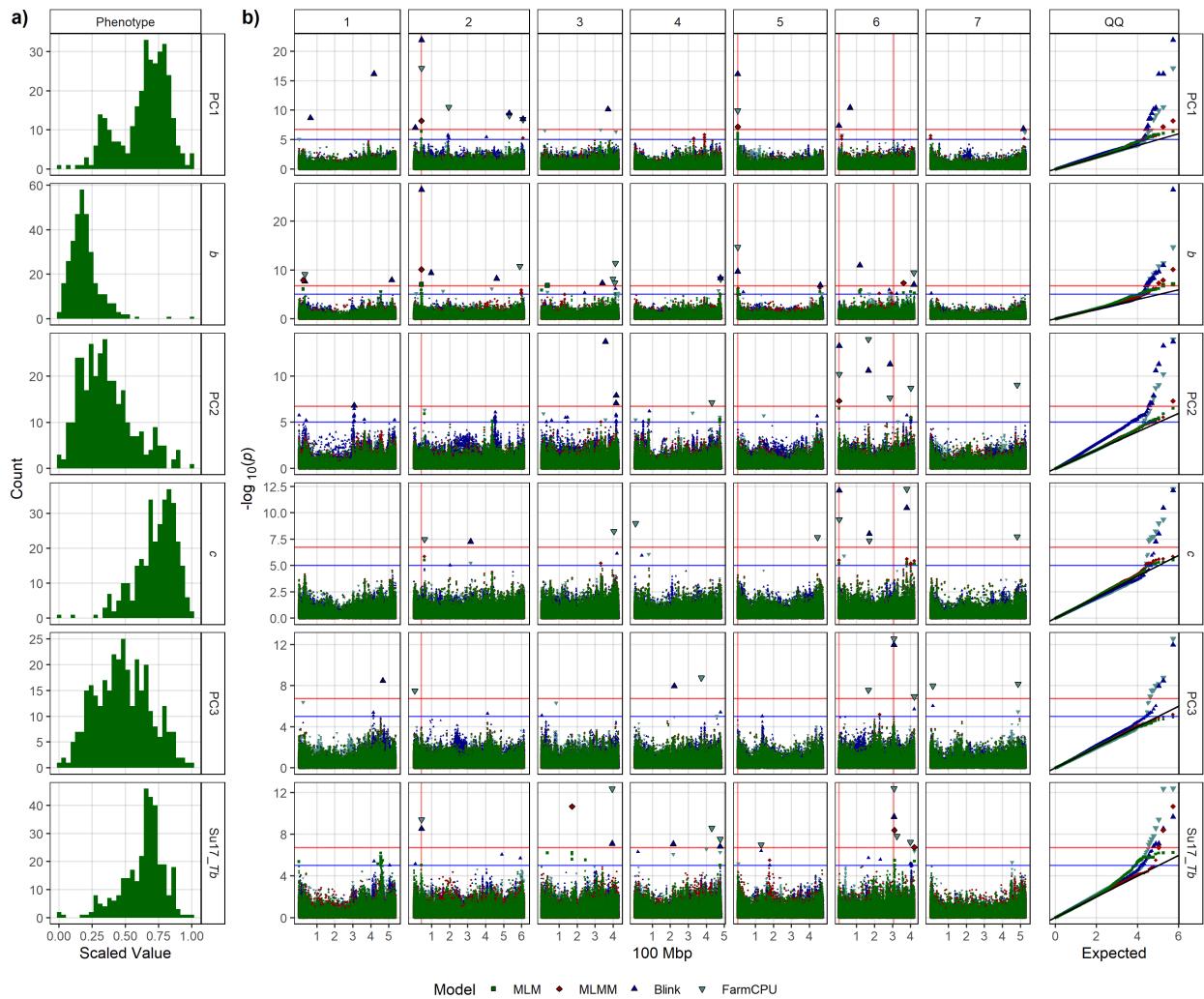
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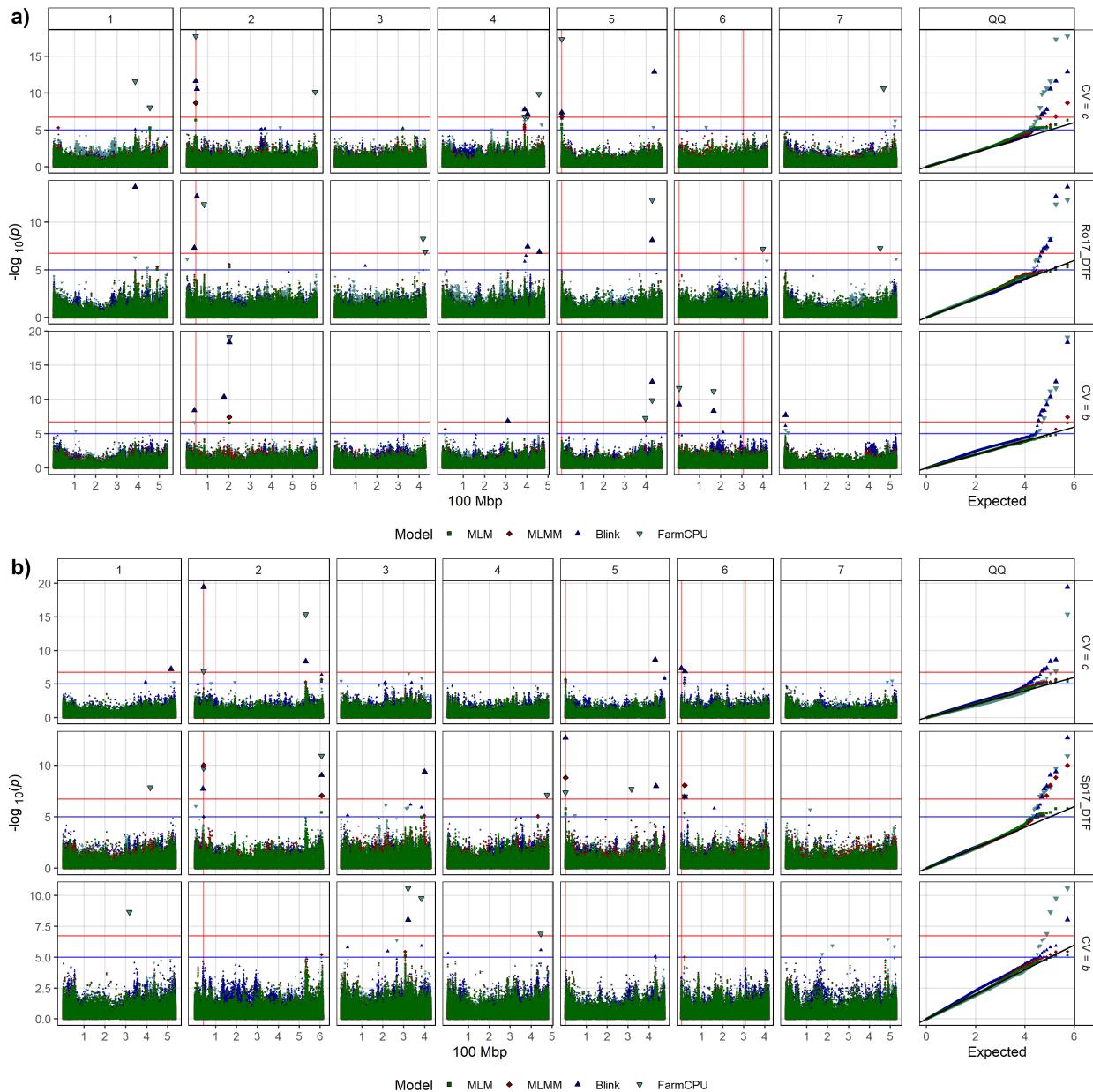
**Figure 2**



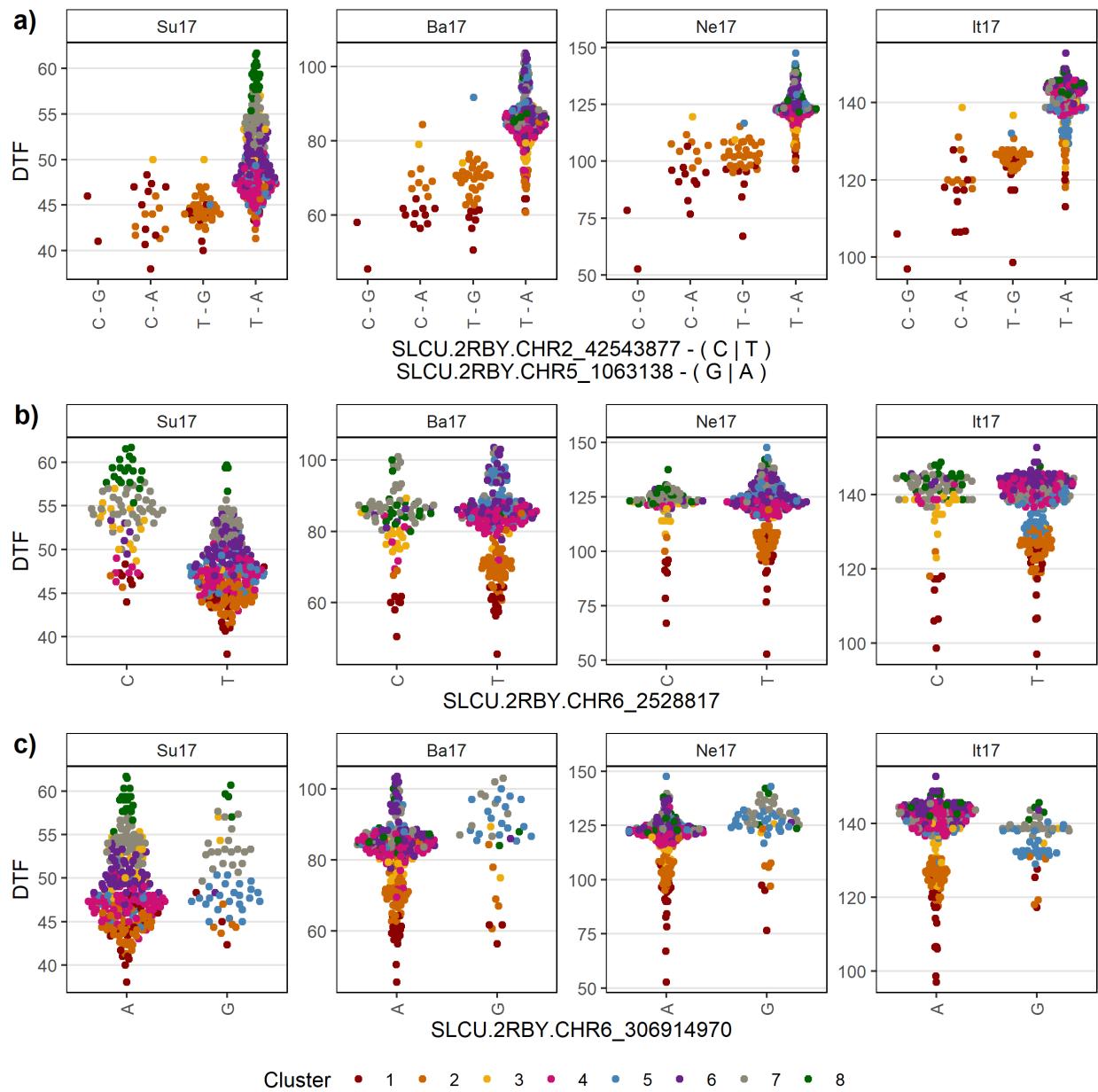
**Figure 3**



**Figure 4**



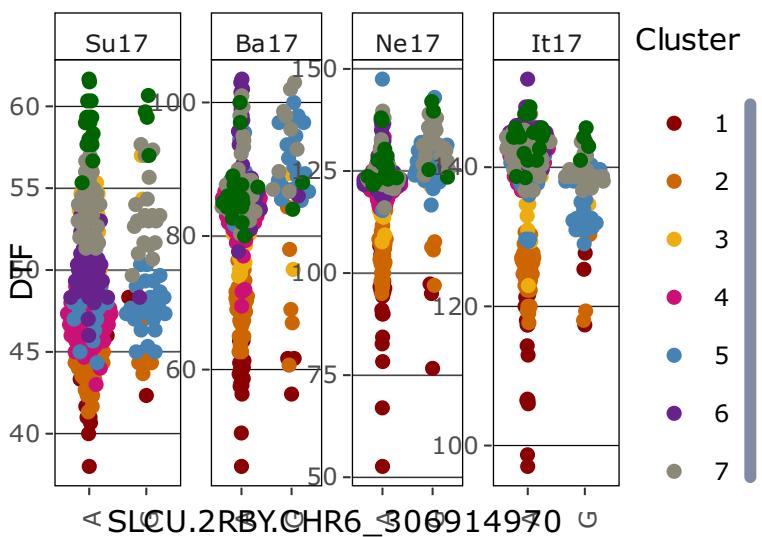
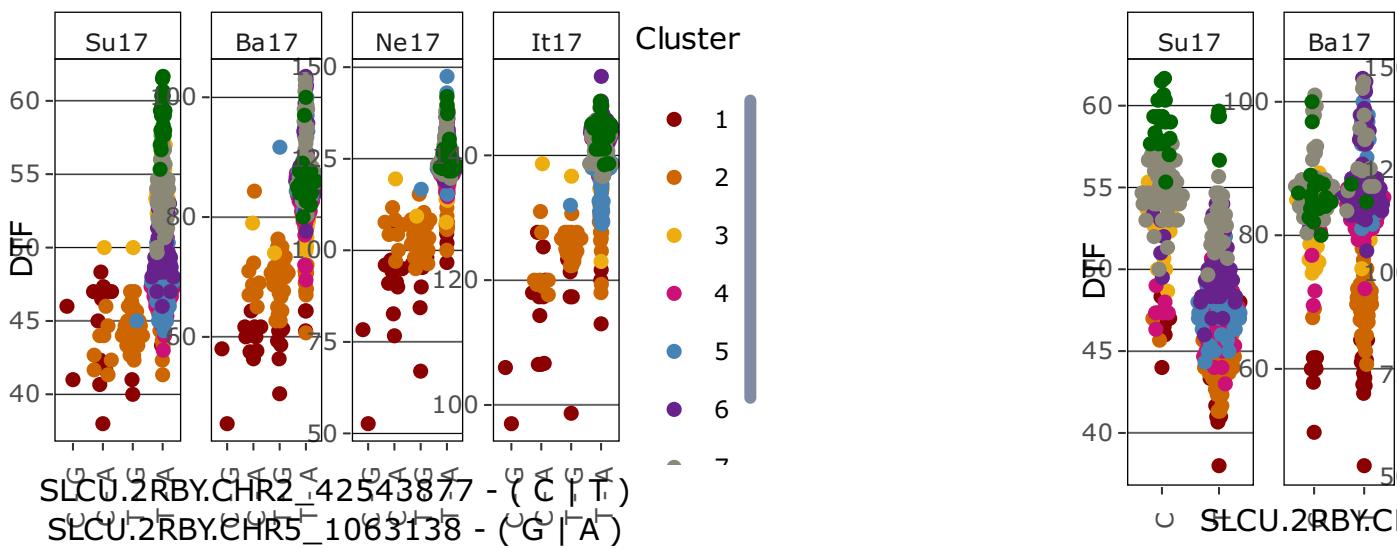
**Figure 5**



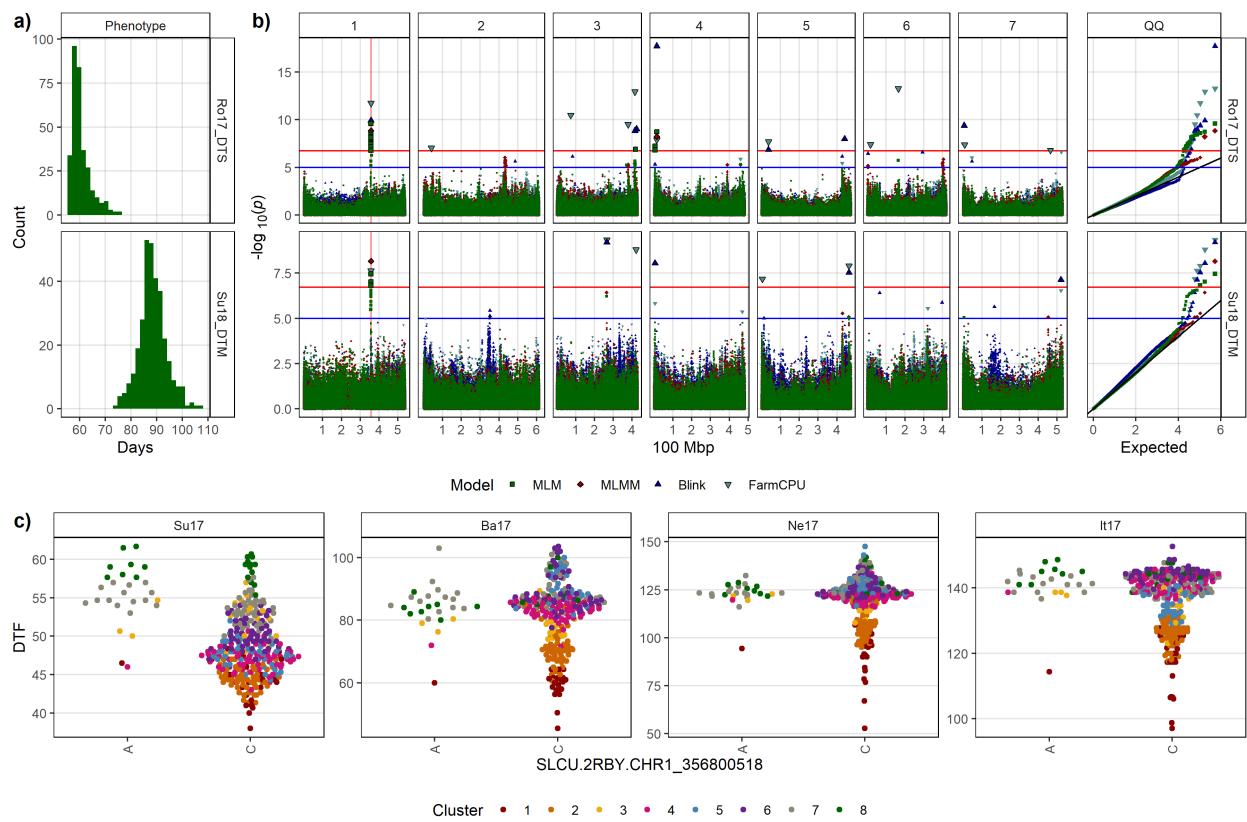
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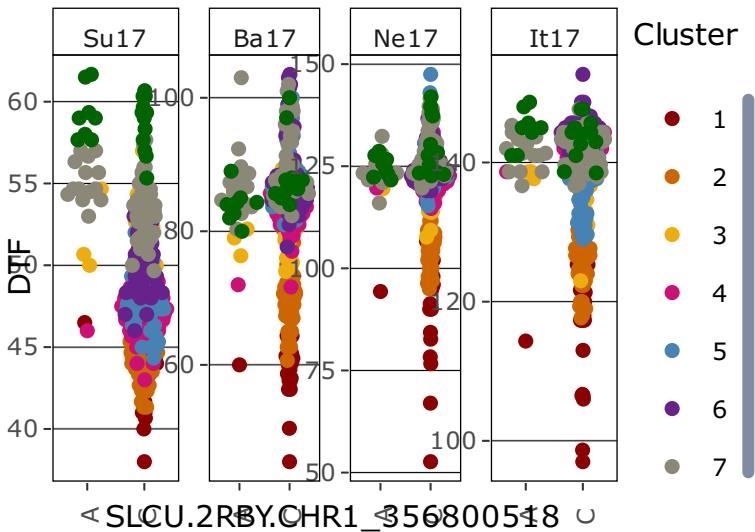
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**Figure 6**



Additional/Figure\_06\_c\_plotly.html



## Supplemental Tables

**Supplemental Table 1**

Supplemental\_Table\_01.csv

SNP													Search												
#	Chromosome	Position	Model	Fst	Trait	Evale	Neg_log10_p	Effect	MAF	Request of Model without SNP	Request of Model with SNP	HDR_Adjusted_P-value	FT_Gene	FT_Pos	FT_End	FT_Distance	FT_Distance_c								
1	SLCU.2R BY.CHR1_7708	7708	MLM	Ba17	Pc	0.0000053219393096	5.0864917423608	0.799424099976	0.1111111111111111	0.47744239040439	0.510507516469427	0.01048245552047	LoReLD	2407337	2412279	2326475	2326475								
2	SLCU.2R BY.CHR1_100948	100948	FastP	Ba17	DTT	4.235998731819e-9	8.3679479372369	-3.93722234447264	0.484278295974	0.06140778306657	0.06140778306657	0.06140778306657	LoReLD	2407337	2412279	2307289	2307289								
3	SLCU.2R BY.CHR1_108306	108306	MLM	Ba16	DTT	0.00000515605644226	5.2455212949071	-0.17160000021207	0.25157212704625	0.28814138950305	0.39907110114904	0.17964424295061	LoReLD	2407337	2412279	2299031	2299031								
4	SLCU.2R BY.CHR1_108306	108306	MLMM	Ba16	DTT	0.000007442402601301	5.1127573977981	0.25157212704625	0.47205105190504	0.47205105190504	0.47205105190504	0.47205105190504	LoReLD	2407337	2412279	2299031	2299031								
5	SLCU.2R BY.CHR1_157985	157985	BIN	PC2	PCA	0.000001942703807404	5.7717414999432	0.16048141401452	0.06203204932919	0.06203204932919	0.06203204932919	0.06203204932919	LoReLD	2407337	2412279	2240352	2240352								
6	SLCU.2R BY.CHR1_166983	166983	FastP	Ba17	DTT-c	4.257706144000e-9	7.08148021245207	4.34347031810178	0.061002144070012	0.0604914191250583	0.0604914191250583	0.0604914191250583	LoReLD	2407337	2412279	2240352	2240352								
7	SLCU.2R BY.CHR1_169053	169053	BIN	Ba17	DTT-c	4.223114680007e-9	8.37454610866007	0.36116838487725	0.0604824555204725	0.0604824555204725	0.0604824555204725	0.0604824555204725	LoReLD	2407337	2412279	2326324	2326324								
8	SLCU.2R BY.CHR1_178509	178509	MLM	Ba17	Ts	0.00000217419996745	5.5649277308724	12.2184034806137	0.06172050617205	0.077797167839668	0.0624244357234661	0.0624244357234661	LoReLD	2407337	2412279	2228748	2228748								
9	SLCU.2R BY.CHR1_178509	178509	MLMM	Ba17	Ts	0.00000433775265056	5.13286242499908	0.06172050617205	0.0604824555204725	0.0604824555204725	0.0604824555204725	0.0604824555204725	LoReLD	2407337	2412279	2228748	2228748								
10	SLCU.2R BY.CHR1_291609	291609	BIN	Ba16	DTT	3.322260500000e-9	8.47858733000087	0.160714287514286	0.0602822096718724	0.0602822096718724	0.0602822096718724	0.0602822096718724	LoReLD	2407337	2412279	211728	211728								

Showing 1 to 10 of 2,544 entries

Previous

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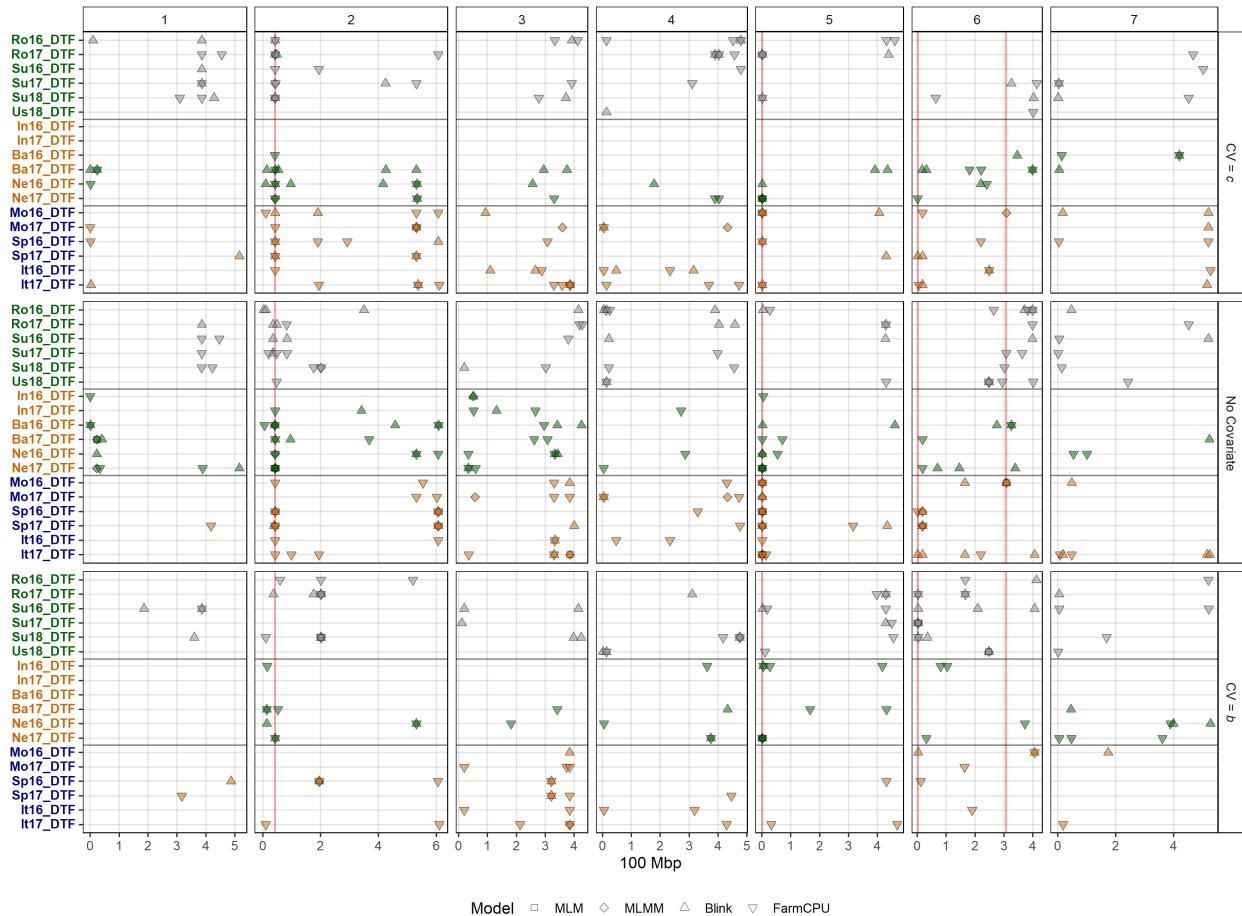
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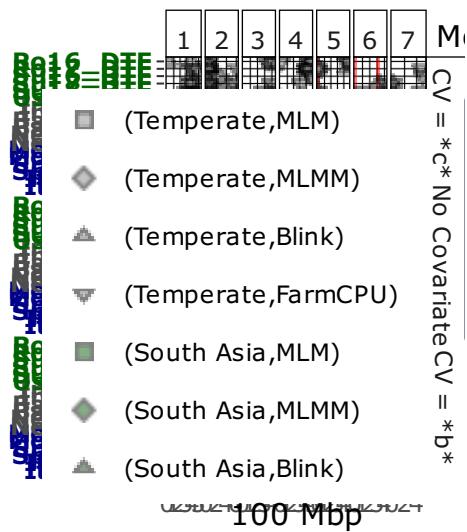
Next

## Supplemental Figures

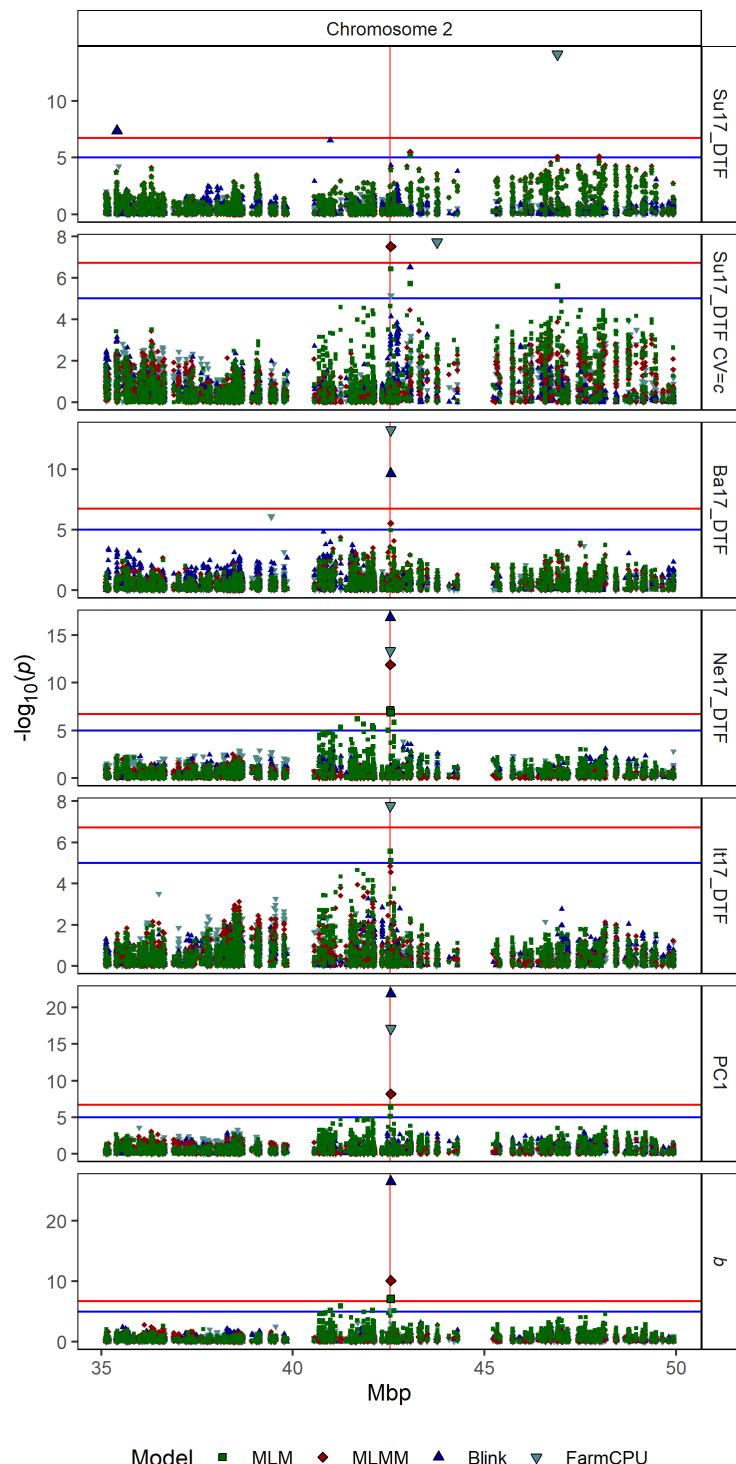
Supplemental Figure 1



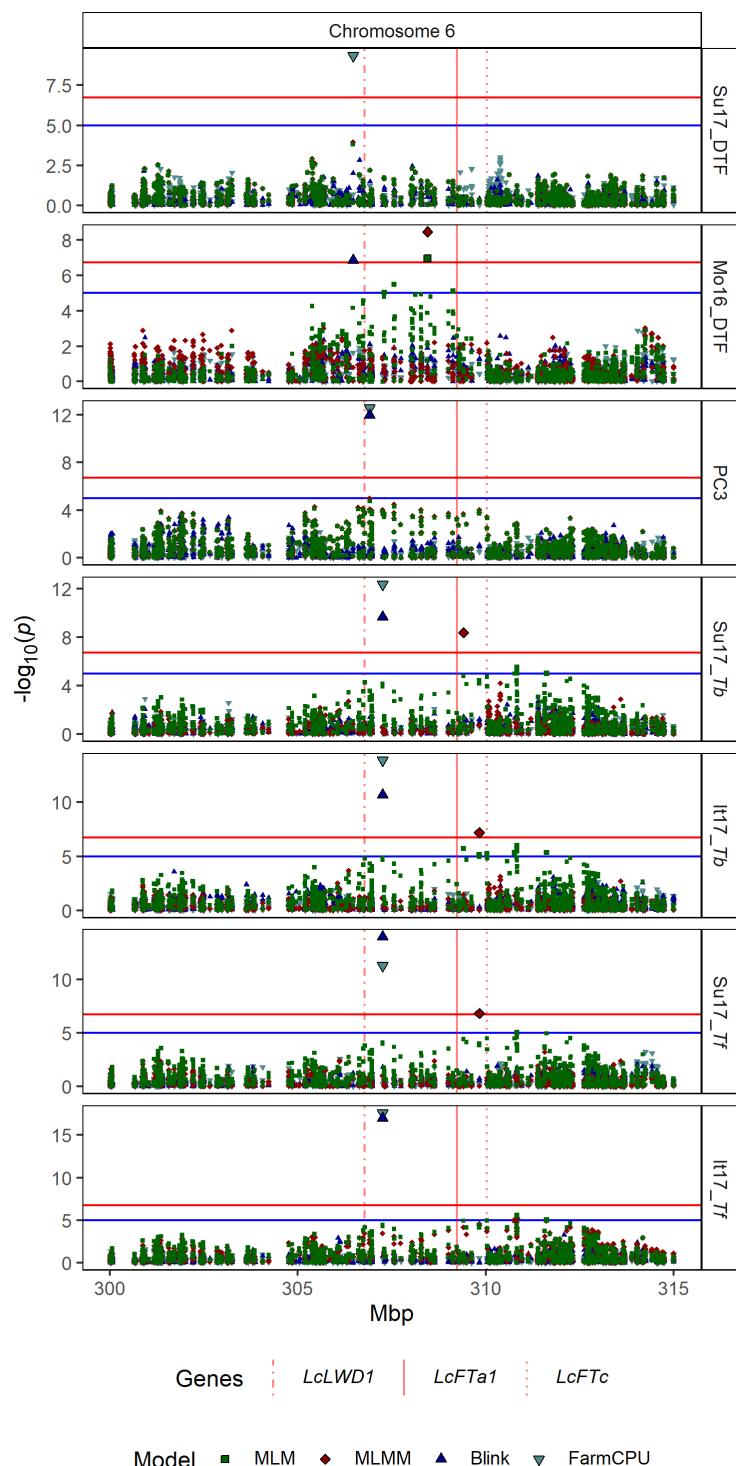
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Supplemental Figure 2

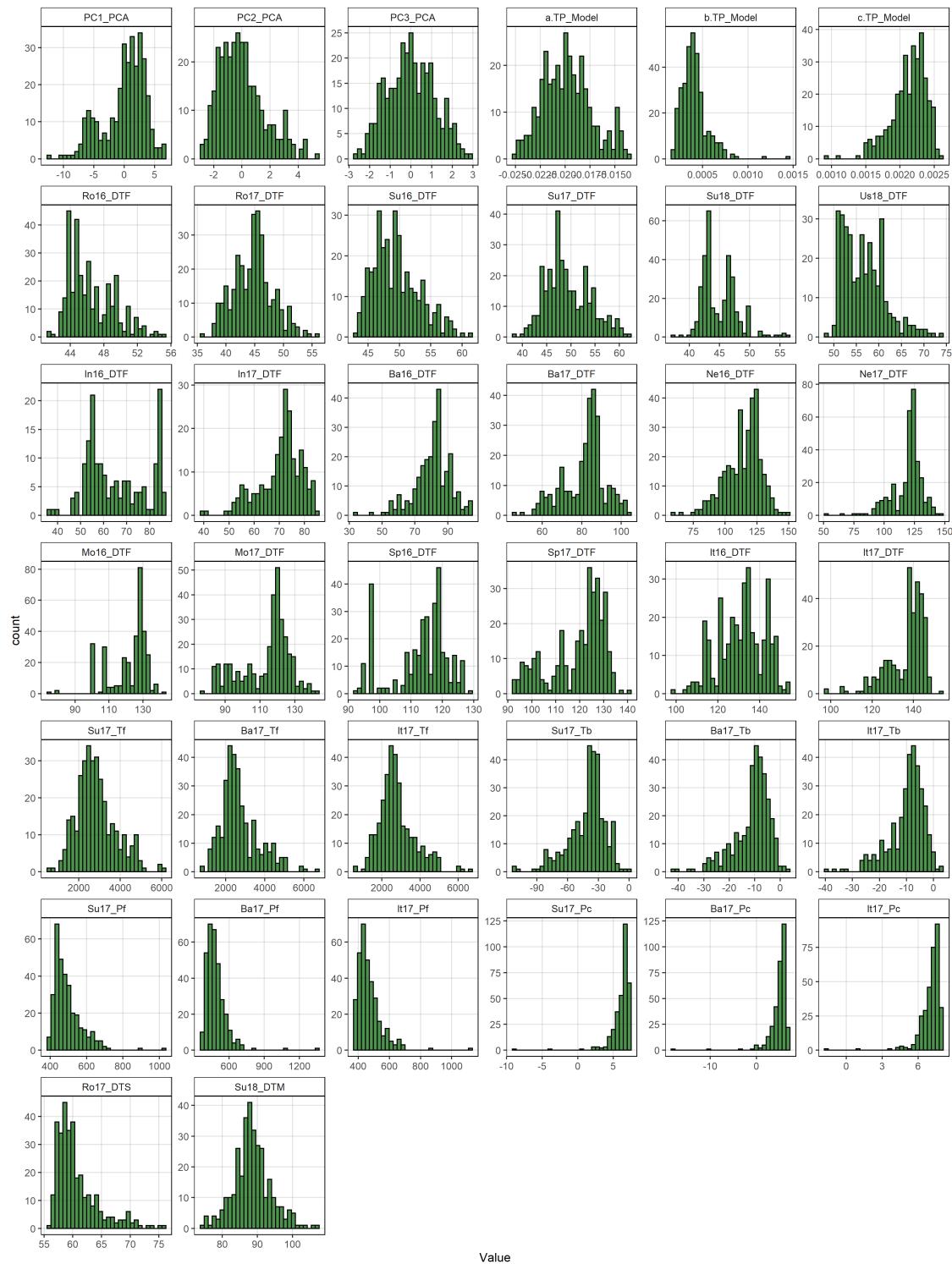


Supplemental Figure 3



## Additional Figures

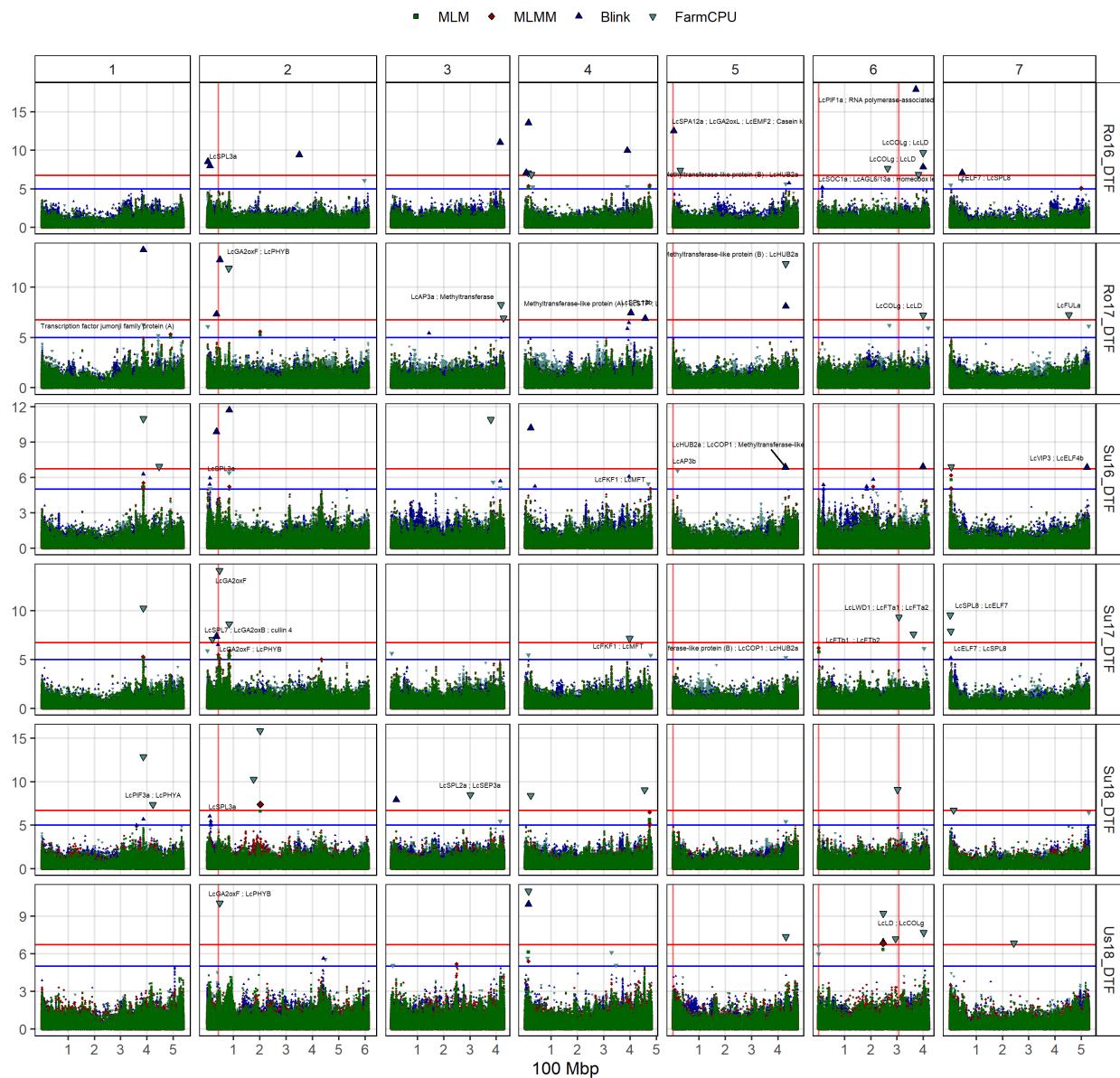
### Phenotype Data



## Grouped Manhattan Plots

### DTF Temperate

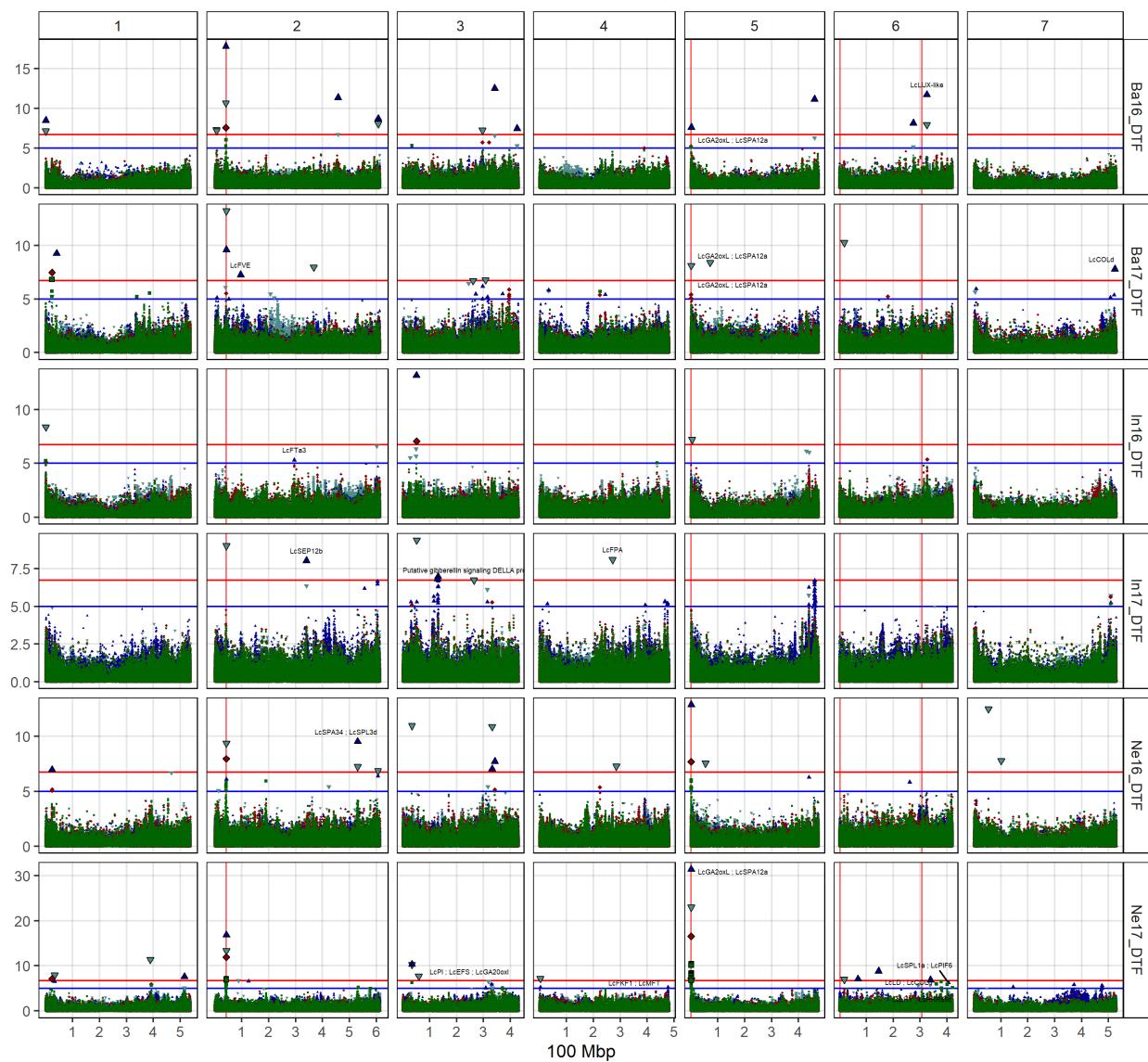
Man\_DTF\_Temperate



## DTF South Asia

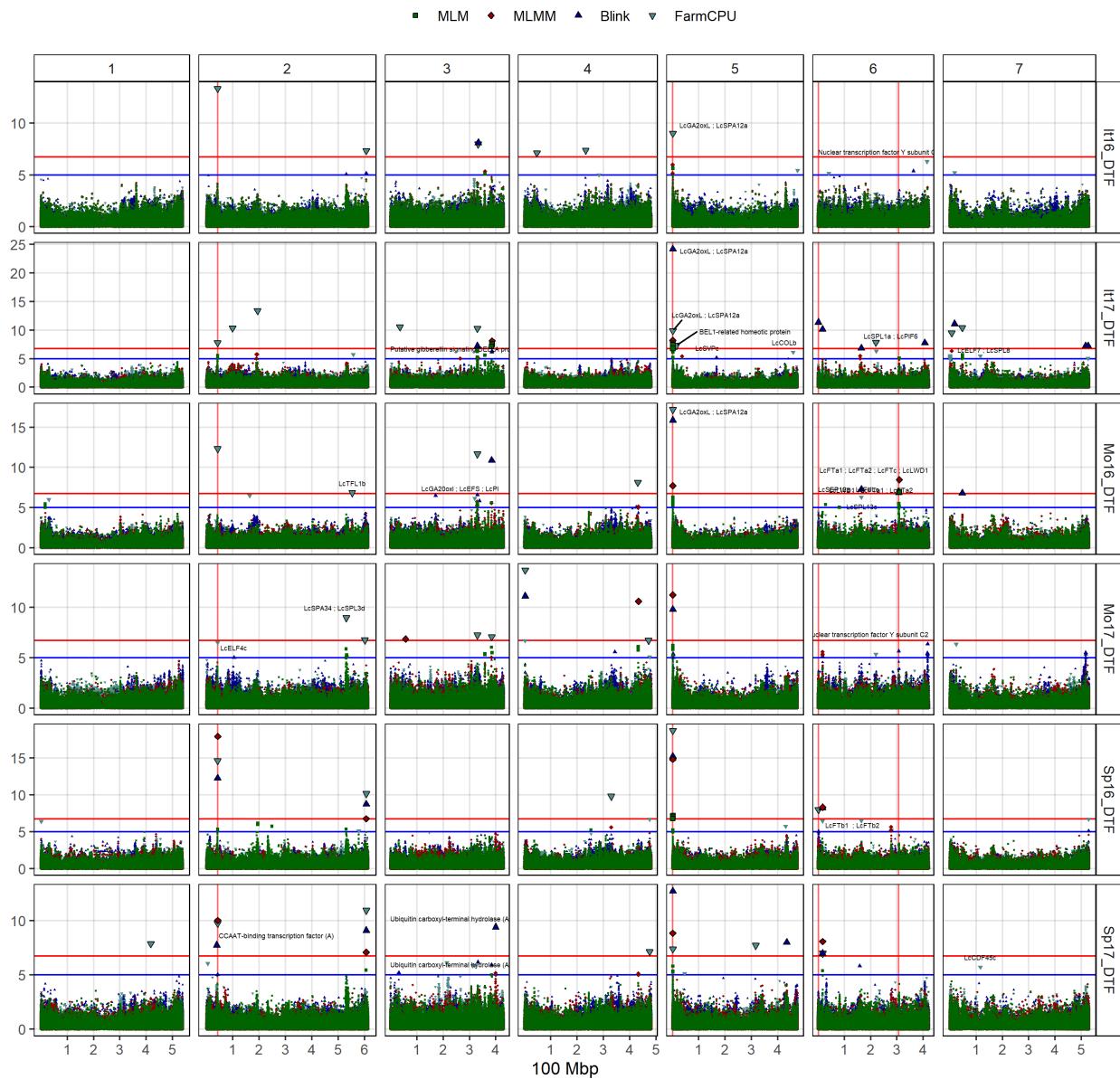
Man\_DTF\_SouthAsia

■ MLM    ♦ MLMMM    ▲ Blink    ▽ FarmCPU



## DTF Mediterranean

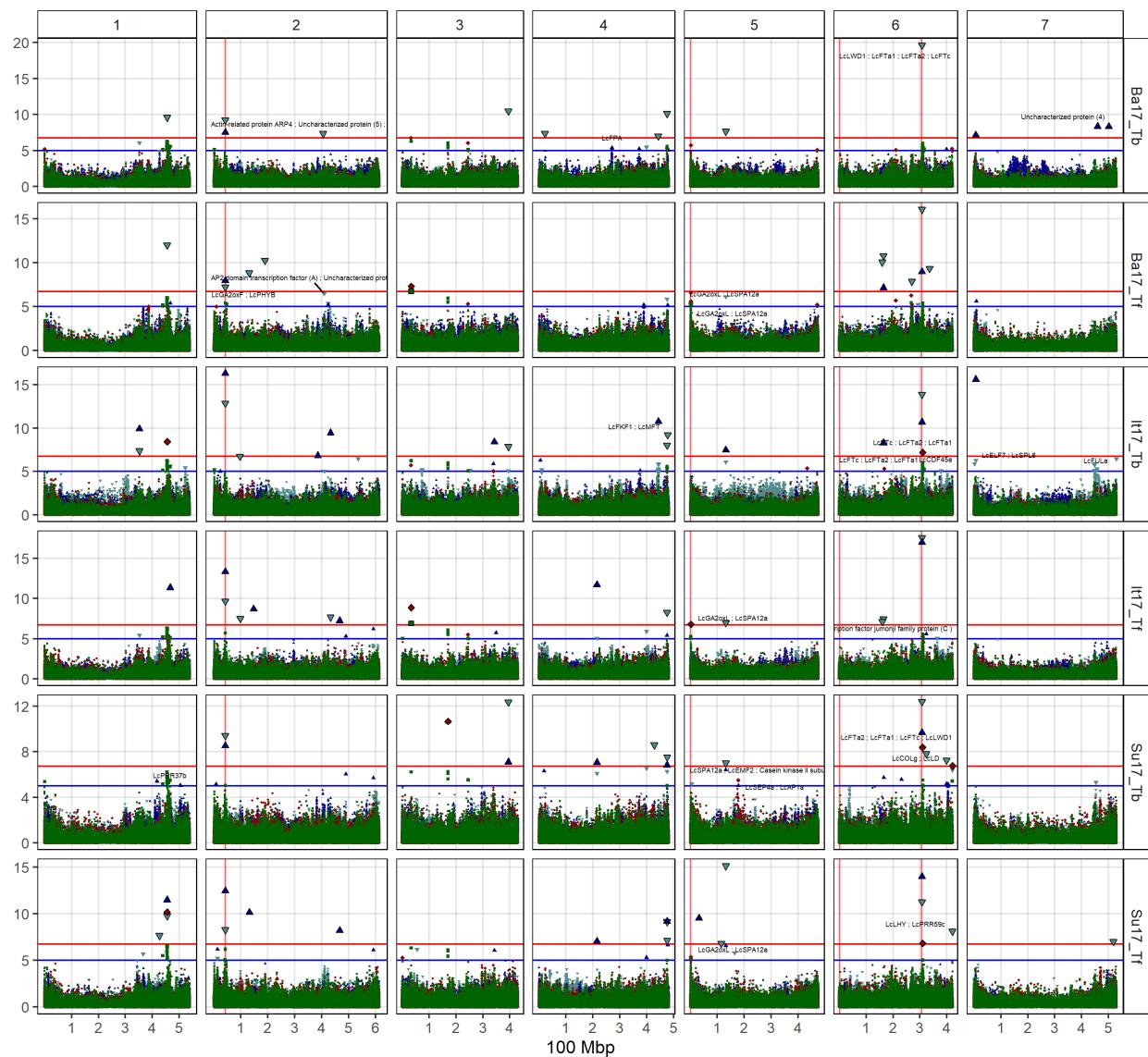
### Man\_DTF\_Mediterranean



## *Tf* and *Tc*

Man\_Tf\_Tb

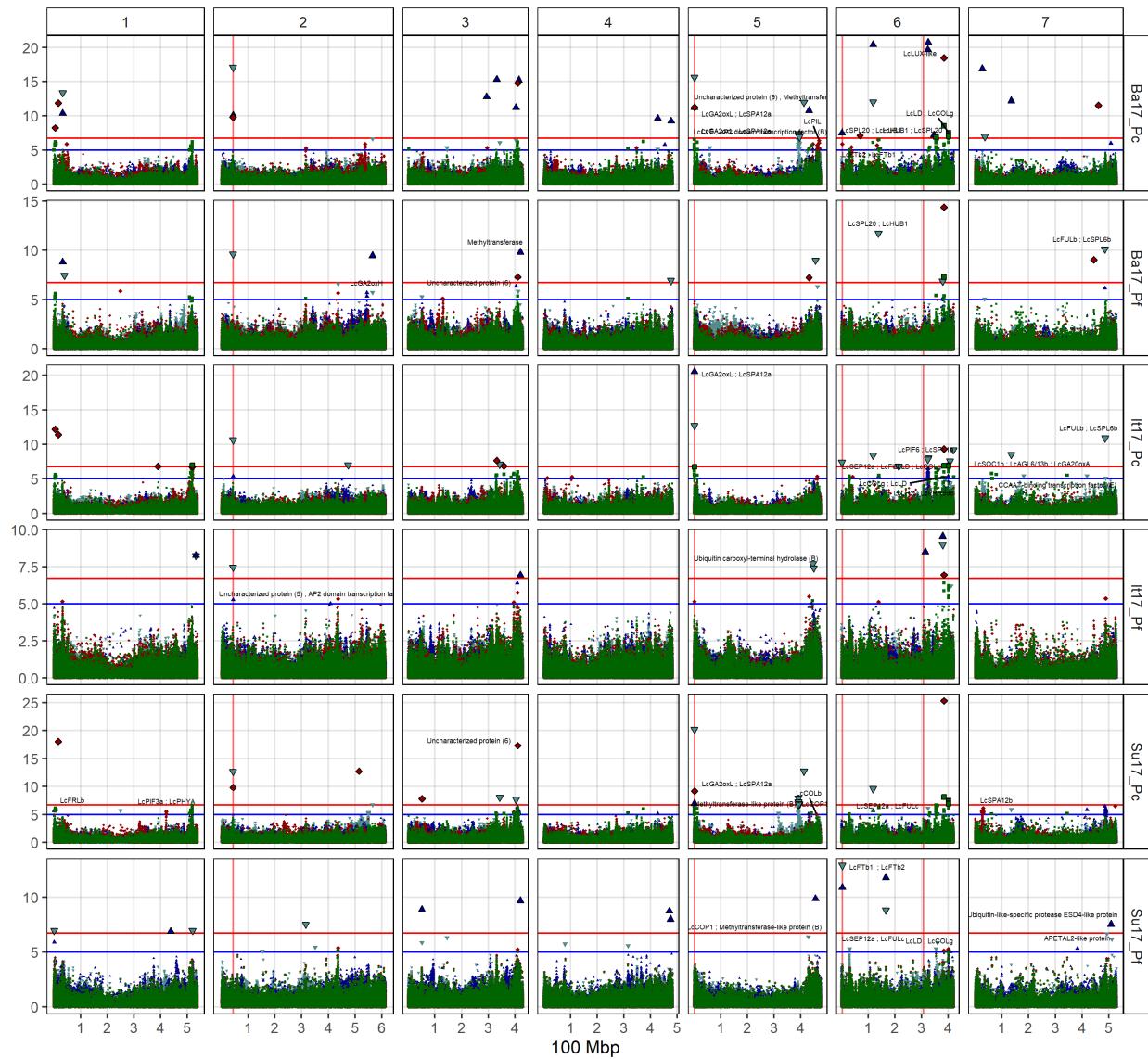
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## *Pf* and *Pc*

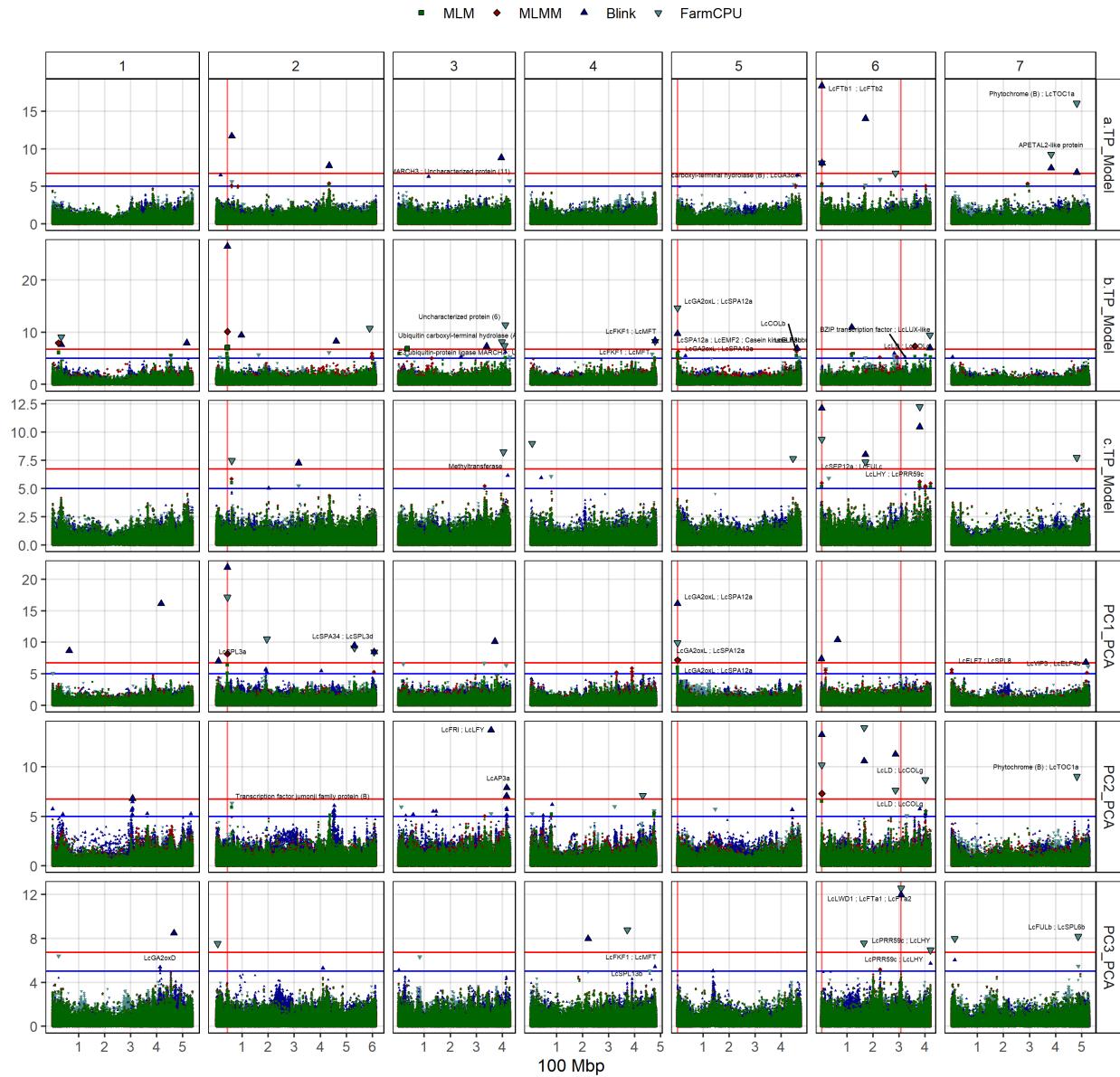
Man\_Pf\_Pc

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## PCA + abc Coefficients

Man\_PCA\_abc



## Facetted & Multi-Modeled Manhattan Plots

