



## Data analysis LAEAR 8 environments

202081DVPRG\_momi  
202082DVPRG\_pivi  
202121DVPRG\_repe  
202118DVPRG\_momi  
202217DVPRG\_momi  
202218DVPRG\_repe  
202252DVPRG\_stom

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Palmira, April 2022



@BiovIntCIAT\_eng

@BiovIntCIAT\_esp

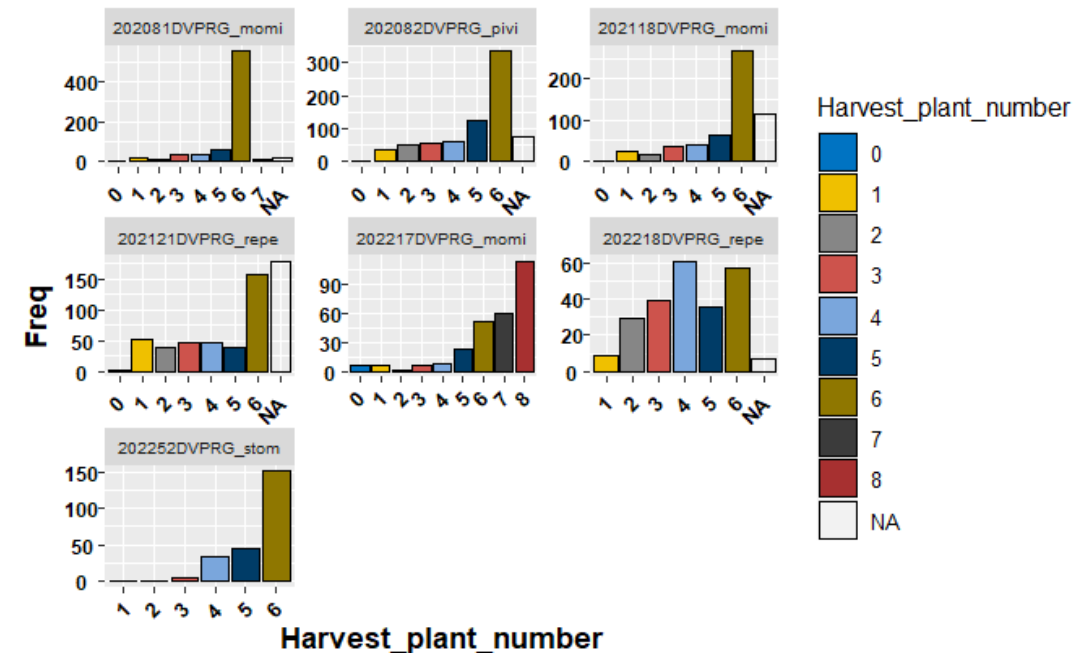
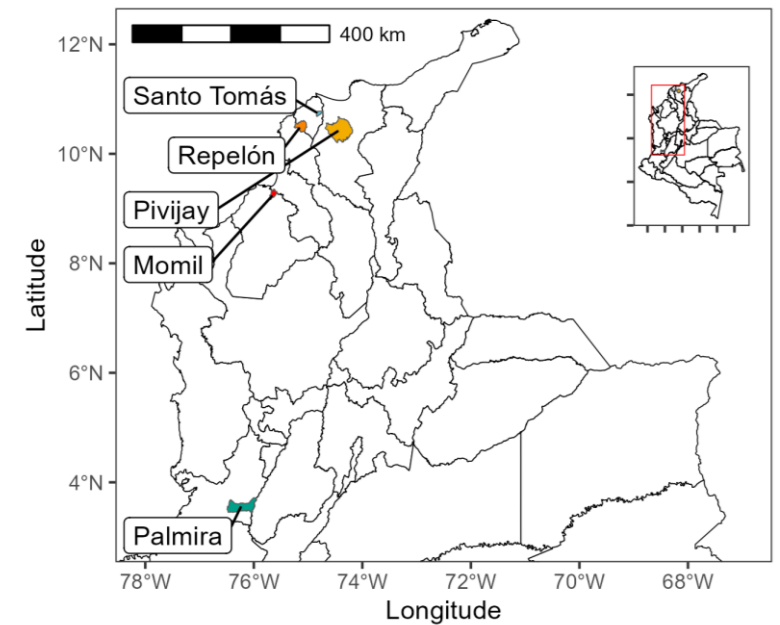
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# Resolvable row-col with randomized checks

use_trial_name	use_plant_date	use_harvest_date	harvesting_time	use_location	n_gen
202081DVPRG_momi	2020-July-22	2021-May-03	9month 11day	Momil. Cordoba, Colombia	228
202082DVPRG_pivi	2020-July-08	2021-April-30	9month 22day	Pivijay. Magdalena, Colombia	226
202118DVPRG_momi	2021-May-20	2022-March-25	10month 5day	Momil. Cordoba, Colombia	181
202121DVPRG_repe	2021-June-01	2022-March-23	9month 22day	Repelon. Atlantico, Colombia	180
202217DVPRG_momi	2022-May-19	2023-March-02	9month 11day	Momil. Cordoba, Colombia	135
202218DVPRG_repe	2022-May-08	2023-February-21	9month 13day	Repelon. Atlantico, Colombia	117
202252DVPRG_stom	2022-June-30	2023-March-03	8month 3day	Santo Tomas. Atlantico, Colombia	117
202231DVPRG_ciat	2022-July-07	Not yet harvested		CIAT, Valle, Colombia	

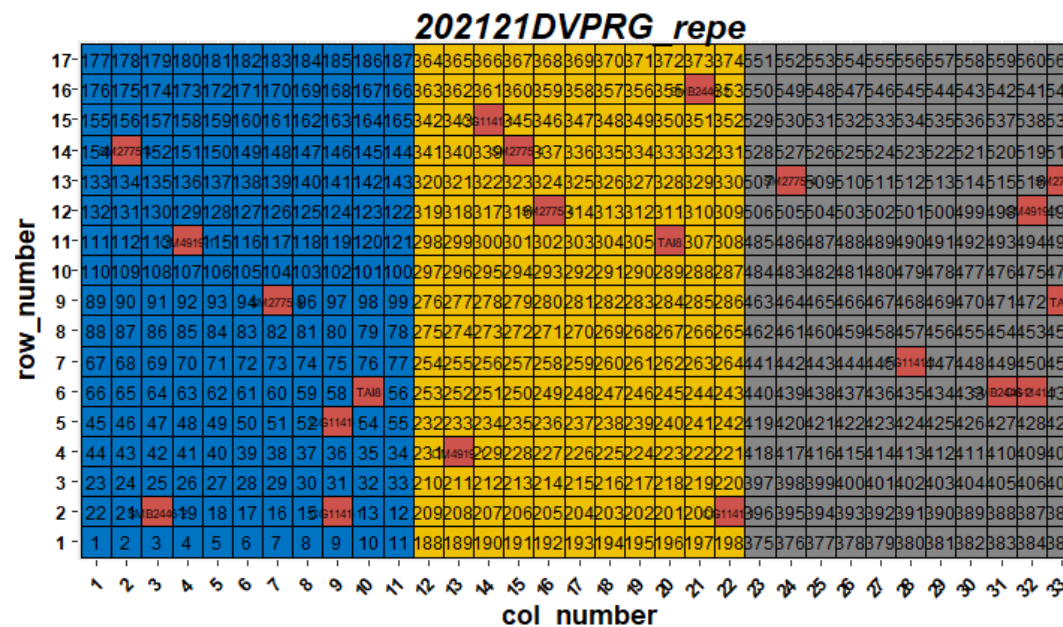
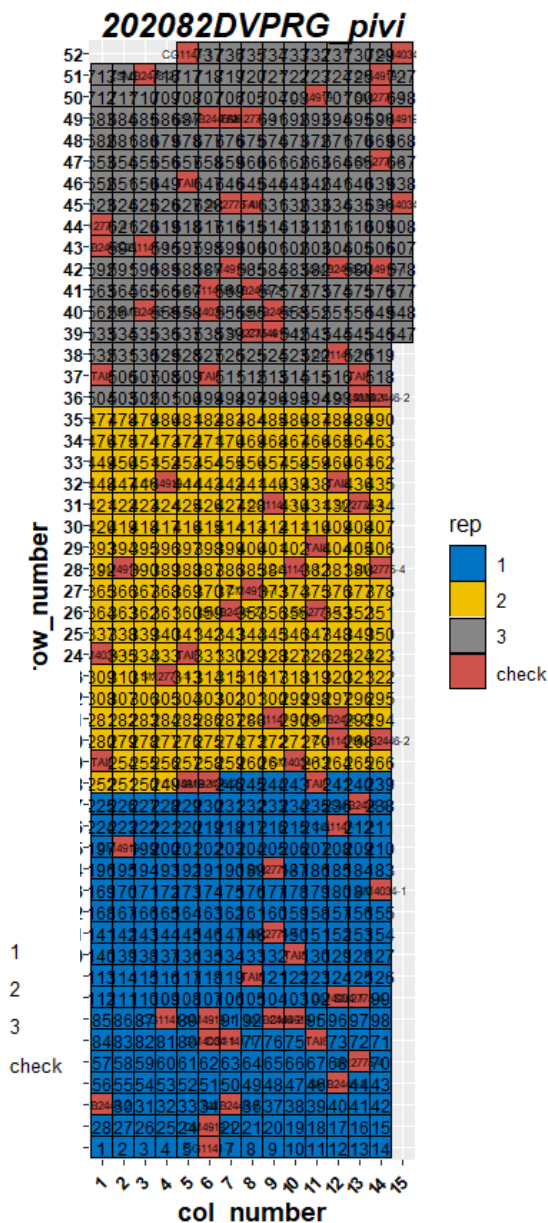
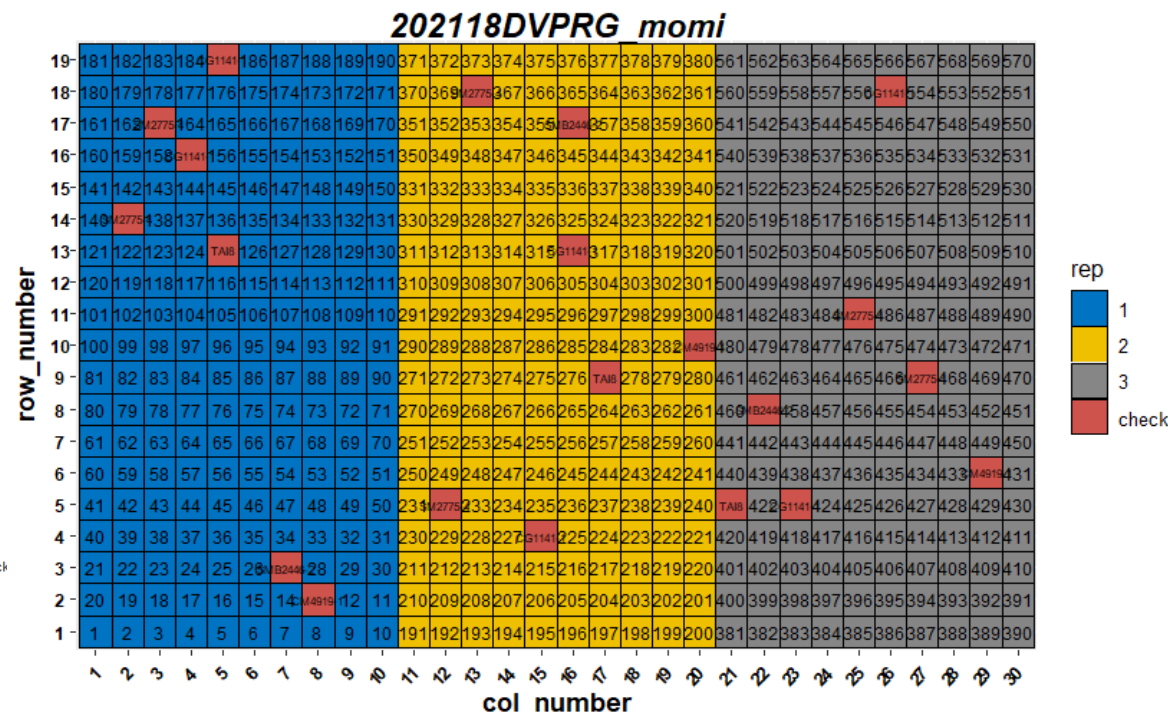
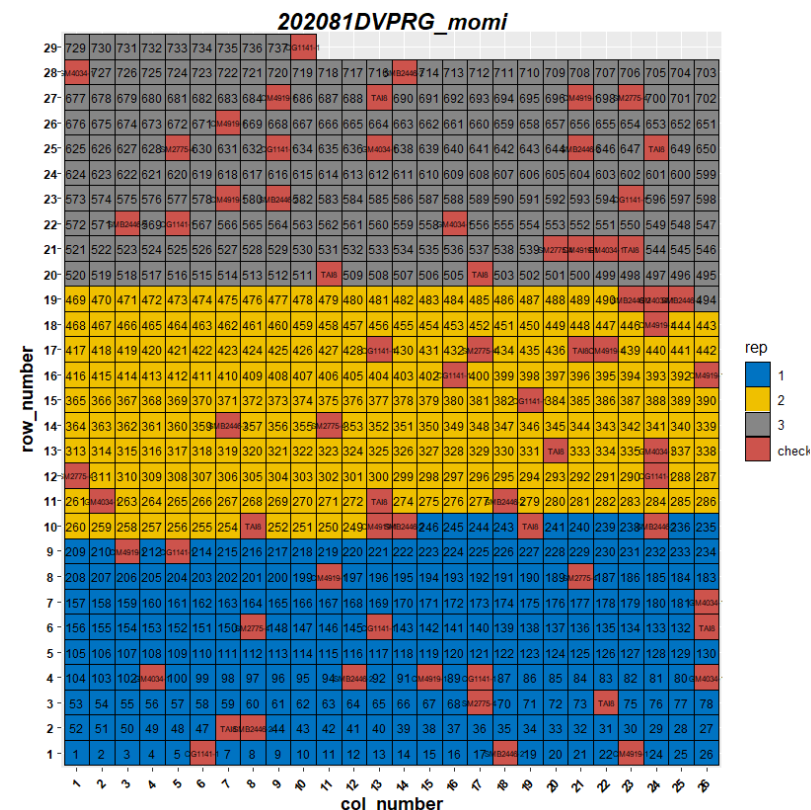
## Plot size:

- 202081DVPRG\_momi: **10** plants per plot, harvesting **6** plants for yield
- 202082DVPRG\_pivi: **10** plants per plot, harvesting **6** plants for yield
- 202118DVPRG\_momi: **10** plants per plot, harvesting **6** plants for yield
- 202121DVPRG\_repe: **10** plants per plot, harvesting **6** plants for yield
- 202217DVPRG\_momi: **10** plants per plot, harvesting **8** plants for yield
- 202218DVPRG\_repe: **10** plants per plot, harvesting **6** plants for yield
- 202252DVPRG\_stom: **10** plants per plot, harvesting **6** plants for yield





# Trial Design – Row col



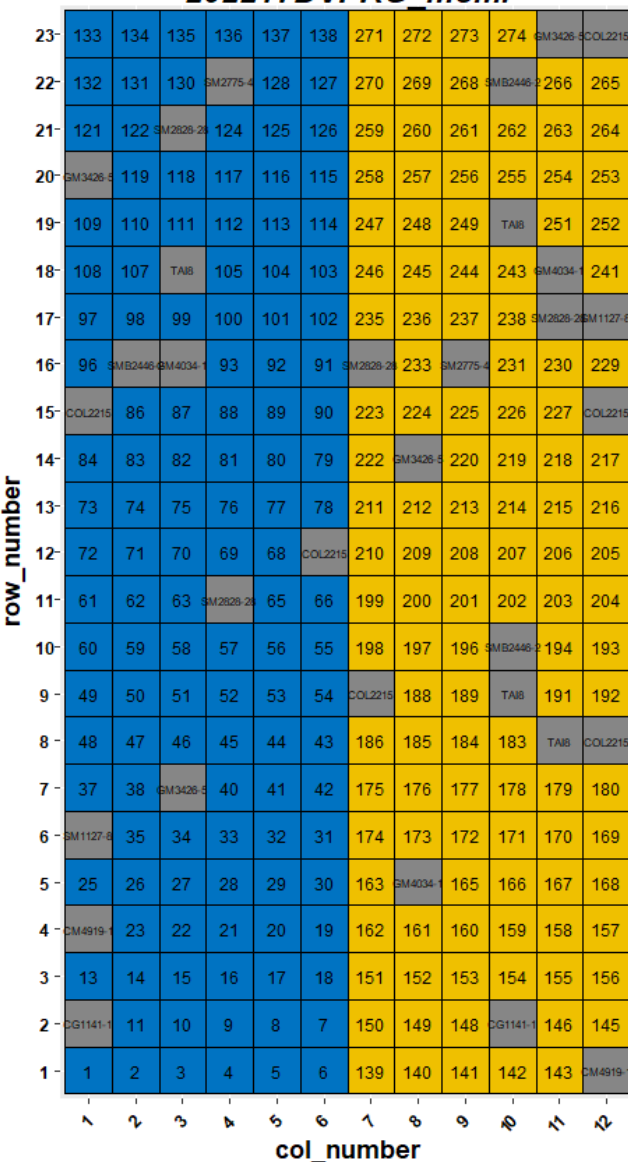
Group 1

Check varieties are completely randomized

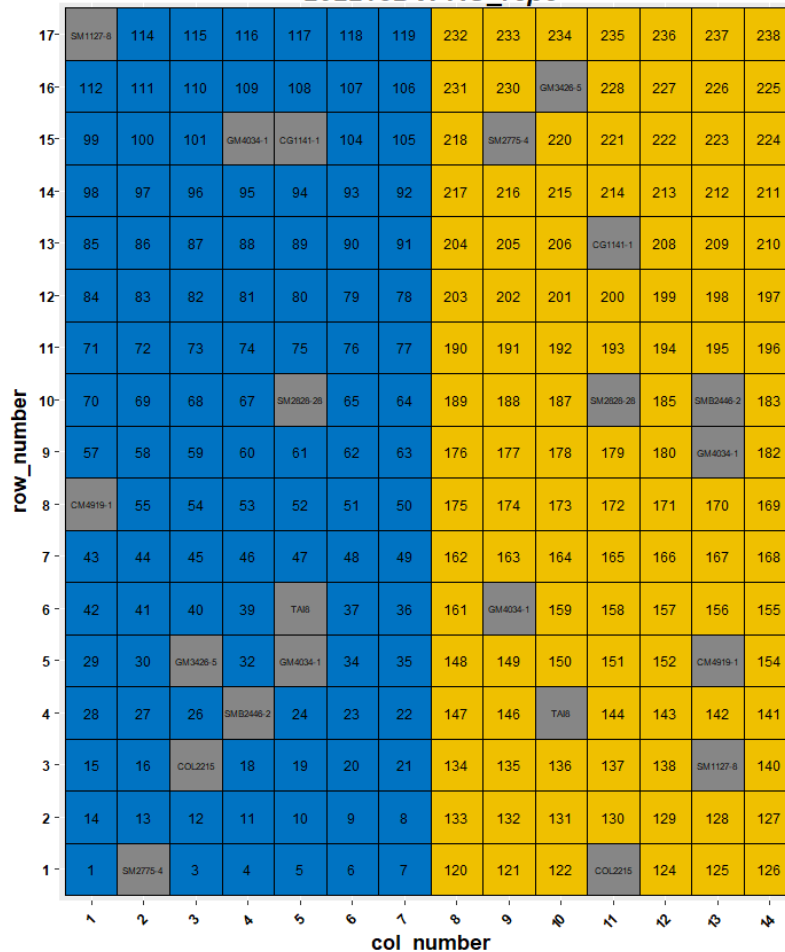
# Trial Design – Row Group 2

Check varieties are completely randomized

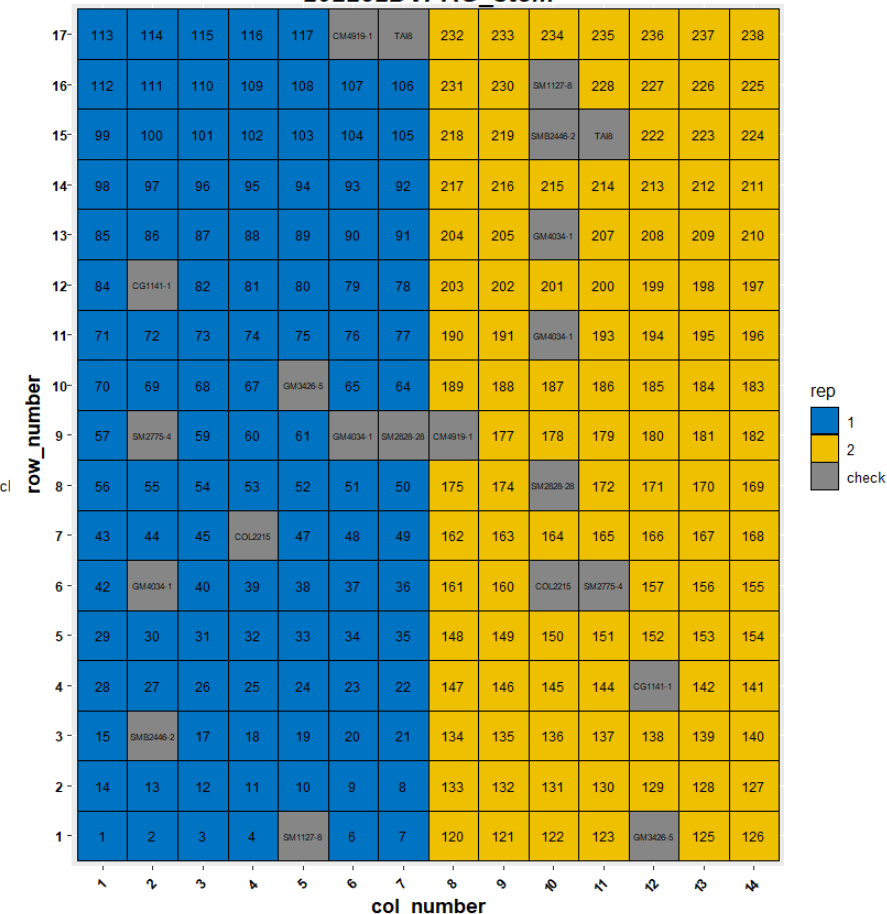
202217DVPRG\_momi



202218DVPRG\_repe



202252DVPRG\_stom



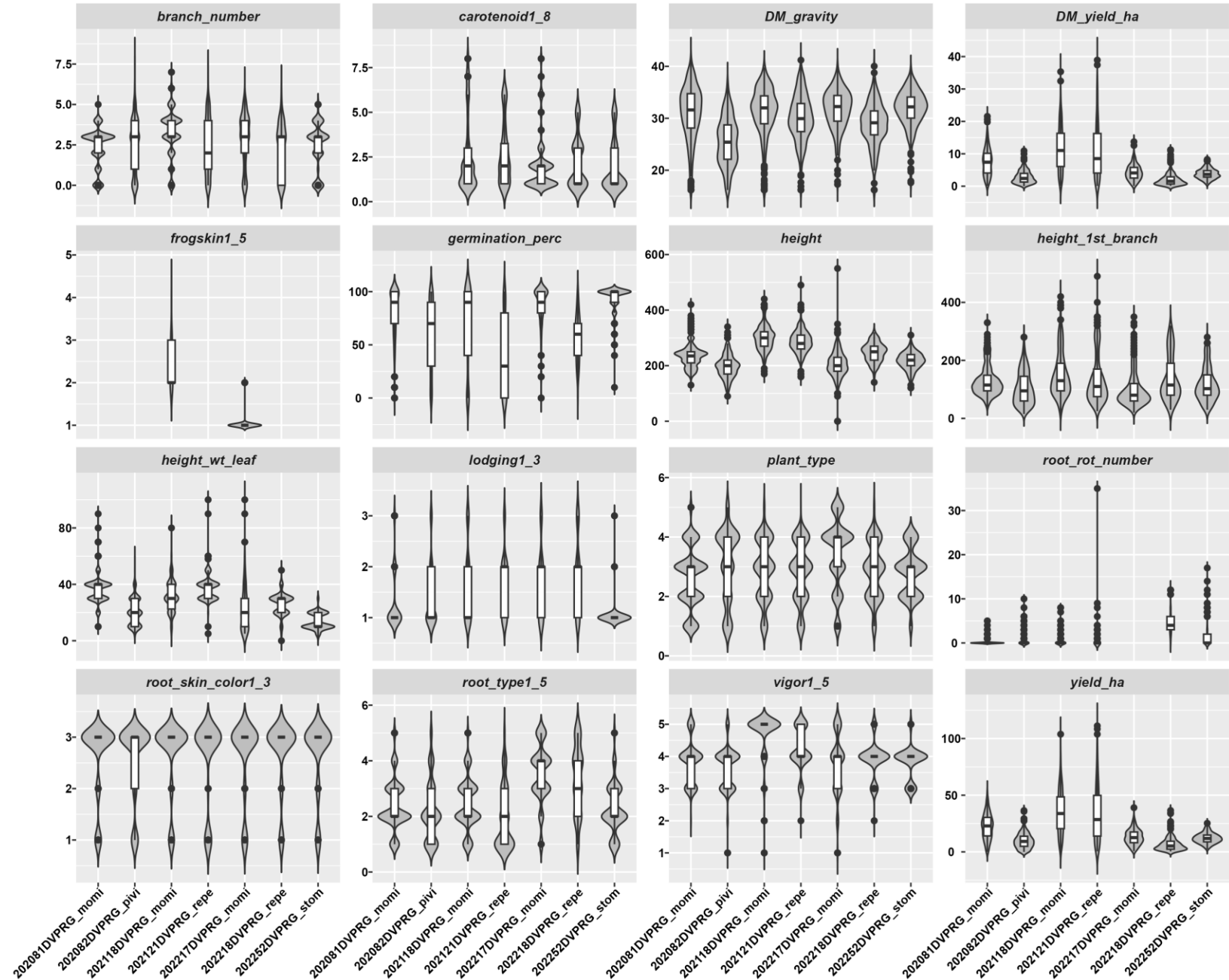
# Check genotypes

1. CG1141-1\_is\_Costena
2. CG489-31\_is\_NAT31
3. CM4919-1\_is\_Veronica
4. CM523-7\_is\_Catumare
5. CM6438-14\_is\_Vergara
6. CM6740-7\_is\_Reina
7. COL2215\_is\_Venezolana
8. GM4034-1\_is\_Reina\_wx
9. HMC1P12\_is\_HMC1
10. SM1127-8\_is\_Cubana



# Exploratory data análisis

# Trait variation across trials (phenotypic value)



# Shared genotypes

Connectivity Matrix

202082DVPRG_pivi	16	16	16	177	176	222	226
202081DVPRG_momi	16	16	16	181	180	228	222
202121DVPRG_repe	13	13	13	180	180	180	176
202118DVPRG_momi	13	13	13	181	180	181	177
202252DVPRG_stom	117	117	117	13	13	16	16
202218DVPRG_repe	117	117	117	13	13	16	16
202217DVPRG_momi	135	117	117	13	13	16	16
202217DVPRG_momi							
202218DVPRG_repe							
202252DVPRG_stom							
202118DVPRG_momi							
202121DVPRG_repe							
202081DVPRG_momi							
202082DVPRG_pivi							

Due to the common number of genotypes, two trial groups were formed.

**Group 1:**

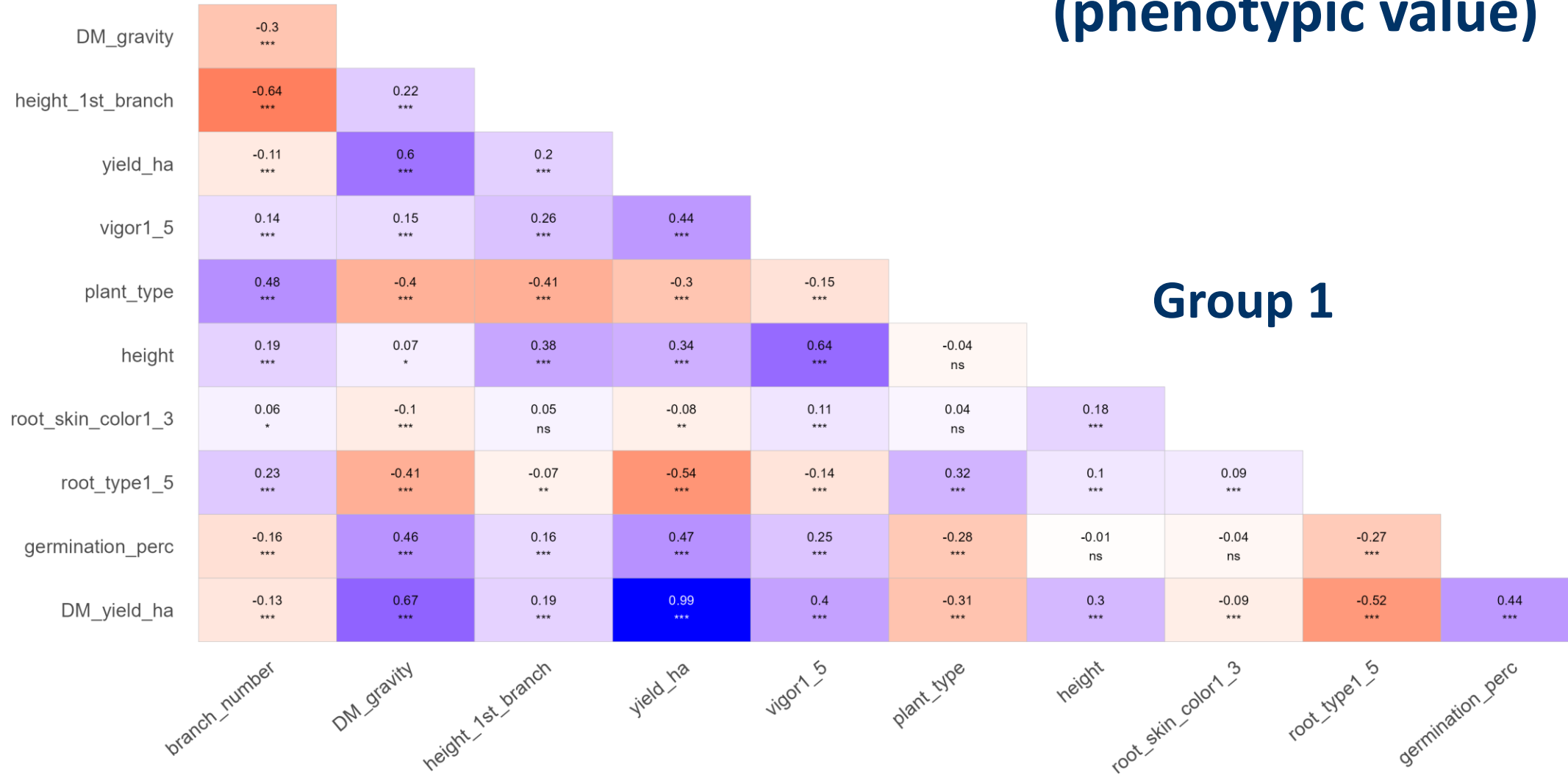
- 202081DVPRG\_momi
- 202082DVPRG\_pivi
- 202121DVPRG\_repe
- 202118DVPRG\_momi

**Group 2:**

- 202217DVPRG\_momi
- 202218DVPRG\_repe
- 202252DVPRG\_stom



# Multiple corr trait (phenotypic value)



# Multiple corr trait (phenotypic value)

DM_gravity	0.02 ns									
height_1st_branch	-0.82 ***	-0.08 ns								
yield_ha	-0.02 ns	0.46 ***	-0.03 ns							
vigor1_5	0.08 ns	0.08 ns	0.05 ns	0.31 ***						
plant_type	0.49 ***	-0.13 **	-0.52 ***	-0.14 **	-0.15 **					
height	-0.07 ns	-0.19 ***	0.4 ***	-0.11 ns	0.34 ***	-0.27 ***				
root_skin_color1_3	-0.02 ns	0.07 ns	0.08 ns	0.03 ns	0.06 ns	-0.01 ns	0.16 ***			
root_type1_5	0.15 **	-0.32 ***	-0.1 ns	-0.6 ***	-0.25 ***	0.34 ***	-0.01 ns	-0.05 ns		
germination_perc	-0.06 ns	0.36 ***	-0.01 ns	0.51 ***	0.16 ***	-0.1 ns	-0.17 ***	-0.04 ns	-0.32 ***	
DM_yield_ha	-0.03 ns	0.59 ***	-0.03 ns	0.98 ***	0.29 ***	-0.15 **	-0.13 **	0.03 ns	-0.59 ***	0.51 ***
	branch_number	DM_gravity	height_1st_branch	yield_ha	vigor1_5	plant_type	height	root_skin_color1_3	root_type1_5	germination_perc

Group 2

# Statistical data analysis



# Single heritability

**Moderate to high heritability** showing the good trial management at 7 locations.

## Group 1

trial	branch_number	DM_gravity	DM_yield_ha	germination_perc	height	height_1st_branch	plant_type	root_skin_color1_3	root_type1_5	vigor1_5	yield_ha
202081DVPRG_momi	0.89	0.95	0.88	0.87	0.89	0.84	0.88	0.97	0.78	0.72	0.86
202082DVPRG_pivi	0.88	0.94	0.87	0.9	0.88	0.89	0.86	0.96	0.86	0.71	0.87
202118DVPRG_momi	0.84	0.96	0.86	0.96	0.77	0.88	0.8	0.96	0.79	0.74	0.83
202121DVPRG_repe	0.92	0.91	0.84	0.92	0.88	0.88	0.83	0.98	0.78	0.67	0.83

## Group 2

trial	branch_number	DM_gravity	DM_yield_ha	germination_perc	height	height_1st_branch	plant_type	root_skin_color1_3	root_type1_5	vigor1_5	yield_ha
202217DVPRG_momi	0.88	0.81	0.6	0.74	0.5	0.89	0.87	0.98	0.61	0.57	0.61
202218DVPRG_repe	0.85	0.65	0.53	0.33	0.74	0.89	0.76	0.94	0.64	0.42	0.51
202252DVPRG_stom	0.89	0.84	0.83	0.68	0.81	0.92	0.66	0.98	0.79	0.42	0.8

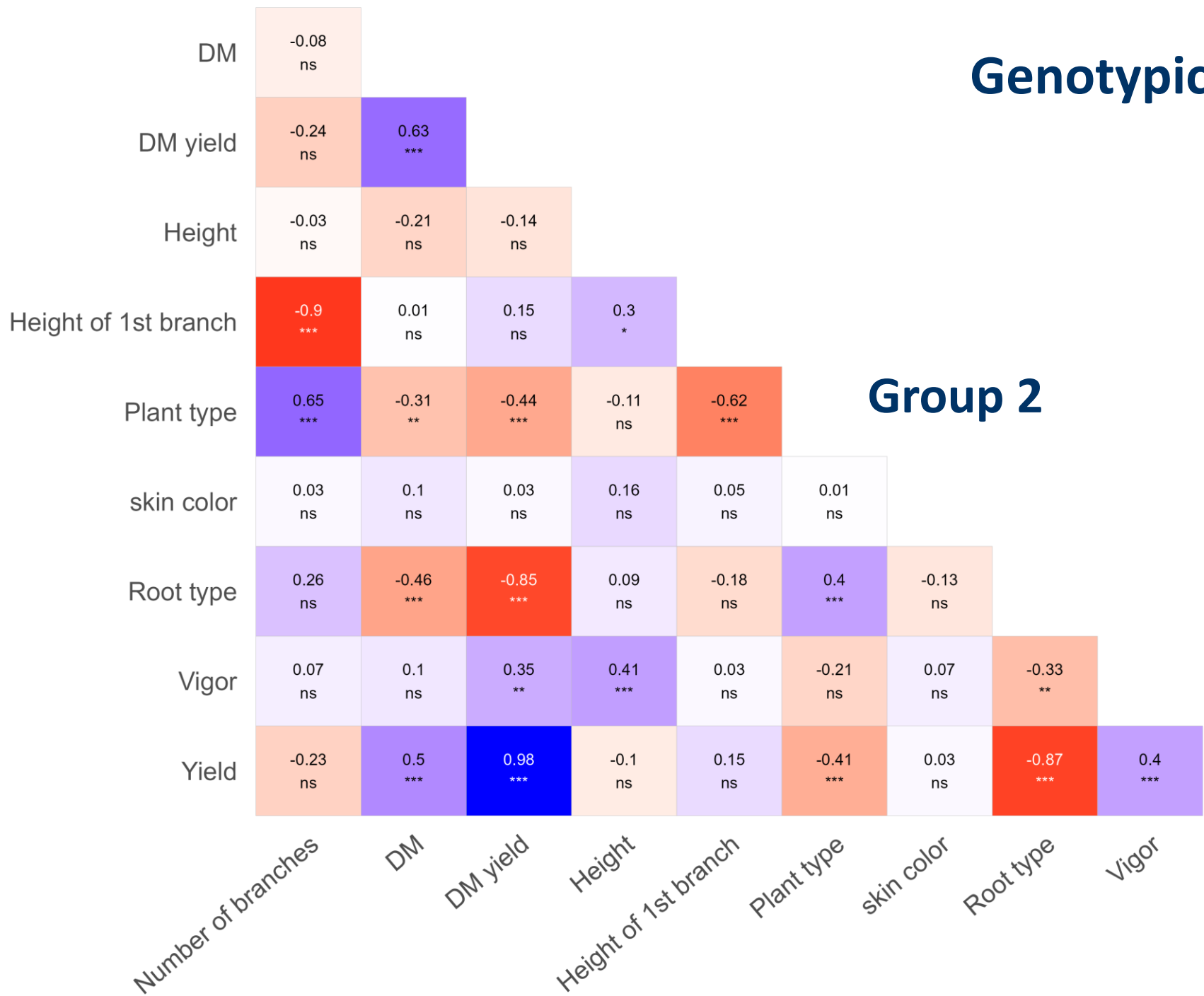
# Genotypic correlation

## Group 1

DM	-0.46 ***								
DM yield	-0.44 ***	0.81 ***							
Height	0.15 ns	-0.43 ***	-0.37 ***						
Height of 1st branch	-0.78 ***	0.19 ns	0.19 ns	0.34 ***					
Plant type	0.61 ***	-0.45 ***	-0.53 ***	0 ns	-0.53 ***				
skin color	0.15 ns	-0.17 ns	-0.21 *	0.28 ***	-0.01 ns	0.08 ns			
Root type	0.39 ***	-0.7 ***	-0.88 ***	0.32 ***	-0.17 ns	0.46 ***	0.12 ns		
Vigor	0.04 ns	0.03 ns	0.19 ns	0.64 ***	0.28 ***	-0.29 ***	0.18 ns	-0.23 **	
Yield	-0.41 ***	0.74 ***	0.98 ***	-0.33 ***	0.18 ns	-0.52 ***	-0.19 ns	-0.9 ***	0.24 **
	Number of branches	DM	DM yield	Height	Height of 1st branch	Plant type	skin color	Root type	Vigor

# Genotypic correlation

## Group 2





# Heritability gxe

## Group 1

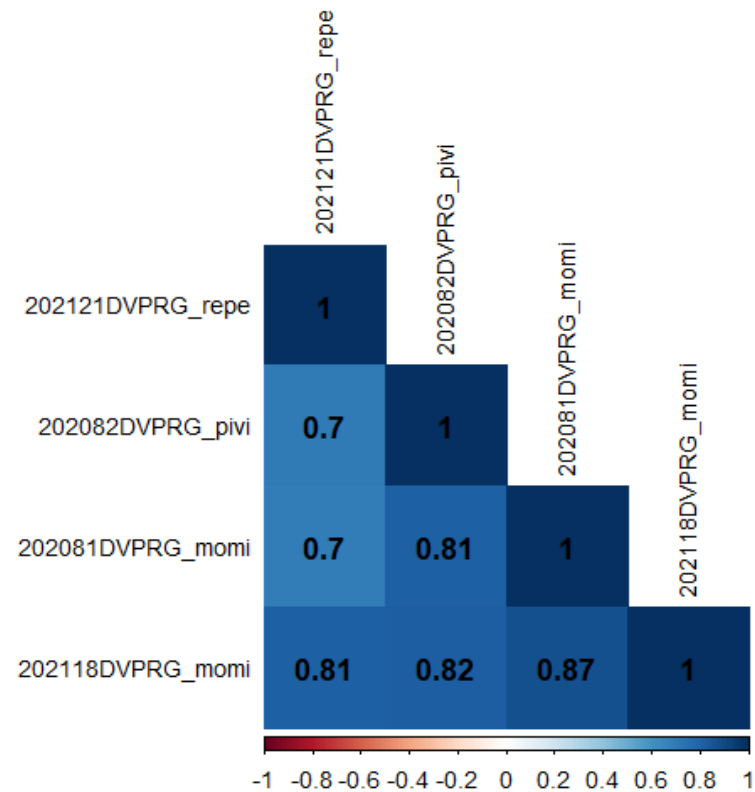
trait	h2
root_skin_color1_3	0.98
DM_gravity	0.97
branch_number	0.93
height	0.92
germination_perc	0.91
height_1st_branch	0.91
plant_type	0.9
root_type1_5	0.89
DM_yield_ha	0.87
yield_ha	0.85
vigor1_5	0.68

## Group 2

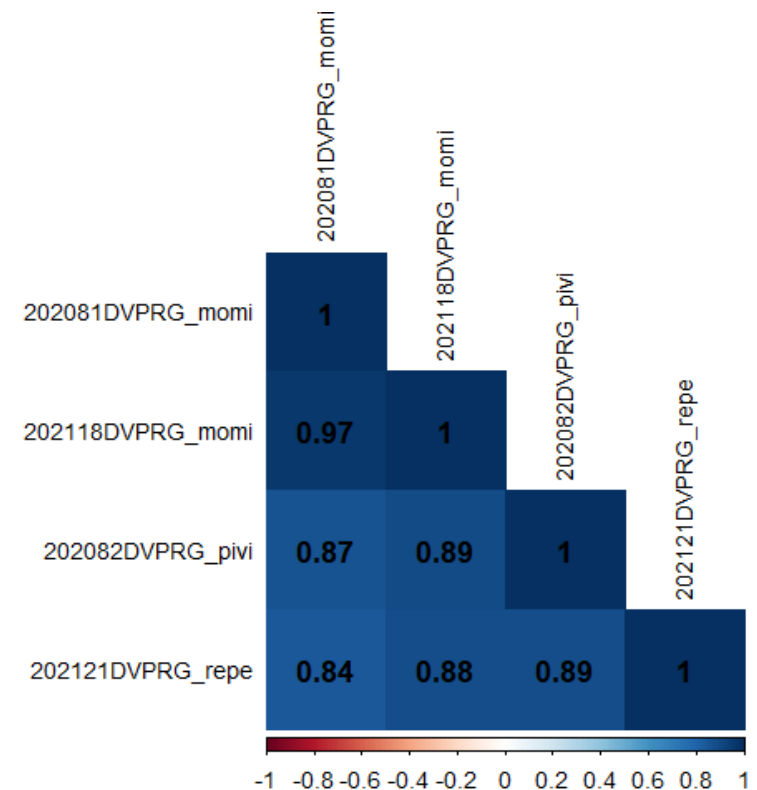
trait	h2
root_skin_color1_3	0.99
branch_number	0.92
height_1st_branch	0.9
DM_gravity	0.87
plant_type	0.81
DM_yield_ha	0.76
root_type1_5	0.75
yield_ha	0.72
height	0.72
germination_perc	0.72
vigor1_5	0.25

# Genotypic Correlation: Locations Group 1

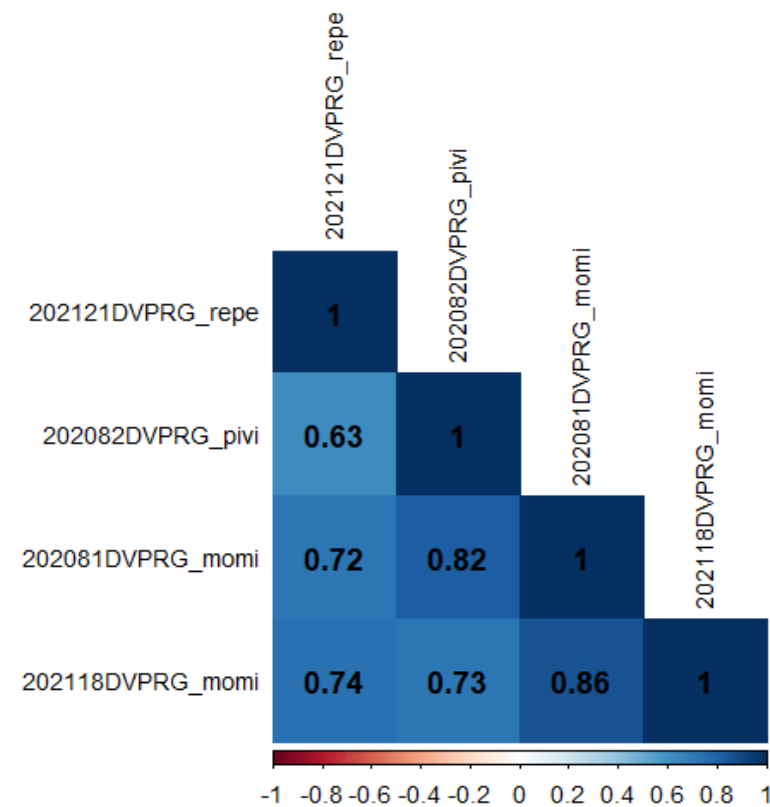
Yield



Dry Matter

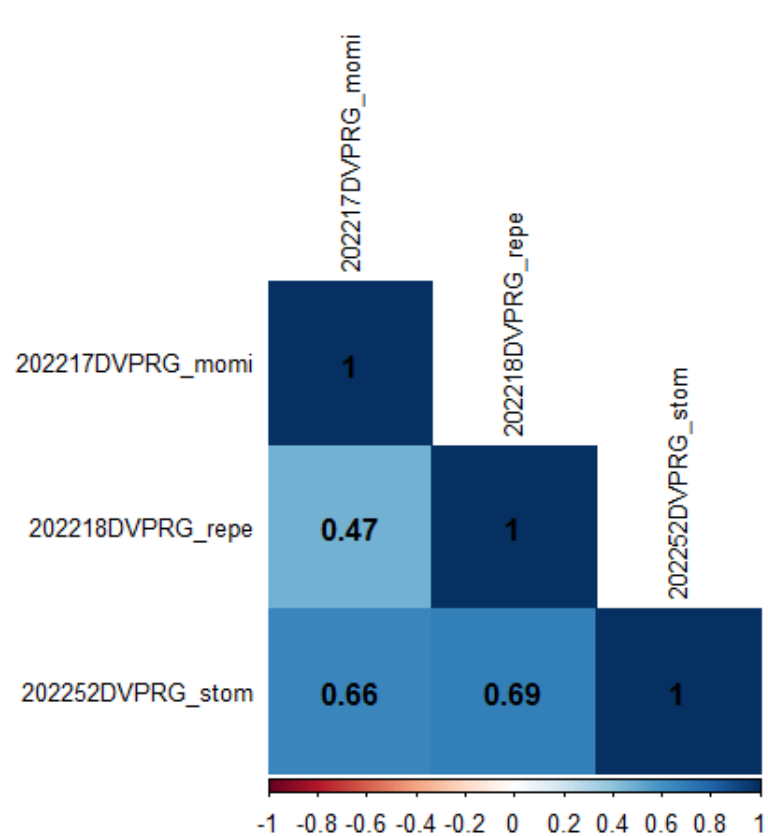


Plant type

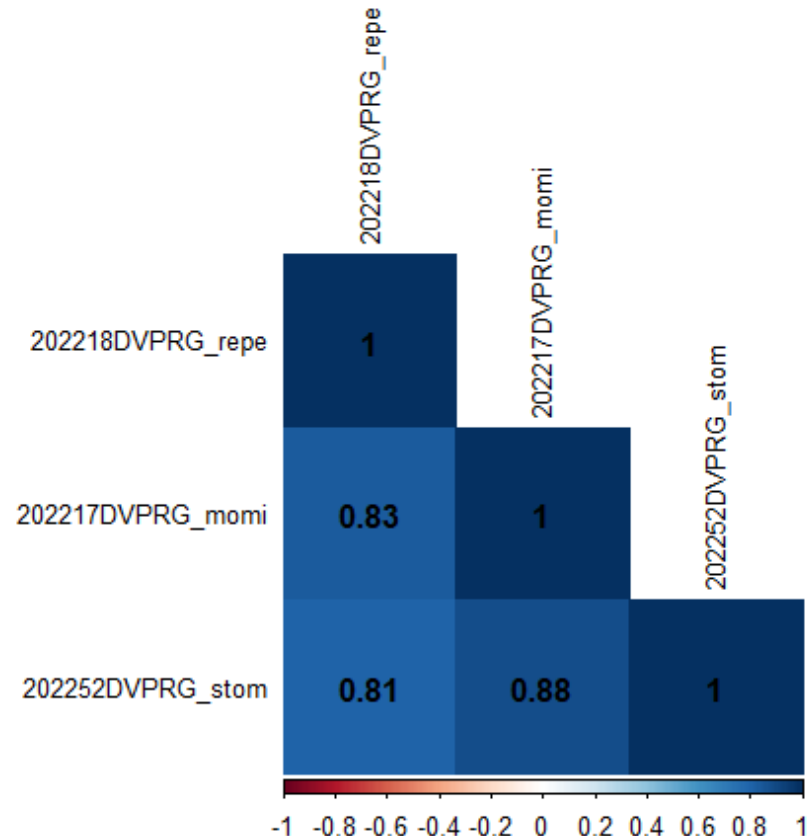


# Genotypic Correlation: Locations Group 2

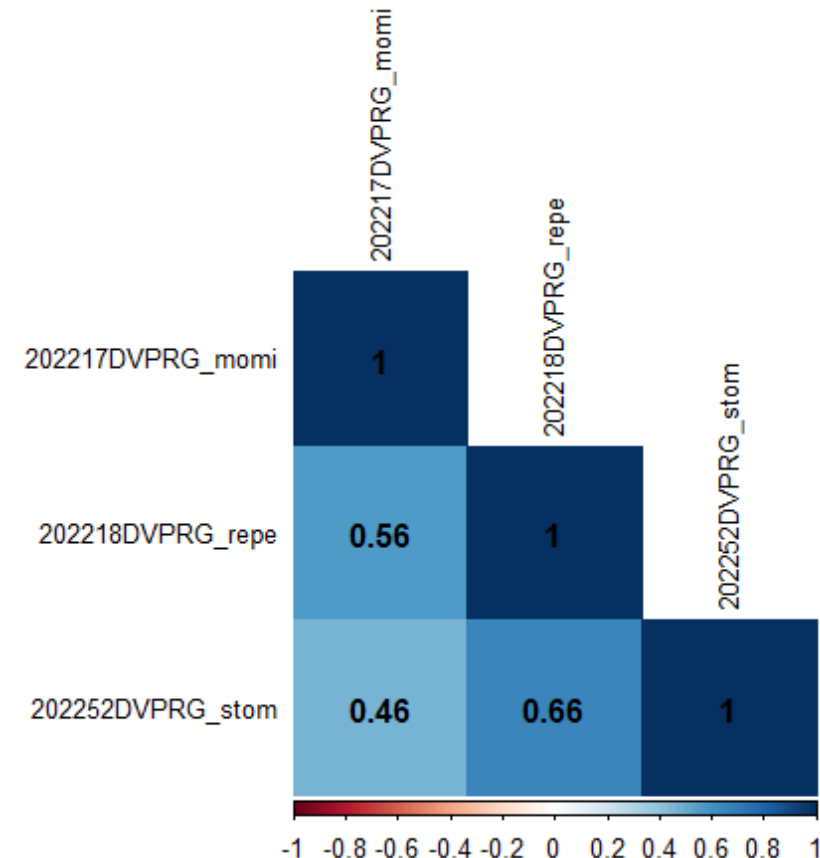
Yield



Dry Matter



Plant type





# Selection comments

- 1) **DM\_gravity**, **plant\_type** & **yield\_ha** were used to calculate index selection.
- 2) Scores given were:
  - **DM\_gravity** = 10
  - **plant\_type** = -5
  - **yield\_ha** = 10
- 3) Percentage to be selected: **20%**

## Statistic selection based on index selection (zoom it)

## Group 1

[illegible]

## Group 2

Accession number	EM alignment	gap	length	gap %	Index	Accession number
SMV775-1, <i>S. baibotti</i>	34.20	2.04	37.1	5.5	10.023834	SMV775-1, <i>S. baibotti</i>
SMV645-1, <i>S. castani</i>	35.00	2.24	37.2	6.0	10.023793	SMV645-1, <i>S. castani</i>
SMV443-1	38.30	2.36	40.7	5.8	10.023820	SMV443-1
SMV443-2	38.30	2.36	40.7	5.8	10.023820	SMV443-2
SMV406-1	33.00	2.10	35.1	6.0	10.024720	SMV406-1
SMV406-2	33.00	2.10	35.1	6.0	10.024720	SMV406-2
SMV408-8	33.10	1.98	35.0	5.6	10.024741	SMV408-8
SMV408-9	33.10	1.98	35.0	5.6	10.024741	SMV408-9
SMV408-10	32.80	1.84	34.7	5.3	10.024744	SMV408-10
SMV408-11	32.80	1.84	34.7	5.3	10.024744	SMV408-11
SMV408-12	32.80	1.84	34.7	5.3	10.024744	SMV408-12
SMV408-13	32.80	1.84	34.7	5.3	10.024744	SMV408-13
SMV408-14	32.80	1.84	34.7	5.3	10.024744	SMV408-14
SMV408-15	32.80	1.84	34.7	5.3	10.024744	SMV408-15
SMV408-16	32.80	1.84	34.7	5.3	10.024744	SMV408-16
SMV408-17	32.80	1.84	34.7	5.3	10.024744	SMV408-17
SMV408-18	32.80	1.84	34.7	5.3	10.024744	SMV408-18
SMV408-19	32.80	1.84	34.7	5.3	10.024744	SMV408-19
SMV408-20	32.80	1.84	34.7	5.3	10.024744	SMV408-20
SMV408-21	32.80	1.84	34.7	5.3	10.024744	SMV408-21
SMV408-22	32.80	1.84	34.7	5.3	10.024744	SMV408-22
SMV408-23	32.80	1.84	34.7	5.3	10.024744	SMV408-23
SMV408-24	32.80	1.84	34.7	5.3	10.024744	SMV408-24
SMV408-25	32.80	1.84	34.7	5.3	10.024744	SMV408-25
SMV408-26	32.80	1.84	34.7	5.3	10.024744	SMV408-26
SMV408-27	32.80	1.84	34.7	5.3	10.024744	SMV408-27
SMV408-28	32.80	1.84	34.7	5.3	10.024744	SMV408-28
SMV408-29	32.80	1.84	34.7	5.3	10.024744	SMV408-29
SMV408-30	32.80	1.84	34.7	5.3	10.024744	SMV408-30
SMV408-31	32.80	1.84	34.7	5.3	10.024744	SMV408-31
SMV408-32	32.80	1.84	34.7	5.3	10.024744	SMV408-32
SMV408-33	32.80	1.84	34.7	5.3	10.024744	SMV408-33
SMV408-34	32.80	1.84	34.7	5.3	10.024744	SMV408-34
SMV408-35	32.80	1.84	34.7	5.3	10.024744	SMV408-35
SMV408-36	32.80	1.84	34.7	5.3	10.024744	SMV408-36
SMV408-37	32.80	1.84	34.7	5.3	10.024744	SMV408-37
SMV408-38	32.80	1.84	34.7	5.3	10.024744	SMV408-38
SMV408-39	32.80	1.84	34.7	5.3	10.024744	SMV408-39
SMV408-40	32.80	1.84	34.7	5.3	10.024744	SMV408-40
SMV408-41	32.80	1.84	34.7	5.3	10.024744	SMV408-41
SMV408-42	32.80	1.84	34.7	5.3	10.024744	SMV408-42
SMV408-43	32.80	1.84	34.7	5.3	10.024744	SMV408-43
SMV408-44	32.80	1.84	34.7	5.3	10.024744	SMV408-44
SMV408-45	32.80	1.84	34.7	5.3	10.024744	SMV408-45
SMV408-46	32.80	1.84	34.7	5.3	10.024744	SMV408-46
SMV408-47	32.80	1.84	34.7	5.3	10.024744	SMV408-47
SMV408-48	32.80	1.84	34.7	5.3	10.024744	SMV408-48
SMV408-49	32.80	1.84	34.7	5.3	10.024744	SMV408-49
SMV408-50	32.80	1.84	34.7	5.3	10.024744	



**Thank you!**