



# GGT: a “swiss army knife” for molecular marker data

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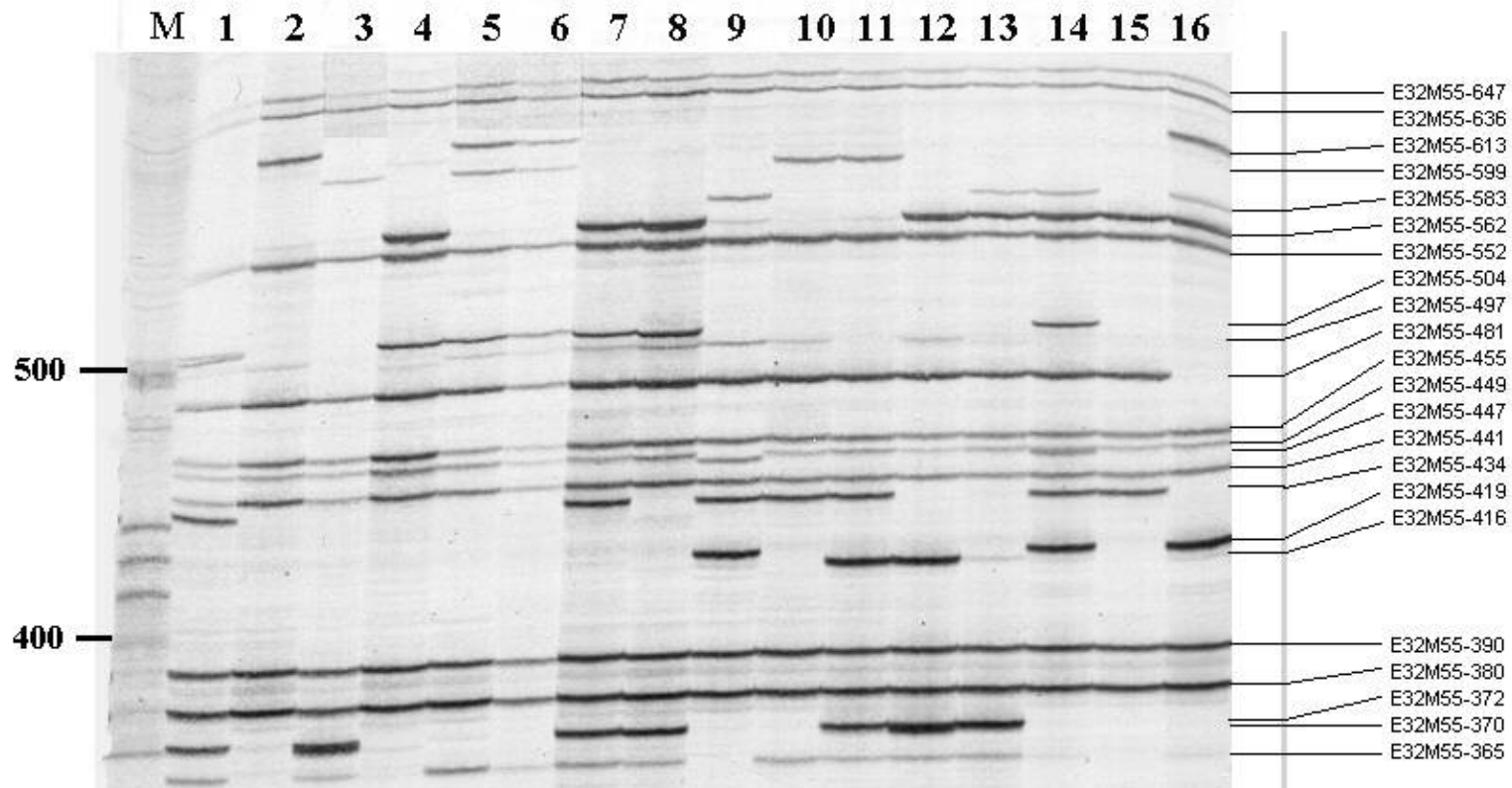


PAG '06 | Poster 958 | Computer demo CP015

# Molecular marker data

## AFLP profile of 16 barley lines by E32/M55

M: 10 bp DNA size markers	3: Steptoe	6: Franka	9: Apex	12: C118	15: Vada
1: Harrington	4: Morex	7: Proctor	10: Prisma	13: C123	16: 116-5
2: TR306	5: Igri	8: Nudinka	11: C92	14: L94	



# Visualization of marker data

barley\_ggt.xls

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK		
1	Alias		Abed4611	Abed5193	Abelone	Adele	Akita	Alabama	Alanis	Albright	Alexis	Alliot	Annabell	Annasofie	Apex	Aravis	Ardila	Ariel	Aspen	Astoria	Barke	Bartok	Bella	Bereta	Blenheim	Bond	Brenda	Brewster	Brise	Britta	Cadeau	Champso	Chant	Caruso	Caskant				
2																																							
3	nchrom=7																																						
4	nind=148																																						
5	popt=unkn																																						
6																																							
7	name=chrom1																																						
8	E38M54-472	9.484	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
9	E37M33-311	88.39	B	B	B	B	B	B	B	A	B	B	B	U	B	B	B	B	U	B	B	U	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
10	E38M55-205	95.887	B	U	A	B	A	A	U	U	A	B	B	A	A	B	U	A	A	U	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
11	E33M54-214	96.533	A	A	A	A	U	A	A	A	A	A	A	A	A	A	A	U	A	A	U	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
12	E38M50-119	105.768	B	B	A	A	A	B	A	A	A	A	A	A	B	A	B	U	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
13	E39M61-255	151.478	A	A	A	A	A	A	A	A	U	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
14	E39M61-222	151.837	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
15	E38M50-284	156.782	B	B	A	A	B	B	B	B	B	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
16	E35M54-183	163.372	B	B	B	A	B	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
17	E35M54-180	163.455	A	A	A	A	B	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	B	B	A	A	A	A	A	A	A	A	A
18																																							
19	name=chrom2																																						
20	E38M54-169	31.23	A	A	B	B	A	B	B	A	B	B	B	A	B	B	B	U	B	B	B	B	B	A	A	B	B	B	B	B	B	B	A	B	A	B	B	B	
21	E35M54-412	33.719	A	A	A	B	U	B	A	A	B	B	B	B	B	B	B	B	U	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
22	E38M54-238	34.974	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
23	E35M48-133	35.136	B	B	B	B	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
24	E35M48-236	36.698	A	A	U	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	U	A	A	
25	E38M55-219	40.727	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	U	B	B	U	A	B	B	B	B	A	B	U	B	B	B	B	B	B	B	B	
26	E38M50-094	41.521	A	B	U	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
27	E35M55-117	47.619	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	U	A
28	E35M61-228	48.634	A	A	B	U	B	B	B	B	B	B	B	A	U	A	U	B	A	A	B	A	U	A	U	U	U	A	A	A	A	A	A	A	A	A	A	A	
29	E35M54-243	49.235	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	U	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
30	E35M61-378	49.807	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
31	E37M33-160	52.806	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
32	E38M54-390	60.3	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
33	E38M55-228	79.488	A	A	A	A	A	U	B	B	B	B	A	A	B	A	B	A	U	A	B	U	A	U	B	B	A	A	A	B	U	B	A	B	B	B	A	A	
34	E35M54-078	89.22	B	A	B	B	A	B	A	B	B	B	B	B	B	B	B	B	U	B	B	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	
35	E38M54-134	103.16	B	B	B	U	B	B	U	B	B	U	U	U	B	B	B	B	B	B	B	B	U	B	U	U	B	B	B	B	B	B	B	B	B	B	B	B	

Sheet1 / Sheet2 / Sheet3 /

Conditional formatting in excel

## ▶ Disadvantage

- | Does not take into account map information
- | Very limited amount of alleles can be colored
- | 255 column limit !

## ▶ Advantage

- | Flexible environment for sorting, filtering

# GGT: graphical genotypes

- ▶ Aim (end of last century): visualize marker data in a more flexible way
- ▶ Not too much hassle to get data from already existing formats (loc-file for mapping and resulting map) into package
- ▶ Show some statistics on marker data
- ▶ First windows 3.1 version developed in 1997
  - | (GGT is only available for windows)



1997 version of GGT

# Many additions but main concept not changed..

## ► Some highlights:

- | 32 bits version released in 1998
- | Paper in Journal of Heredity 1999
- | Computer demo @ PAG 2006!

## ► Additions:

- | Filtering + sorting
- | Input/output (excel, mapchart, mega)
- | A growing range of advanced analysis methods

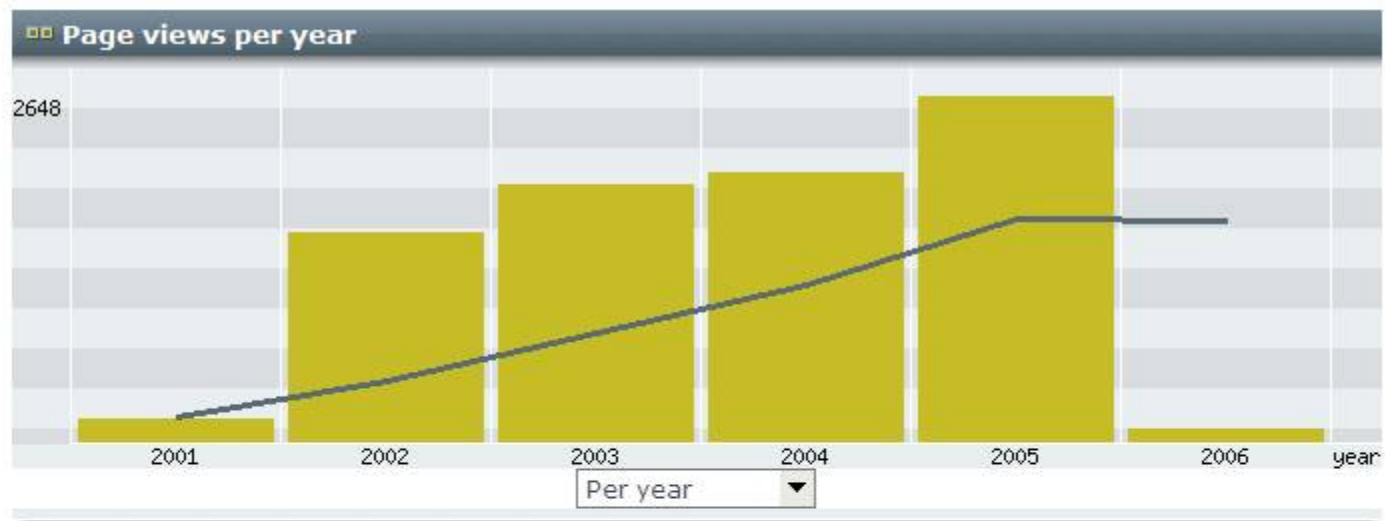
**Computer Note**

**GGT: Software for the Display of Graphical Genotypes**  
Ralph van Berloo

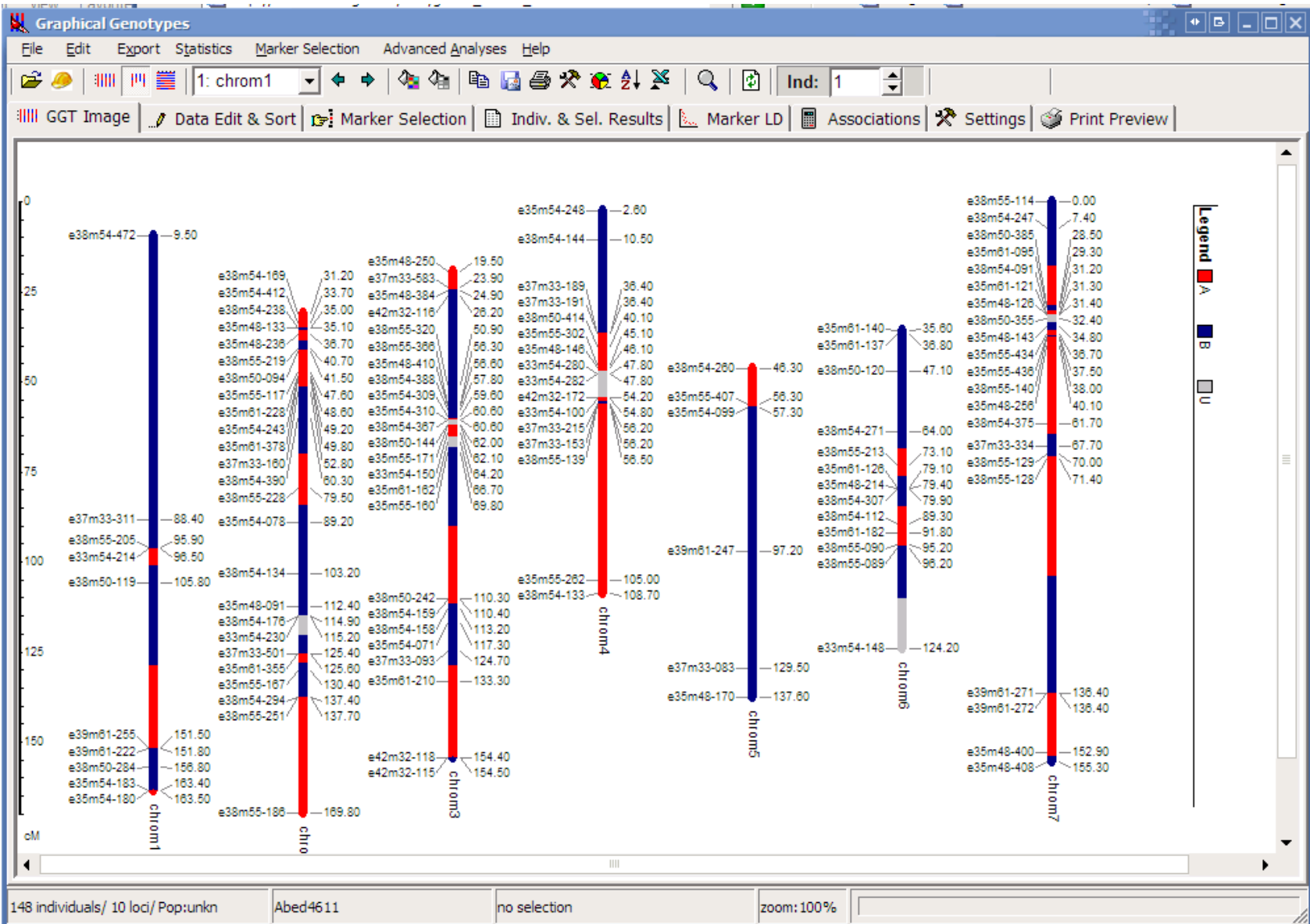
A graphical representation of molecular marker data can be an important tool in

GGT brings graphical genotyping to the widely used windows platform. Besides graphically representing marker data, GGT can also be used to select individuals with a preferred genotype. GGT was written in Borland Delphi and runs under Microsoft Windows or Windows 95/98.

# GGT website visits..







**2006 edition of GGT will now be demonstrated**

# Acknowledgements

- | CBSG
- | Fred van Eeuwijk & Richard Visser
- | Arnold Kraakman
- | Rients Niks
- | Many GGT users that have provided feedback!



**Web: [www.pbr.wur.nl/uk/resources](http://www.pbr.wur.nl/uk/resources)**

▶ Back up slides..

> No Data Available <

Open a file or choose "Build GGT File" from the "File" menu to create a GGT file from MAP & LOC data...

New ! import GGT data from Excel files - see menu

```
CHROM1.LOC - Notepad
File Edit Format View Help
; This file was used as input for the JOINMAP mapping software
; use the BUIL GGT FILE option to merge '.loc' and '.map' files into a
;
;
; Fri, 10 Jan 1997, 11:54
; grouping file: mylvuniq.grp
; original file: mylvuniq.loc
; linkage group: 1
;
name = 1vuniq-1
popt = RI9
nloc = 72
nind = 103
;
E42M32-231#1
aaaaa -ca-a ccccc aacca cacac caaca aaaca cccca accaa accaa
caaaa aaaaa accaa acccc accaa cccac acaaa cacc caaaa ccaac
ccc
E33M61-740
aaaaa aaaca ccccc aacca aacac caaca caaca acaaa acacc accaa
cacia acaaa accca ccccc accaa accac accaa caaca caaaa caaac
cca
E35M54-93
aaaaa aaaca ccccc aacca aacac caaca caaca acaaa acacc accaa
cacia acaaa accca CCC-C accaa accac accaa caaca caaaa caaac
ccc
E42M40-287
dddd ddbbd bdbbb dbbbd bdddb bddbd ddbbd bbbbd dbbdd dbbd
dbdd dbdd dbbbd dbbbb dbbd bbbdb dbbd bdbbb bddd bdbbd
bbb
E33M55-508
dbbd bddd bdbbb dbbb dbdbd bddbd bddd dbdd bbbb dbdd
bddd dbdd ddbbb bdbbb bdddb dbbd dbdd bbbd bdbd bddd
dbd
E33M61-120
dddd dbbd bdbbb dbbb dddb bddbd ddbbd bbbd dbbd dbbd
bddd dbdd dbbd dbbbb dbbd bbbd dbbd bdbb bddd bdbd
bbb
E35M48-228
ddd- bdbbd bdbbb dbbb dd-db b-dbd bddd dbdd bbbb dbdd
bdbd dbdd ddb-b bdbbb bd-dd dbbd dbdd bbbd bdbd bddd
bbd
E41M40-112
aaaaa aaa-a ccccc aacca cacac caaca aaaca acaca accac accaa
```

```
chrom1.map - Notepad
File Edit Format View Help
; Genetic map file of a Barley RIL population
; chromosome 1
;
chrom 1
;
E33M55-508 0.0
E39M61-574 1.8
E35M48-228 4.0
E33M61-740 14.6
E35M54-93 14.6
E41M40-112 20.7
E42M51-267 23.3
E42M32-231#1 26.5
E42M40-287 28.5
E33M61-120 29.2
E37M32-99 38.0
E37M32-555#1 38.6
E35M61-432 44.0
E42M32-195 71.7
E38M54-618 79.3
E33M61-210 79.3
E37M33-154 81.0
E37M33-311 81.0
E33M54-261 81.6
E45M55-510 81.6
E35M55-458 84.0
E33M61-353 85.3
E33M54-201 86.0
E33M54-202 86.0
E42M40-472 86.0
E37M33-439 86.6
E33M61-718 86.6
E40M40-105 87.5
E40M32-261 87.5
E33M58-220 87.5
E33M61-362 89.8
E33M61-357 89.8
E39M61-372 90.7
E32M61-148 90.7
E33M54-291 90.7
E35M55-271 90.7
E35M54-412 91.3
E35M54-230 91.3
```

# Input files: map and locus data

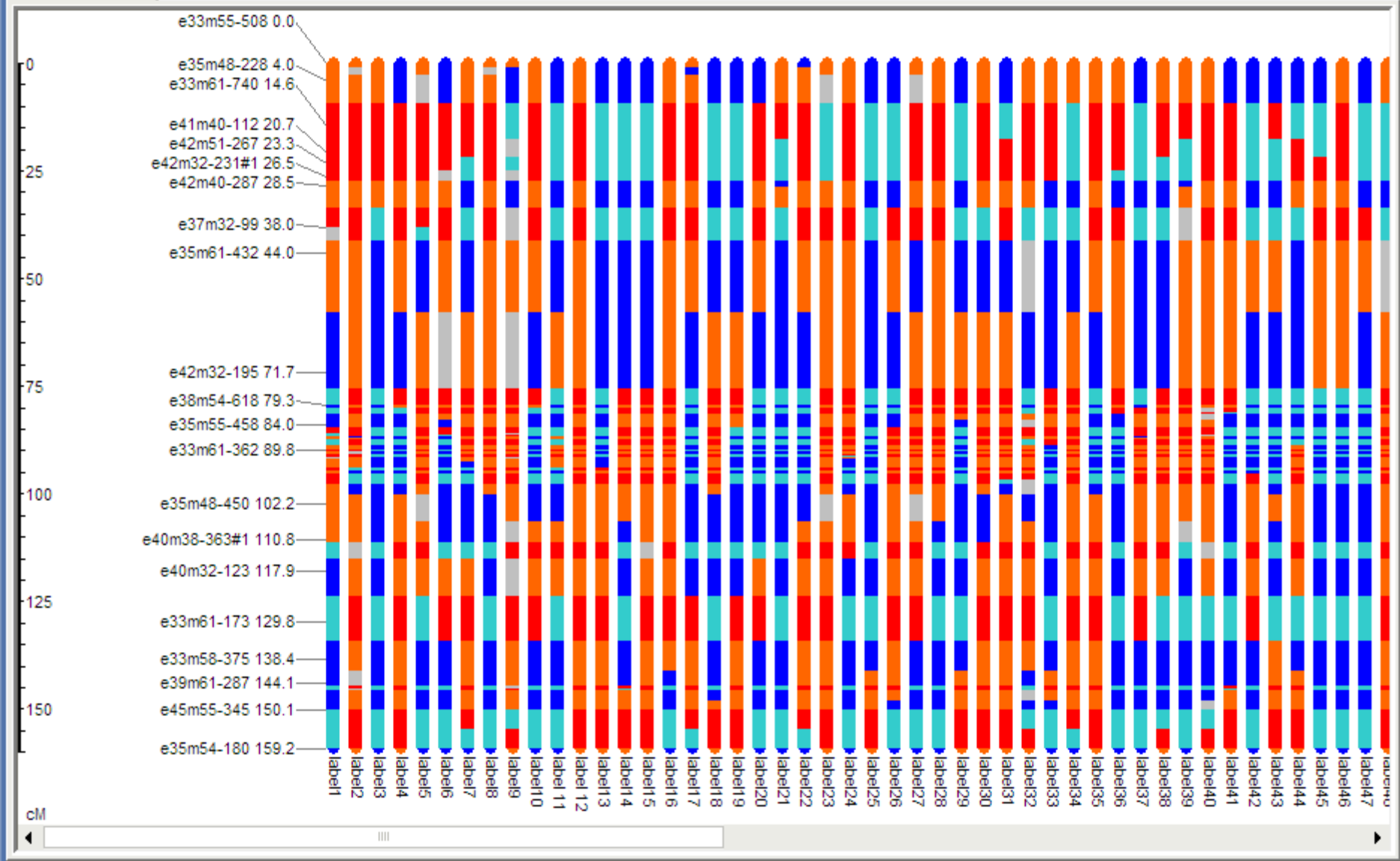
Build GGT file

Build GGT file

Marker names & positions	Locus / GGT file
<input checked="" type="checkbox"/> chrom 1	nchrom=1
<input checked="" type="checkbox"/> E33M55-508 0.0	nind=103
<input checked="" type="checkbox"/> E39M61-574 1.8	popt=ri9
<input checked="" type="checkbox"/> E35M48-228 4.0	
<input checked="" type="checkbox"/> E33M61-740 14.6	name= 1
<input checked="" type="checkbox"/> E35M54-93 14.6	nloc=72
<input checked="" type="checkbox"/> E41M40-112 20.7	e33m55-508 0.0
<input checked="" type="checkbox"/> E42M51-267 23.3	dddbd bdddb bdbbb ddbbb dbdbd bdddb ddbdd bdbdd bdbbb dbdbd
<input checked="" type="checkbox"/> E42M32-231#1 26.5	bdddb ddbdd ddbbb bdbbb bdddb dbdbd ddbdd bdbdd bdbdd bdbdd
<input checked="" type="checkbox"/> E42M40-287 28.5	dbd
<input checked="" type="checkbox"/> E33M61-120 29.2	e39m61-574 1.8
<input checked="" type="checkbox"/> E37M32-99 38.0	d-dbd bd-bd bdbbb bdbbb ddbdb bdbdb ddbdd dbdbd bdbbb dbdbd
<input checked="" type="checkbox"/> E37M32-555#1 38.6	bdddb dbdbd ddbbb bdbbb bdddb dbdbd ddbdd bdbdd bdbdd bdbdd
<input checked="" type="checkbox"/> E35M61-432 44.0	dbd
<input checked="" type="checkbox"/> E42M32-195 71.7	e35m48-228 4.0
<input checked="" type="checkbox"/> E38M54-618 79.3	dddb- bdbdb bdbbb ddbbb dd-db b-dbd bdddb ddbdd bdbbb dbdbd
<input checked="" type="checkbox"/> E33M61-210 79.3	bdbdd ddbdd ddb-b bdbbb bd-dd dbdbd ddbdd bdbdd bdbdd bdbdd
<input checked="" type="checkbox"/> E37M33-154 81.0	bbd
<input checked="" type="checkbox"/> E37M33-311 81.0	e33m61-740 14.6
<input checked="" type="checkbox"/> E33M54-261 81.6	aaaaa aaaca caccc aacca aacac caaca caaca acaaa acacc accaa
<input checked="" type="checkbox"/> E45M55-510 81.6	cacaa acaaa accca ccccc accaa accac accaa caaca caaaa caaac
<input checked="" type="checkbox"/> E35M55-458 84.0	cca
<input checked="" type="checkbox"/> E33M61-353 85.3	e35m54-93 14.6
<input checked="" type="checkbox"/> E33M54-201 86.0	aaaaa aaaca caccc aacca aacac caaca caaca acaaa acacc accaa
<input checked="" type="checkbox"/> E33M54-202 86.0	cacaa acaaa accca ccc-c accaa accac accaa caaca caaaa caaac
<input checked="" type="checkbox"/> E42M40-472 86.0	ccc
<input checked="" type="checkbox"/> E37M33-439 86.6	e41m40-112 20.7
<input checked="" type="checkbox"/> E33M61-718 86.6	aaaaa aaa-a caccc aacca cacac caaca aaaca acaca accac accaa
<input checked="" type="checkbox"/> E40M40-105 87.5	cacac aaaaa accca acacc accaa cccac accaa cacca caaaa ccaac
<input checked="" type="checkbox"/> E40M32-261 87.5	cca
<input checked="" type="checkbox"/> E33M58-220 87.5	
<input checked="" type="checkbox"/> E33M61-362 89.8	

unmodified modified help

Load marker maps Load Locus data Merge data Reset Close Cancel



Bar Fill Style

Gradient  Discrete

Color hatching (only for discrete view)

solid  use hatch

Show/ Hide

Marker-names  Phase info

Marker-positions  Marker-Ticks

Color Legend  cM Ruler

Footer text

Draw curved tips on chromosome ends

Space for markernames:

autosize

Skip markers less than  cM apart

Bar width:  QTL Bar width:

Space between bars:

Length multiplier factor:

Top margin:

Print labels every  Individuals

print labels sideways (rotated 270°)

HAP & DH population

deduce locus phase

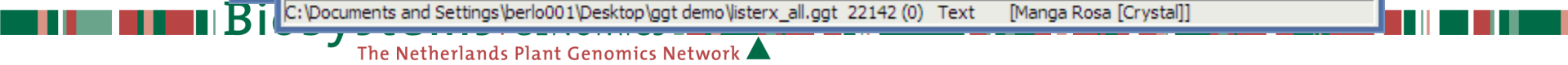
Settings Load & Save

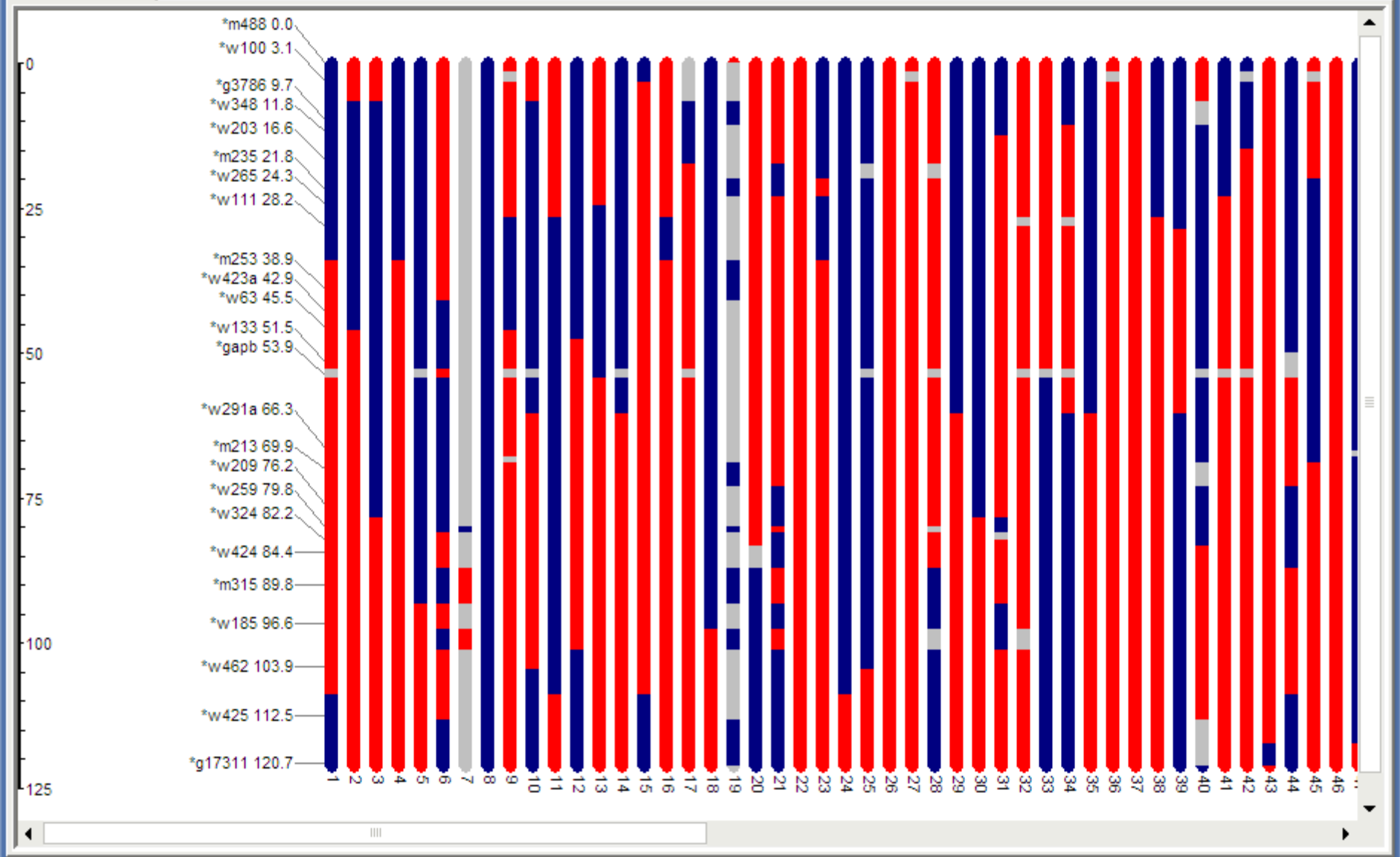
Footer text:

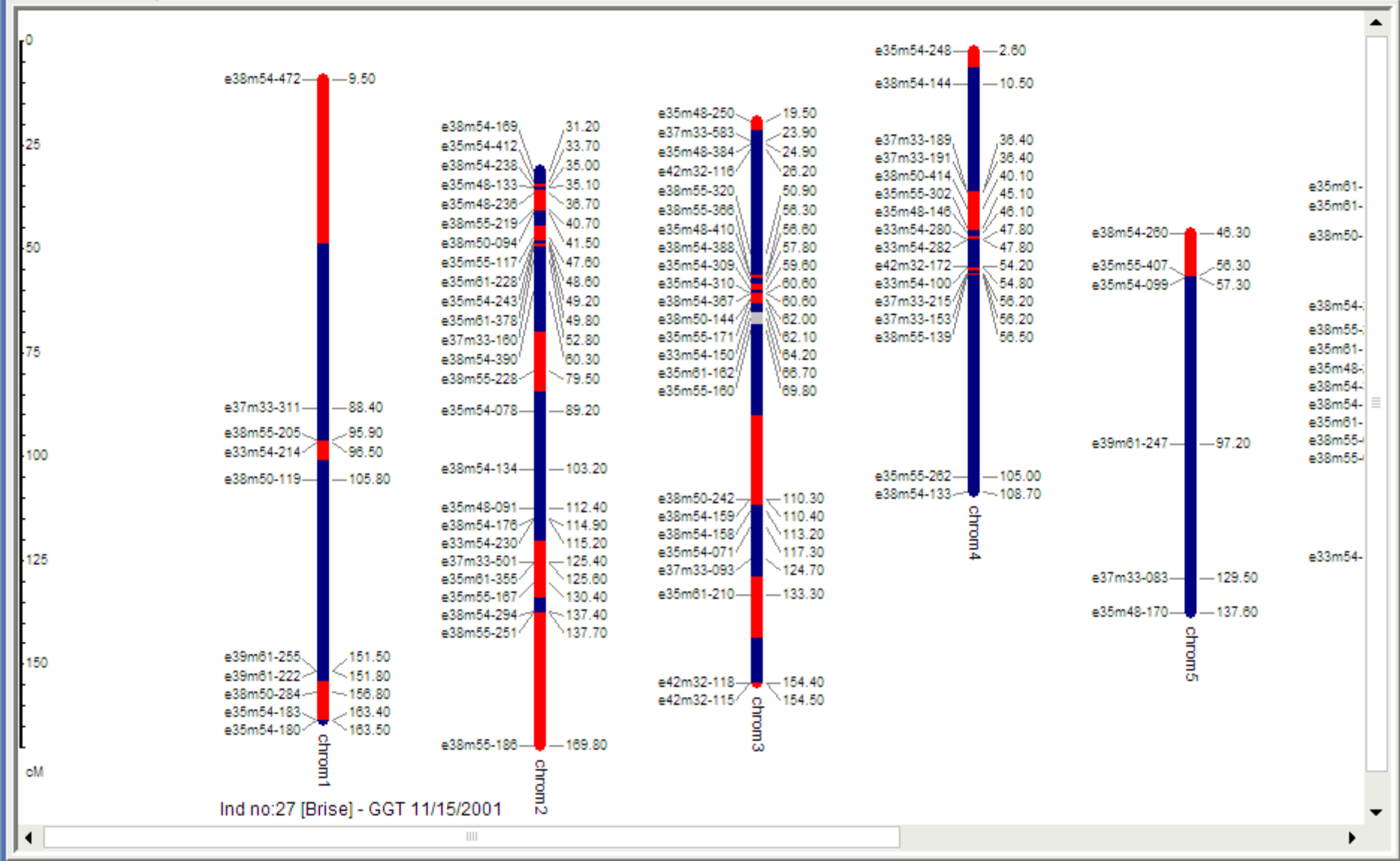
Col	Code	Allele descr.	Hatch	Numval	Used?
	Z	Z	}	0.0	
	[	[	/	0.0	
	\	\	◇	0.0	
	]	]	◇	0.0	
	^	^	◆	0.0	
	˘	˘	=	0.0	
	˘	˘	˘	0.0	
	a	a	/	0.0	✓
	b	b	◆	0.0	✓
	c	c	}	0.0	✓
	d	d	◆	0.0	✓
	e	e	◇	0.0	
	f	f	◆	0.0	
	g	g	+	0.0	
	h	h	◇	0.0	
	i	i	≡	0.0	
	j	j	˘	0.0	
	k	k	=	0.0	
	l	l	≡	0.0	
	m	m	≡	0.0	
	n	n	≡	0.0	

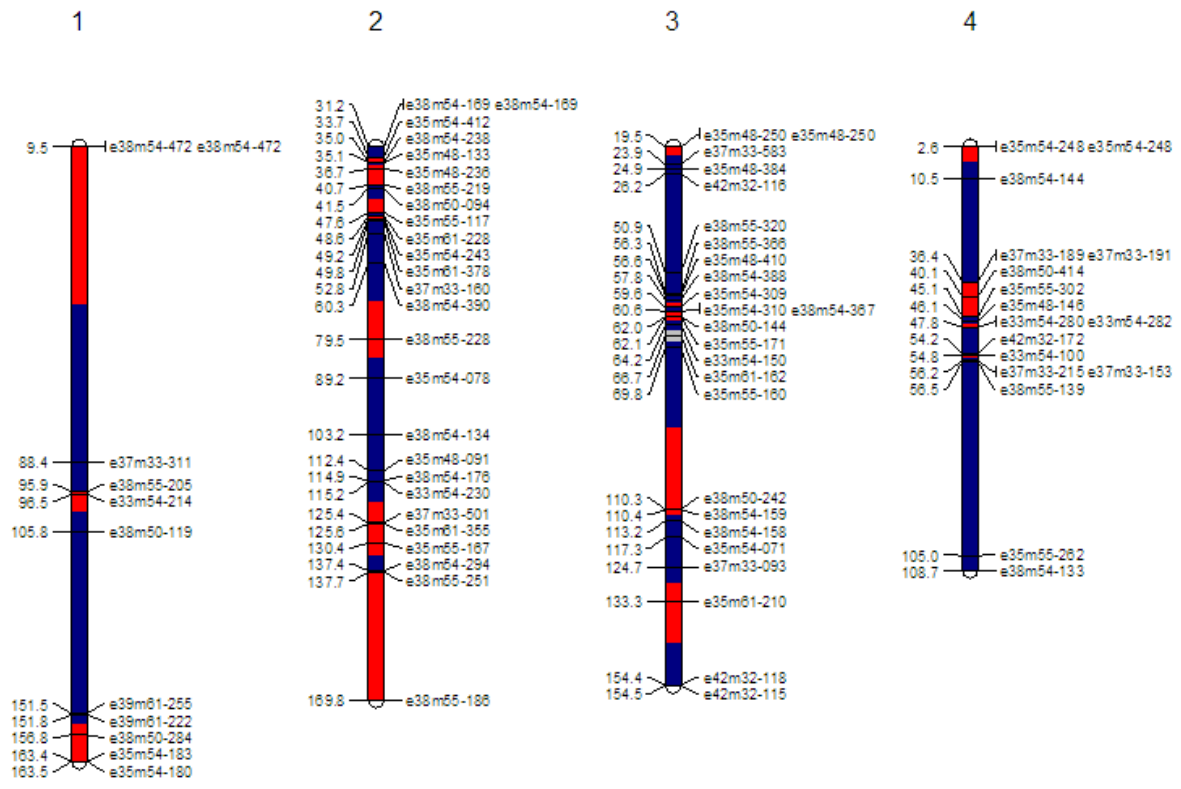


```
FmView - listerx_all.ggt
File Edit View Options Help
nch
nir
pop AAAAAUUBAABAAAAAAUBBBAABBAABAABABBAAAAAABAAAAAAABBAABAAAAAAABBAAAAAAAABBAAAAABBAABBBAA,
*g4552 98.4
AAAAABABAABAAAAAAABBAABBAABAAUBABUBBAAAAAABAAAAAAABBAABAAAAAAABBAAAAAAAAUAAAAABBAABBBAA,
nam *w462 103.9
nlc AAAAAUUBAABBAAAAAAAUBBAABBAABAAAAABAAAAAABAAAAAABBAABAAAAAAABAAABAAAAABAAAAABBAABBBAA,
*m4 *w103 105.2
BAA AAAAAUUBABBBAAAAAAUBBAABBAABAAAAABAAAAAABAAAAAABBAABAAAAAAABAAABAAAAABAAAAABBAABBBAA,
*g4 *w425 112.5
BAA BAAAAUUBABABAABAAAAUBBAAAAAAABAAAAABAAAAAABAAAABAABAABAAAAABAAAAAAABAAAAABBAABBBAA,
*w3 *m532 114.0
BAA BAAAAUBABABABAABAAAAABBAAAAAAAABAAAAABAAAAABUAAAABAABAUBAABAUABAAAAAAABABAAAAABBAABBBAA,
*w1 *g17311 120.7
BAA BAAAAUBABABAABAAAAABBAAAAAAAABAAAAABAAAAABUAAABBAAAAAABUABAAUABAAAAABBAABAAAAABBBBBBBAB,
*w4 *w157 121.5
BAA BAAAAUBABABAABAAAAUBBAAAAAAABAAAAABAAAAABAAAAAABAAAABAABAAAAABBAABAAAAABBBBBBBAB,
*g3
BBE name=2
*w3 nloc=40
BBE *w51 0.0
*w1 BBBAAUBAABAUAAAAUBBAABABBAAABBBABBABAAABAAABBAABBAABABBABABBABABBABAABBAABBBAA,
BBE *w204 3.3
*w2 ABBAABUABBBABAAAABAUUBBAABABBABABBABBABAAAABAAABBABBBAAAABBABBABABBABABBABAABBAABBBAA,
BBE *w122 4.0
*g3 ABBAABUABBBABAAAABAUABAABABBABABBABBABAAAABAAABBABBBAAAABBABBABABBABABBABAABBAABBBAA,
BBE *g3843 6.9
*m2 ABBAABUABBBABAAAABABAAAAUBBBAABBBBABBABAAAABBABBABBBAABBABBABABBBAABBBBAABBAABBBAA,
BBE *w301 7.6
*w2 ABBAABUABBBABAAAABAUABAABABBABABBABBABAAAABABBABBBAABBABBABABBBAABBAABBBBA,
BBE *w390 9.4
*w1 ABBAAUABBBABAAAABAUABAABBBBABBABBABBABAAAABABBABBBAABBABBABABBBAABBAABBBBA,
BBE *w233 13.0
*w1 ABBAAUABBBBAAAABBUABAABBBBABBABBABBABABAABABBABBBAABBABBABABBBAABBAABBBBA,
BBE *w306 13.7
*w1 ABBAAUABABBBAAAABBUABAABBBBABBABBABBABABAABABBABBBAABBABBABABBBAABBAABBBBA,
BBE *w87 13.7
*w6 ABBAAUUAAABBBAAAABBUABAABBBBABBABBABBABABAABABBABBBAABBABBABABBBAABBAABBBBA,
RRR *w167 14.2
ARRAAITAARRRAARRRITAAARRRRAARRRARRRRARRRARRRARRRARRRARRRARRRARRRARRRARRRARRRARRRARRRARRRARRRARRRARRRARRR,
C:\D [ | ]
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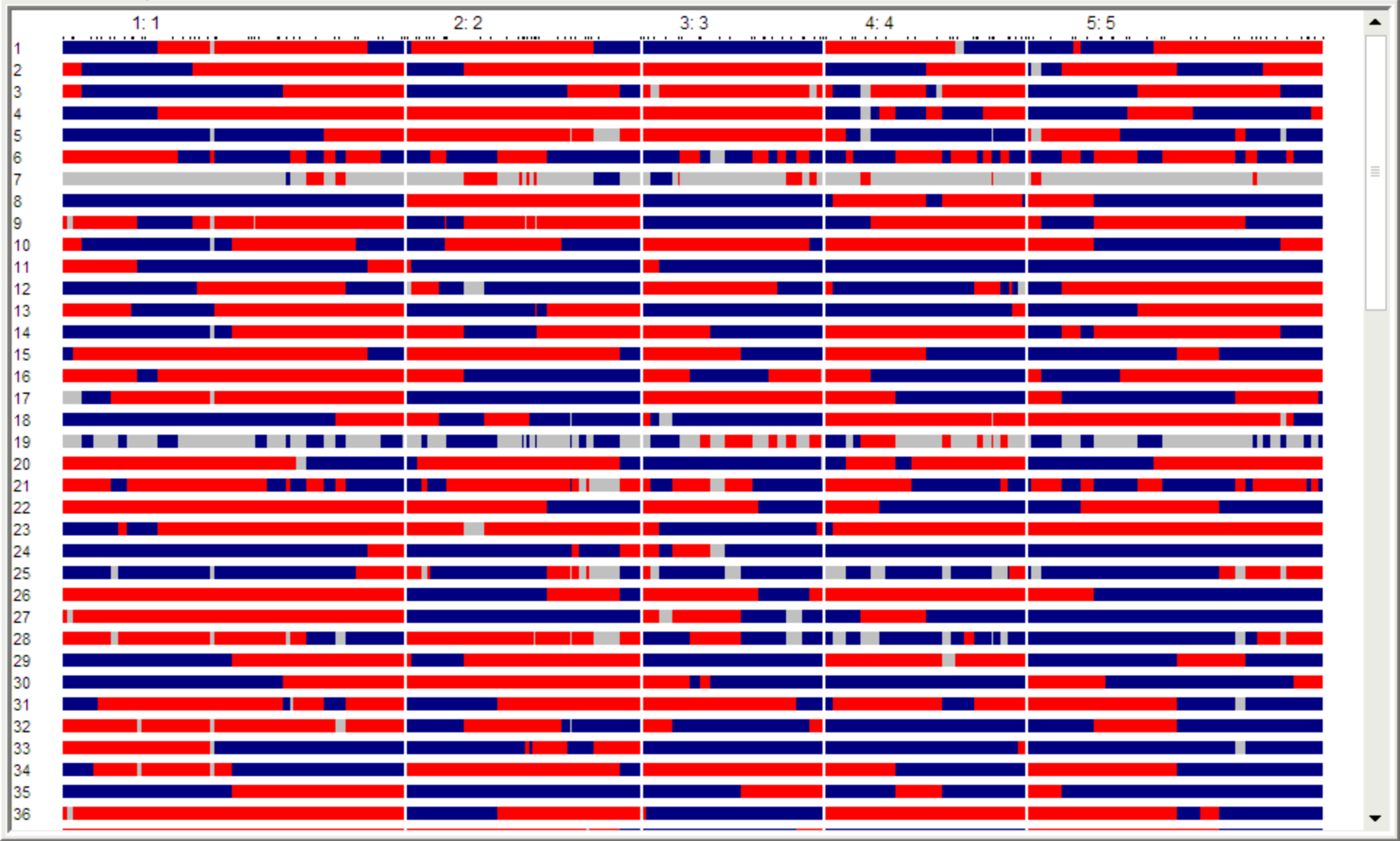




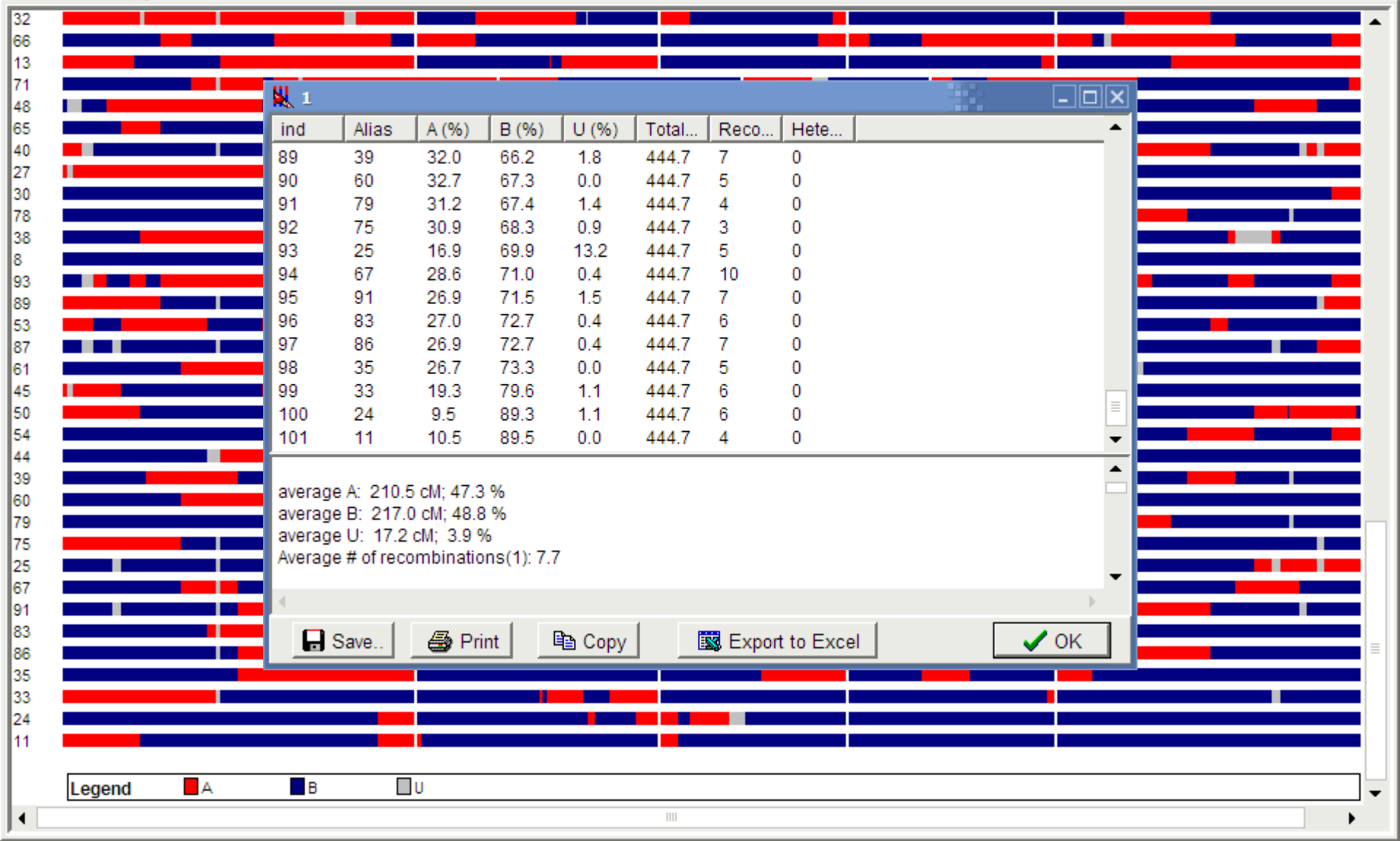




# Export to MapChart







1

ind	Alias	A (%)	B (%)	U (%)	Total...	Reco...	Hete...
89	39	32.0	66.2	1.8	444.7	7	0
90	60	32.7	67.3	0.0	444.7	5	0
91	79	31.2	67.4	1.4	444.7	4	0
92	75	30.9	68.3	0.9	444.7	3	0
93	25	16.9	69.9	13.2	444.7	5	0
94	67	28.6	71.0	0.4	444.7	10	0
95	91	26.9	71.5	1.5	444.7	7	0
96	83	27.0	72.7	0.4	444.7	6	0
97	86	26.9	72.7	0.4	444.7	7	0
98	35	26.7	73.3	0.0	444.7	5	0
99	33	19.3	79.6	1.1	444.7	6	0
100	24	9.5	89.3	1.1	444.7	6	0
101	11	10.5	89.5	0.0	444.7	4	0

average A: 210.5 cM; 47.3 %  
 average B: 217.0 cM; 48.8 %  
 average U: 17.2 cM; 3.9 %  
 Average # of recombinations(1): 7.7

Save.. Print Copy Export to Excel OK

Marker	Pos	Select	Alleles
Linkage-group 1 <1>			
<input checked="" type="checkbox"/> *m488	0.0	B	BAABBAUBAAAABABBAUBAAAABBBAAABBBAAABBAABBABBABAABBAUBABAAAAABBBABBBBB
<input checked="" type="checkbox"/> *g4715a	0.0	B	BAABBAUBAAAABABBAUBAAAABBBUAAAABBBAAABBAABBABBABAABBAUBABAAAAABBBABBBBB
<input checked="" type="checkbox"/> *w372	0.0	B	BAABBAUBAAAABABBAUBAAAABBBAAABBBAAABBAABBABBABAABBAABBABAABAAAAABBBABBBBBB
* *w100	3.1	A11	BAABBAUBUAAABABBAUBUAAAABBBAAUABBBAAABBBUABBABUABUABUAAABBAABAAAAABBBABBBBB
* *w443	3.8	A11	BAABBAUBAAAABABAAUBUAAAABBBAAABBBAAABBAABBABBABAABUAAABBAABAAAAABBBABBBBB
* *g3786	9.7	A11	BBBBBAUBABABABAABBBAAAABBBAAABBBAAABBAABBUBBABAABBAUBABAUAABBBBABBBBB
* *w348	11.8	A11	BBBBBAUBABABABAABBBUAAAABBBAAAABBBAAAABAABBBBBBABAABBAABBBBAAAABBBBABBBBB
* *w113	13.3	A11	BBBBBAUBABABABAABBBUAAAABBBAAAABBBAAAABAABBBBBBABAABBAABBBBAAAABBBBABBBBB
* *w203	16.6	A11	BBBBBAUBABABABAABBBUAAAABBBAAAABBBAAAABAABBBBBBABAABBAABBBBBAABBBBABBBBB
* *g3829	18.1	A11	BBBBBAUBABABABAABBUABABBUBAAUUBBAAAABAABBBBBBAABAABABAUBBBBBBAABBBBABBBBU
* *m235	21.8	A11	BBBBBAUBABABABAABBBABAABBBAAABBBAAAABAABBBBBBAABBABABAUBABBBAAABBBBABABBA
* *w265	24.3	A11	BBBBBAUBABABABAABBUAAAABBBAAAABBBAAAABAABBBAAAABBABABAABABBBBABBABABABBA
* *w163	25.0	A11	BBBBBAUBABABBBAAABUAAAABBBAAAABBBAAAABAABBBAAAABBABABAABABBBBABBABABABBA
* *w111	28.2	A11	BBBBBAUBBBBBBBBABABUAAAABBBAAAABBAUUAUBAAAABBBAAAABBABABBABABBBBABBABABBA
* *w192	28.2	A11	BBBBBAUBBBBBBBBABABUAAAABBBAAAABBBAAAABAABBBAAAABBABABBABABBBBABBABABBA
* *w62	28.2	A11	BBBBBAUBBBBBBBBABABUAAAABBBAAAABBBAAAABAABBBAAAABBABABBABABBBBABBABABBA
* *w15	28.2	A11	BBBBBAUBBBBBBBBABABUAAAABBBAAAABBBAAAABAABBBAAAABBABABBABABBBBABBABABBA
* *w116	29.1	A11	BBBBBAUBBBBBBBBABABUAAAABBBAAAABBBAAAABAABBBAAAABBABABBABABBBBABBABABBA
* *m253	38.9	A11	ABBABAUBBBBBBBBAABBBAAAABBBAAAABBBAAAABAABBBAAAABBABAABUBABBBAAABBBBABABA
* *w423a	42.9	A11	ABBABBUBBBBBBBBAABBUAAAABBBAAAABBBAAAABAABBBAAAABBABAABABABBBBAABAABABBBAA
* *w63	45.5	A11	ABBABBUBBBBBBBBAABBUAAAABBBAAAABBBAAAABAABBBAAAABBABAABBAABBBBAABAABABBBAA
* *w19	46.9	A11	AABABBUBABBBBBAABBUAAAABBBAAAABBBAAAABAABBBAAAABBABAABBAABBBBAABAABABBBAA
* *w342	48.4	A11	AABABBUBABBBBBAABBUAAAABBBAAAABBBAAAABAABBBAAAABBABAABBAABBBBAABAABABBBAA
* *w133	51.5	A11	AABABBUBABBBBBAABBUAAAABBBAAAABBBAAAABAABBBAAAABBABAABBAABBBBAABAABABBBAA
* *gapb	53.9	A11	UABAUAUBUUBABUAAUBUAAAABUAAUBBAUUUBAAAAUUUAUBABAABUABBBUUUBAAUUBBBUA
* *w72	54.8	A11	AABABBUBABBAABBAABBUAAAABBBAAAABBAABABAABAAAAABAABBAABAABBBAAAABAABABBBAA

Skip unselected individuals in drawing

> Type the code you want to select  
 > Hold CTRL to select all EXCEPT the typed code  
 > Type \* (Numeric keypad) to remove a selection

Clear All       Apply



Selected Individuals Marker Selection Results

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
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- 20
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- 28
- 29
- 30
- 31

**Selection Criteria**

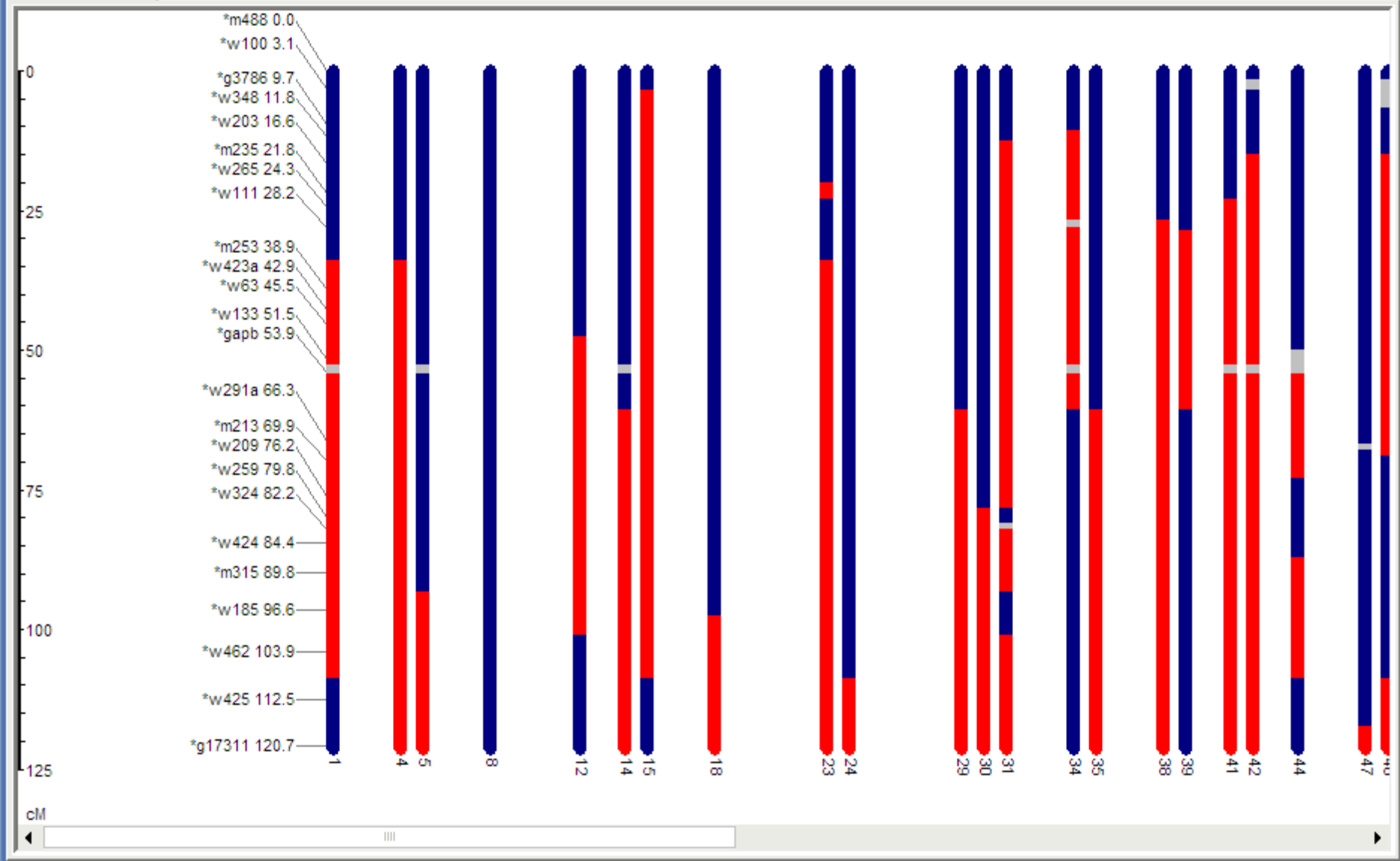
Selected in :  
 1 <>  
 2 <>  
 3 <>  
 4 <>  
 5 <>

Selection criteria:  
 \*m488 <group 1 @ 0.0 > B

**Selection Results**

48 individuals selected:

Nr. 1 [1]  
 Nr. 4 [4]  
 Nr. 5 [5]  
 Nr. 8 [8]  
 Nr. 12 [12]  
 Nr. 14 [14]  
 Nr. 15 [15]  
 Nr. 18 [18]  
 Nr. 23 [23]  
 Nr. 24 [24]  
 Nr. 29 [29]  
 Nr. 30 [30]  
 Nr. 31 [31]  
 Nr. 34 [34]  
 Nr. 35 [35]  
 Nr. 38 [38]  
 Nr. 39 [39]



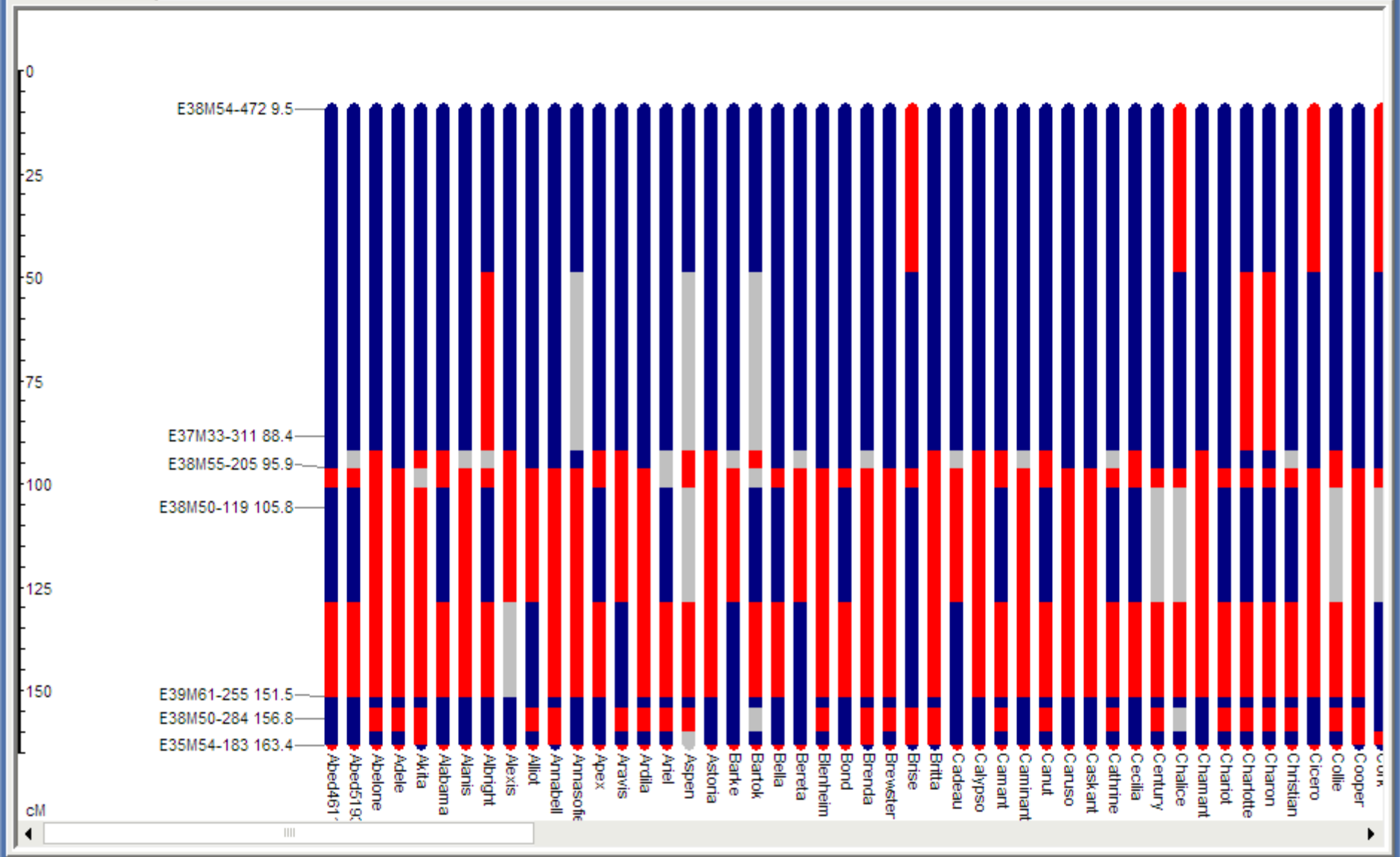
	A	B	C	D	E	F	G	H	I	J	K	L
1	Alias		Abed4611	Abed5193	Abelone	Adele	Akita	Alabama	Alanis	Albright	Alexis	Alliot
2												
3	nchrom=7											
4	nind=148											
5	popt=unkn											
6												
7	name=chrom1											
8	E38M54-472	9.484	B	B	B	B	B	B	B	B	B	B
9	E37M33-311	88.39	B	B	B	B	B	B	B	A	B	B
10	E38M55-205	95.887	B	U	A	B	A	A	U	U	A	B
11	E33M54-214	96.533	A	A	A	A	U	A	A	A	A	A
12	E38M50-119	105.768	B	B	A	A	A	B	A	B	A	A
13	E39M61-255	151.478	A	A	A	A	A	A	A	A	U	B
14	E39M61-222	151.837	B	B	B	B	B	B	B	B	B	B
15	E38M50-284	156.782	B	B	A	A	A	B	B	B	B	A
16	E35M54-183	163.372	B	B	B	B	A	B	B	B	B	B
17	E35M54-180	163.455	A	A	A	A	B	A	A	A	A	A
18												
19	name=chrom2											
20	E38M54-169	31.23	A	A	B	B	A	B	B	A	B	B
21	E35M54-412	33.719	A	A	A	B	U	B	A	A	B	B
22	E38M54-238	34.974	A	A	A	A	A	A	A	A	A	A
23	E35M48-133	35.136	B	B	B	B	A	A	B	B	B	B
24	E35M48-236	36.698	A	A	U	A	A	A	A	A	A	A
25	E38M55-219	40.727	B	B	B	B	B	B	B	B	B	B
26	E38M50-094	41.521	A	B	U	B	A	B	B	B	B	B
27	E35M55-117	47.619	A	A	A	A	A	A	A	A	U	A
28	E35M61-228	48.634	A	A	B	U	A	A	U	A	U	U
29	E35M54-243	49.235	A	B	B	B	B	B	B	B	B	B
30	E35M61-378	49.807	A	B	B	B	B	B	B	B	B	B
31	E37M33-160	52.806	B	B	B	B	B	B	B	B	B	B
32	E38M54-390	60.3	B	B	B	B	B	B	B	B	B	B
33	E38M55-228	79.488	A	A	A	A	A	B	U	B	B	B
34	E35M54-078	89.22	B	A	B	B	A	B	A	B	B	B
35	E38M54-134	103.16	B	B	B	U	B	B	U	B	B	U
36	E35M48-091	112.408	B	A	B	B	B	A	B	B	B	B
37	E38M54-176	114.875	B	B	A	U	A	U	U	U	A	U
38	E33M54-230	115.213	U	B	B	B	B	A	B	B	B	B
39	E37M33-501	125.369	B	A	A	A	A	B	A	A	A	A

GGT <-> Excel data exchange

Alias		Abed4611	Abed5193	Abelone	Adele	Akita	Alabama	Alanis	Albright	Alexis	Alliot	Annabell	Annasofie	Apex	Aravis	Ardila	Ariel	Aspen	Astoria	Barke	Bartok	Bella	Bereta	Blenheim	Bond
nchrom=7																									
nind=148																									
popt=unkn																									
name=chrom1																									
E38M54-472	9.484	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
E37M33-311	88.39	B	B	B	B	B	B	B	A	B	B	B	U	B	B	B	B	U	B	B	U	B	B	B	B
E38M55-205	95.887	B	U	A	B	A	A	U	U	A	B	B	B	A	A	B	U	A	A	U	A	B	U	B	B
E33M54-214	96.533	A	A	A	A	U	A	A	A	A	A	A	A	A	A	U	A	A	A	U	A	A	A	A	A
E38M50-119	105.768	B	B	A	A	A	B	A	B	A	A	A	A	B	A	A	B	U	A	A	B	B	A	A	B
E39M61-255	151.478	A	A	A	A	A	A	A	A	U	B	A	A	A	B	A	A	A	A	B	A	A	B	A	A
E39M61-222	151.837	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
E38M50-284	156.782	B	B	A	A	A	B	B	B	B	A	A	B	B	A	A	A	A	B	B	U	B	B	A	B
E35M54-183	163.372	B	B	B	B	A	B	B	B	B	B	A	B	B	B	B	B	U	B	B	B	B	B	B	B
E35M54-180	163.455	A	A	A	A	B	A	A	A	A	A	B	A	A	A	A	A	U	A	A	A	A	A	A	A
name=chrom2																									
E38M54-169	31.23	A	A	B	B	A	B	B	A	B	B	B	A	B	B	A	A	B	U	B	B	B	A	A	B
E35M54-412	33.719	A	A	A	B	U	B	A	A	B	B	B	B	U	B	B	A	U	A	B	B	B	B	B	B
E39M54-238	24.974	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

Spreadsheet Recode log

Open Excel File Paste Excel data Recode Import into GGT Save Excel File Toggle Headers Clear Close



GGT <-> Excel data exchange

Alias		plant1	plant2	plant3	plant4	plant5	plant6
; non ggt formatted d							
nchrom=1							
name=convert_test							
locus1	10	5	6	4	5	4	4
locus2	25	8	10	8	8	11	10
locus3	70	20.5	22.3	20.5	20.5	22.3	22.3
locus4	100	escul penn		escul	escul	penn	penn

Spreadsheet  
Recode log

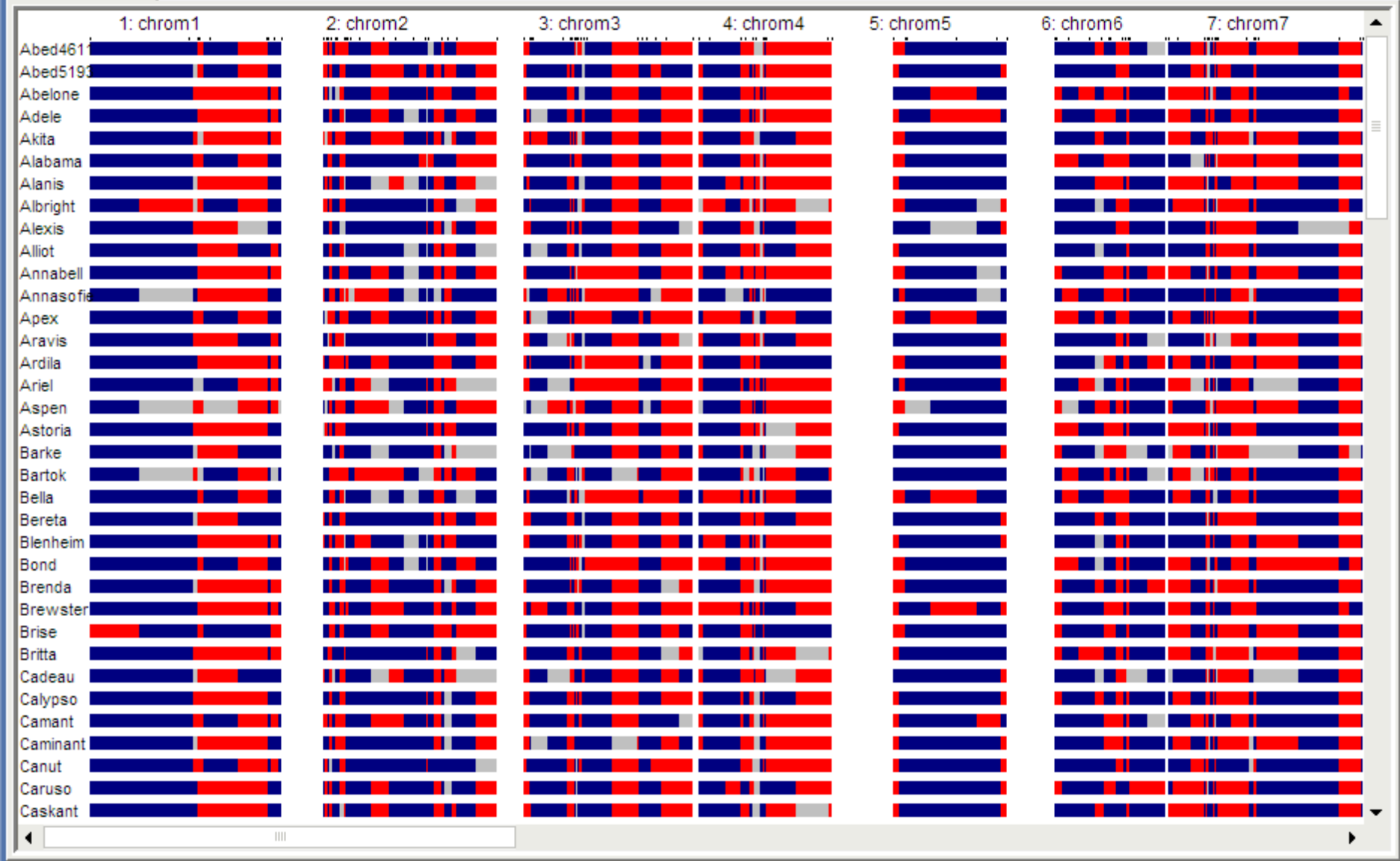
Open Excel File
  Paste Excel data
  Recode
  Import into GGT
  Save Excel File
  Toggle Headers

GGT <-> Excel data exchange

Spreadsheet Recode log

Alias		plant1	plant2	plant3	plant4	plant5	plant6
	; non ggt formatted d						
	nchrom=1						
	name=convert_test						
locus1	10	B	A	C	B	C	C
locus2	25	C	B	C	C	A	B
locus3	70	A	B	A	A	B	B
locus4	100	A	B	A	A	B	B

Open Excel File
  Paste Excel data
  Recode
  Import into GGT
  Save Excel File
  Toggle Headers





Bar Fill Style

Gradient  Discrete

Color hatching (only for discrete view)

solid  use hatch

Show/ Hide

Marker-names  Phase info

Marker-positions  Marker-Ticks

Color Legend  cM Ruler

Footer text

Draw curved tips on chromosome ends

Space for markernames:

autosize

Skip markers less than  cM apart

Bar width:  QTL Bar width:

Space between bars:

Length multiplier factor:

Top margin:

Print labels every  Individuals

print labels sideways (rotated 270°)

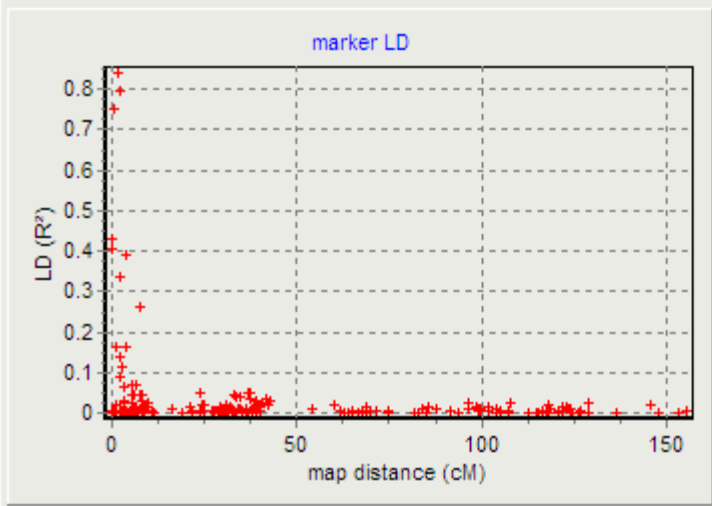
HAP & DH population

deduce locus phase

Settings Load & Save

Footer text:

Col	Code	Allele descr.	Hatch	Numval	Used?
0	0	0	\	0.0	
1	1	1	\	1.0	
2	2	2	///	0.0	
3	3	3	)	0.0	
4	4	4	)	0.0	
5	5	5	)	0.0	
6	6	6	~	0.0	
7	7	7	\	0.0	
8	8	8	≡	0.0	
9	9	9	+	0.0	
:	:	:	+	0.0	
;	;	;		0.0	
<	<	<	\	0.0	
=	=	=		0.0	
>	>	>	)	0.0	
?	?	?	◆	0.0	
@	@	@		0.0	
A	A	A	~	1.0	✓
B	B	B	///	0.0	✓
C	C	C	◆	0.5	
D	D	D	■	-0.5	



Calculate marker LD for group > 1: chrom1 All

Use marker intensity data

R<sup>2</sup>  R  -10log(p)  Lewontin D'  χ<sup>2</sup>

LD values diallel

	e38n	e37n	e38r	e33n	e38r	e39n	e39r	e38r	e35n	e38r	e35n	e38r	e35n	e35r	e38r	e35n	e35r	e3
e38m54	A																	
e37m33	0.3	B																
e38m55	0.0	0.0	C															
e33m54	0.0	0.0	0.0	D														
e38m50	0.0	0.0	0.0	0.8	E													
e39m61	0.0	0.0	0.0	0.3	0.4	F												
e39m61	0.0	0.0	0.1	0.0	0.0	0.0	G											
e38m50	0.0	0.0	0.4	0.0	0.0	0.0	0.2	H										
e35m54	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	I									
e38m54	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	J								
e35m54								0.3										
e38m54								0.0	0.0	B								
e35m48								0.0	0.0	0.0	C							
e35m48								0.0	0.0	0.0	0.8	D						
e38m55								0.0	0.0	0.0	0.3	0.4	E					
e38m50								0.0	0.0	0.1	0.0	0.0	0.0	F				
e35m55								0.0	0.0	0.4	0.0	0.0	0.0	0.2	G			
e35m61								0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	H		
e35m54								0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0		
e35m61								0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0
e37m33								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
e38m54								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.
e38m55								0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.

Note: this is an experimental new module, results depend on the Numval value in settings

Save as Excel File

	Abed4611	Abed5193	Abelone	Adele	Akita	Alabama	Alanis	Albright	Alexis	Alliot	Annabell	Annasofie	Apex	Aravis	Ardila	Ariel	Aspen	Astoria	Barke	Bartok	Bella	Bereta	Blenheim	Bond	Brenda	Brewster
Abed4611																										
Abed5193	0.29																									
Abelone	0.37	0.29																								
Adele	0.35	0.34	0.17																							
Akita	0.34	0.37	0.36	0.32																						
Alabama	0.25	0.33	0.34	0.36	0.33																					
Alanis	0.29	0.30	0.23	0.20	0.37	0.31																				
Albright	0.24	0.23	0.30	0.30	0.36	0.32	0.30																			
Alexis	0.34	0.26	0.32	0.36	0.37	0.37	0.35	0.34																		
Alliot	0.32	0.24	0.23	0.20	0.30	0.33	0.26	0.27	0.19																	
Annabell	0.31	0.39	0.31	0.33	0.30	0.25	0.30	0.38	0.44	0.32																
Annasofie	0.38	0.43	0.38	0.42	0.44	0.36	0.39	0.40	0.46	0.37	0.35															
Apex	0.39	0.47	0.48	0.48	0.42	0.38	0.52	0.39	0.49	0.49	0.37	0.36														
Aravis	0.30	0.25	0.23	0.26	0.29	0.34	0.29	0.31	0.17	0.13	0.35	0.42	0.55													

Similarity Coefficient  
 Simple Matching  Jaccard  Euclidean

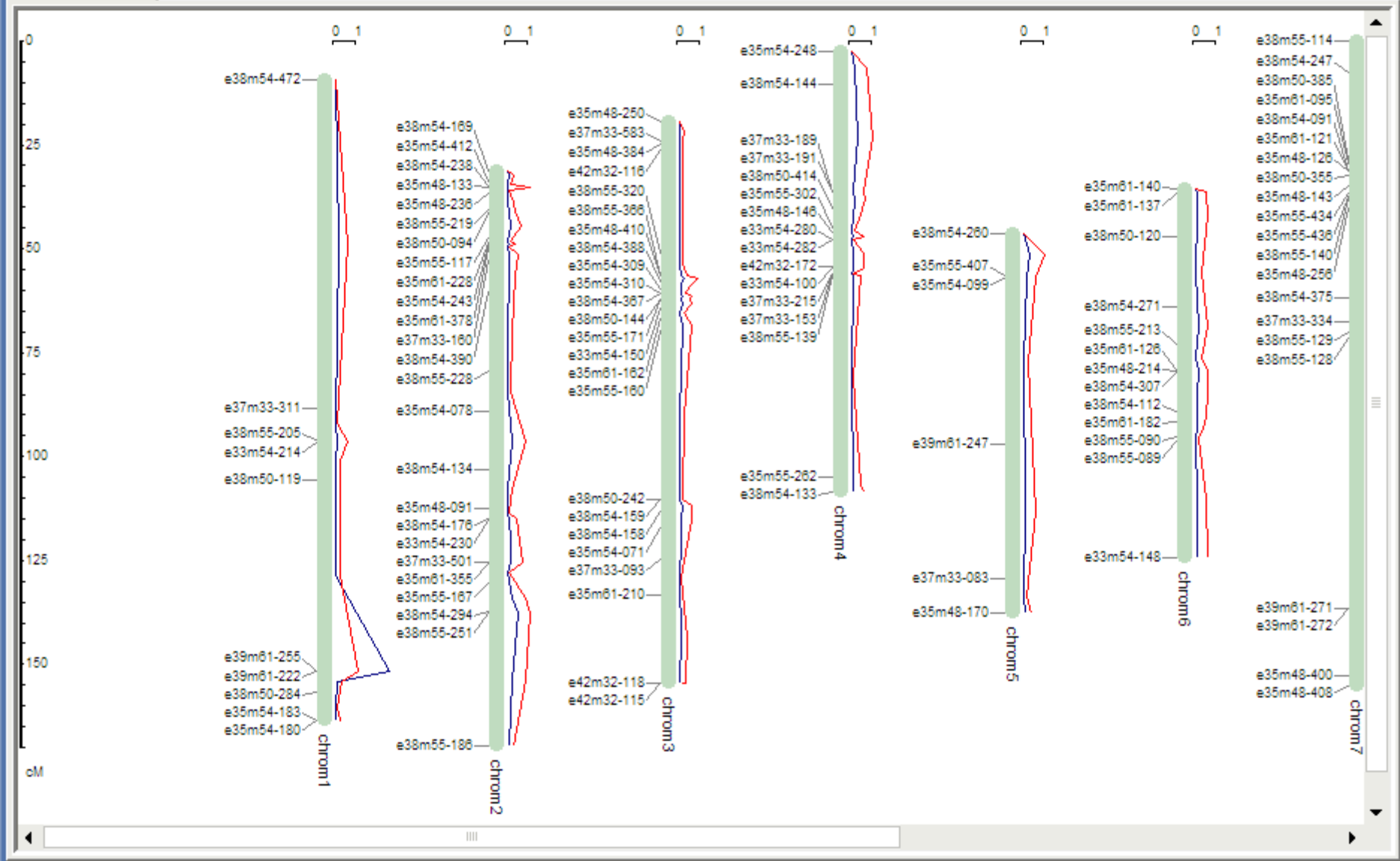
Trait data Marker data -10LOG(p) R<sup>2</sup> p-values q-values marker-trait sync Genetic Distances



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	ROWNAMES	<b>Abed461</b>	<b>Abed519</b>	<b>Abelone</b>	<b>Adele</b>	<b>Akita</b>	<b>Alabama</b>	<b>Alanis</b>	<b>Albright</b>	<b>Alexis</b>	<b>Alliot</b>	<b>Annabell</b>	<b>Annasofi</b>
2	FGENOUN9	49.783	57.222	54.716	55.684	58.029	58.879	55.682	54.564	51.959	57.696	60.379	44.875
3	FGENO9	57.598	58.253	60.228	59.164	60.725	62.515	59.411	58.457	56.202	60.397	63.771	52.646
4	BI9	1.044	.806	1.126	.952	1.088	.951	.951	1.086	.953	.962	.979	1.203
5	BIUN9	1.096	.909	1.149	.842	1.009	.937	1.007	1.23	.97	1.033	.935	1.49
6	LNDI29	1.396047	2.298276	2.321152	0.731887	0.845439	0.583109	1.889718	2.743893	1.882331	1.554961	1.150635	1.729458
7	LNDI2UN9	1.9352680	1.2679330	2.7619700	-.02696018	1.8341482	.99875512	.90850046	2.2285401	2.0716865	2.2632723	.71676604	1.587212753
8	IT1	9	1		9	9	9	9	9	2	2	9	9
9	IT2	9	4		9	9	9	9	9	3	3	9	9
10	IT	9	3		9	9	9	9	9	3	2	9	9
11	LP	109.8			108.3	113.3	112.8	107.4	112.4			104.8	104.3
12	LP1	106			103	110	110	103	105.5			101	105
13	LP2	113.6			113.6	116.6	115.6	111.7	119.3			108.6	103.6
14	AUDPC	214.9167	115	232.1667	228.9167	221.6667	217.0833	212.5	216.9167	122.5833	111.25	222.5	236.5833
15	AUDPC1	204.167	96.833	232.167	225.167	220.5	211.167	198.333	213.5	127.167	99.167	212.333	225.167
16	AUDPC2	225.667	133.167		232.667	222.833	223	226.667	220.333	118	123.333	232.667	248
17	BYDV	2.5	2.666667	1.666667	0.333333	1.166667	3.5	3.666667	1.833333	2	1.833333	1.833333	2.5
18	BYDV04	3	3	2	0	1	4	4	2	2	2	2	3
19	BYDV1	2	2.67	1.67	.33	1.67	2.67	3.33	1.67	1.67	1.33	1.67	2.33
20	BYDV2	3	2.67		.33	.67	4.33	4	2	2.33	2.33	2	2.67
21	HEADING	54	56	57	56	55	57	54.5	56	52	53	52	56.5
22	HEADING1	54	57	57	58	56	58	57	57	52	52	51	54
23	HEADING2	54	55		54	54	56	52	55	52	54	53	59
24	HEIGHT	63.8125	73.40625	69.375	77.53125	79.96875	72.6875	66.40625	78.60938	80.46875	77.875	79.1875	64.71875
25	HEIGHT1	60.13	69.31	69.38	76.06	77.44	71.88	65.81	76.72	78.94	82.75	76.38	68.94
26	HEIGHT2	67.5	77.5		79	82.5	73.5	67	80.5	82	73	82	60.5
27	RACH_HL	3	5	2			3	3	0	3	0	5	3
28	RACH_HL2	1	1	1			1	1	0	1	0	1	1
29	RACH_H	0	1	1			1	0	2	0	2	1	1
30													

ROWNAMES	Abed4611	Abed5193	Abelone	Adele	Akita	Alabama	Alanis	Albright	Alexis	Alliot	Annabell	Annasofie	Apex	Aravis	Ardila	Ariel	Aspen	Astoria	Barke	Bartok	Bella	Bereta	Blenheim	Bond	Brenda	
FGENOUN9	49.8	57.2	54.7	55.7	58.0	58.9	55.7	54.6	52.0	57.7	60.4	44.9		52.4	52.9	46.8	57.4	54.9	55.9	56.8	55.0	52.9	48.0	57.0	50.8	5
FGENO9	57.6	58.3	60.2	59.2	60.7	62.5	59.4	58.5	56.2	60.4	63.8	52.6		55.4	56.4	54.9	60.2	60.6	58.1	59.9	57.5	56.3	55.7	60.8	54.4	5
BI9	1.0	0.8	1.1	1.0	1.1	1.0	1.0	1.1	1.0	1.0	1.0	1.2		1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.2	1.0	1.2	0.9	1
BIUN9	1.1	0.9	1.1	0.8	1.0	0.9	1.0	1.2	1.0	1.0	0.9	1.5		1.0	1.1	1.0	0.9	1.2	0.9	1.0	0.9	1.1	1.0	1.2	1.0	1
LNDI29	1.4	2.3	2.3	0.7	0.8	0.6	1.9	2.7	1.9	1.6	1.2	1.7		0.6	0.1	2.0	1.1	2.3	1.4	1.7	-0.5	2.7	1.9	2.2	1.3	1
LNDI2UN9	1.9	1.3	2.8	0.0	1.8	1.0	0.9	2.2	2.1	2.3	0.7	1.6		-1.8	1.8	2.2	0.4	2.5	2.2	2.1	-0.6	2.5	2.9	2.7	1.9	1
IT1	9.0	1.0		9.0	9.0	9.0	9.0	9.0	2.0	2.0	9.0	9.0	9.0	3.0	9.0	9.0	9.0	9.0	2.0	9.0	9.0	9.0	9.0	9.0	9.0	9
IT2	9.0	4.0		9.0	9.0	9.0	9.0	9.0	3.0	3.0	9.0	9.0	9.0	4.0	9.0	9.0	9.0	9.0	3.0	9.0	9.0	9.0	9.0	9.0	9.0	9
IT	9.0	3.0		9.0	9.0	9.0	9.0	9.0	3.0	2.0	9.0	9.0	9.0	4.0	9.0	9.0	9.0	9.0	3.0	9.0	9.0	9.0	9.0	9.0	9.0	9
LP	109.8			108.3	113.3	112.8	107.4	112.4			104.8	104.3	104.3		109.3	109.5	119.9	109.4		108.0	103.2	107.4	107.6	108.7	109.1	11
LP1	106.0			103.0	110.0	110.0	103.0	105.5			101.0	105.0	100.0		105.0	105.0	112.0	103.5		109.0	99.0	101.0	102.0	106.0	105.0	11
LP2	113.6			113.6	116.6	115.6	111.7	119.3			108.6	103.6	108.6		113.6	113.9	127.8	115.3		107.0	107.3	113.8	113.2	111.4	113.1	11
AUDPC	214.9	115.0	232.2	228.9	221.7	217.1	212.5	216.9	122.6	111.3	222.5	236.6		122.5		201.8	216.4	232.6	115.8	238.1	234.5	231.0		226.8	229.8	82
AUDPC1	204.2	96.8	232.2	225.2	220.5	211.2	198.3	213.5	127.9	99.2	212.3	225.2		122.5		201.8	215.8	231.0	124.8	236.8	234.5	231.0		221.7	229.8	82
AUDPC2	225.7	133.2		232.7	222.8	223.0	226.7	220.3	118.0	123.3	232.7	248.0					217.0	234.2	106.7	239.3				232.0		
BYDV	2.5	2.7	1.7	0.3	1.2	3.5	3.7	1.8	2.0	1.8	1.8	2.5		1.7		1.7	1.2	2.2	2.7	3.0	3.7	2.0		1.5	2.0	1
BYDV04	3.0	3.0	2.0	0.0	1.0	4.0	4.0	2.0	2.0	2.0	2.0	3.0		2.0		2.0	1.0	2.0	3.0	3.0	4.0	2.0		2.0	2.0	1

	FGENOJ9	FGENO9	B19	BLUN9	LNDI29	LNDI2UN9	IT1	IT2	IT	LP	LP1	LP2	AUDPC	AUDPC1	AUDPC2	BYDV	BYDV04	BYDV1	BYDV2	HEADING	HEADING1	HEADING2	HEIGHT	HEIGHT1	HEIGHT2	RACH_HL	RACH_HL2	RACH_H	
FDR thresh.	2.9	2.9	1E9	1E9	1E9	1E9	4.5	3.4	4.2	3.0	2.8	2.9	4.4	3.9	5.5	2.7	2.8	3.0	2.6	4.5	3.3	3.3	3.5	3.2	1E9	1E9	1E9	1E9	
1>e38m54-472	1.0	1.1	0.2	0.1	0.3	0.4	1.0	0.9	1.0	1.9	2.3	2.1	1.6	2.0	0.6	8.6	8.5	6.6	9.4	0.4	0.4	0.3	0.0	0.4	0.1	2.6	2.0	0.3	
1>e37m33-311	0.1	0.1	0.1	0.3	0.3	0.1	0.1	0.0	0.0	0.6	0.6	0.8	0.2	0.2	0.6	0.4	0.7	0.1	0.6	0.2	0.1	0.6	0.0	0.3	0.3	1.3	1.7	0.7	
1>e38m55-205	0.6	0.5	1.8	1.7	0.1	0.0	0.9	1.5	1.2	0.0	0.4	0.1	1.1	0.6	1.4	1.5	1.6	2.1	0.7	1.1	0.9	0.6	1.0	0.6	0.9	0.7	0.8	0.3	
1>e33m54-214	0.0	0.0	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.0	0.5	0.3	0.1	0.1	0.7	0.4	0.6	0.3	0.1	1.2	0.8	0.6	1.1	0.7	0.2	0.6	0.6	0.1	
1>e38m50-119	0.4	0.6	2.2	1.5	0.2	0.7	0.3	0.1	0.3	1.9	2.5	1.1	0.4	0.4	0.6	0.5	0.6	0.4	0.3	0.5	0.2	1.0	2.6	2.4	1.4	2.6	2.2	0.3	
1>e39m61-255	1.2	0.4	0.0	0.5	0.4	0.1	23.8	21.2	22.1	1.4	1.2	1.0	19.3	17.6	13.3	0.1	0.1	0.0	0.1	0.8	1.0	0.3	0.3	0.2	0.1	0.0	0.0	0.4	
1>e39m61-222	1.4	1.6	1.6	1.5	0.0	0.3	0.4	0.5	0.5	0.3	0.1	0.6	0.8	0.9	0.7	0.2	0.2	0.1	0.7	0.6	0.9	0.3	0.5	0.4	0.4	0.0	0.3	0.1	
1>e38m50-284	0.2	0.3	0.3	1.1	0.3	0.4	0.0	0.0	0.0	0.8	1.6	0.8	0.1	0.3	0.0	0.2	0.1	0.4	0.1	0.6	0.4	0.5	0.4	0.5	0.5	0.6	0.8	0.7	
1>e35m54-183	0.5	0.5	0.5	0.1	1.5	1.2	0.3	0.4	0.4	0.1	0.0	0.2	0.1	0.2	0.5	3.0	2.5	2.5	3.3	1.2	0.8	0.8	0.8	0.8	0.2	0.2	0.1	0.3	
1>e35m54-180	0.8	0.8	0.8	0.3	1.8	1.6	0.1	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.3	3.4	2.8	3.0	3.4	1.4	1.1	0.8	0.7	0.7	0.2	0.0	0.0	0.2	
2>e38m54-169	1.7	1.0	0.4	0.9	0.7	1.3	0.4	1.0	0.8	0.0	0.3	0.2	0.4	0.4	0.1	0.8	1.2	1.1	0.4	1.9	0.5	3.3	1.6	1.4	0.6	0.1	0.1	0.0	
2>e35m54-412	3.3	2.1	1.5	0.2	1.2	1.9	0.1	0.2	0.3	0.2	0.5	0.5	0.1	0.2	0.0	2.1	1.8	2.2	2.3	1.4	0.8	2.1	1.0	0.8	0.4	0.5	0.5	0.1	
2>e38m54-238	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2>e35m48-133	0.1	0.1	0.2	0.6	0.7	0.1	0.1	0.1	0.1	0.3	0.0	0.3	0.2	0.2	0.1	0.2	0.1	0.2	0.4	0.3	0.3	1.0	1.2	0.9	0.4	0.5	1.0	1.9	
2>e35m48-236	0.2	0.3	0.2	0.3	0.5	0.7	0.3	0.3	0.4	1.9	2.3	1.6	0.5	0.4	1.0	0.5	0.4	0.3	0.4	0.1	0.3	0.0	0.8	1.0	0.1	0.7	0.7	0.1	
2>e38m55-219	0.2	0.1	0.2	1.5	1.4	0.6	0.4	0.2	0.3	1.1	0.8	1.1	0.7	0.6	0.6	0.3	0.4	0.1	0.3	0.1	0.2	0.5	0.5	0.3	0.4	1.1	0.7	0.3	
2>e38m50-094	0.0	0.0	0.1	0.3	0.2	0.0	1.4	1.0	1.2	0.6	0.5	0.8	1.0	0.8	1.3	0.1	0.1	0.0	0.3	0.3	0.2	0.1	0.0	0.0	0.1	0.3	0.7	0.2	





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