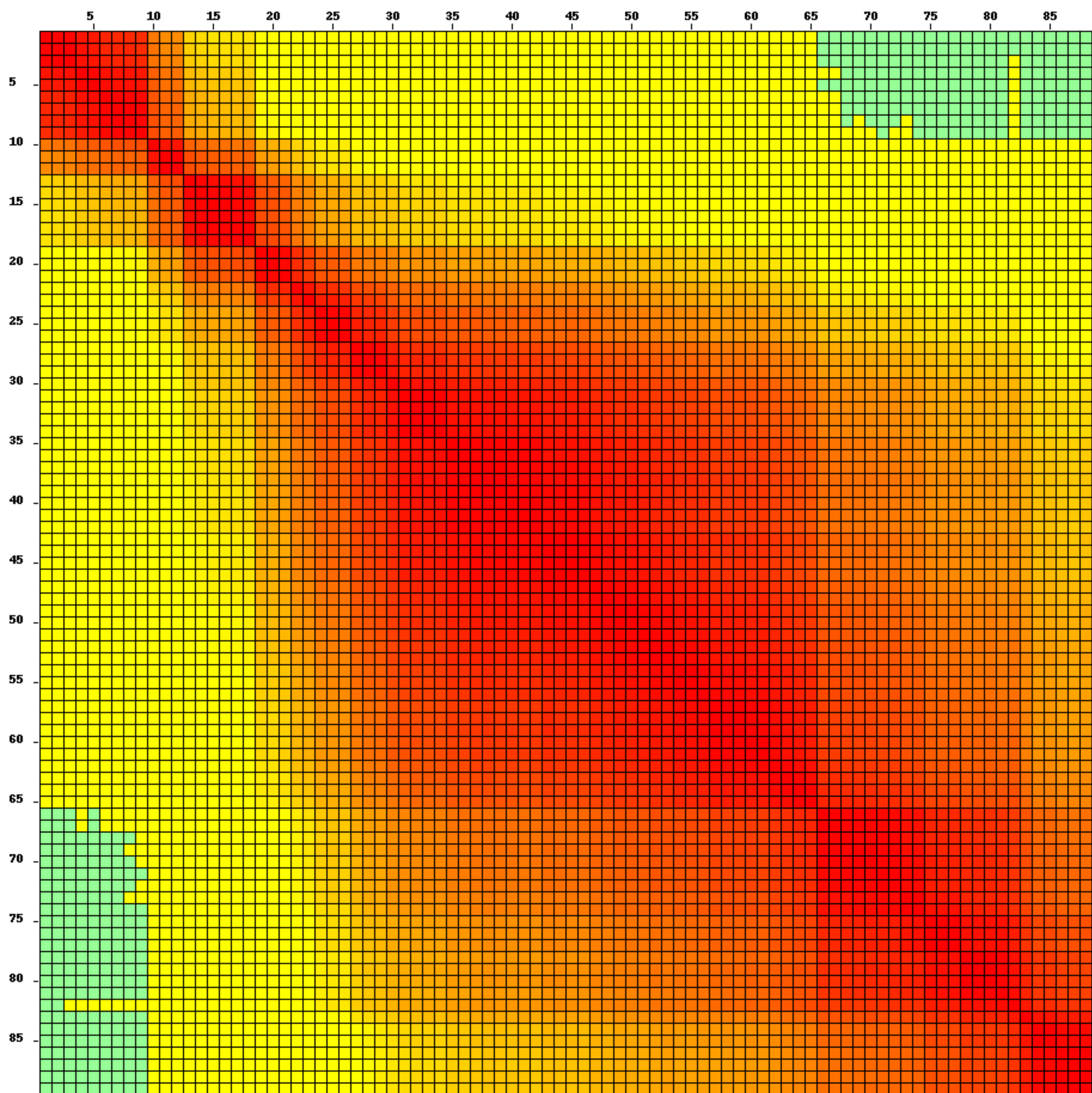


**Additional file 5. Marker genotype analysis in individuals of 70349 mapping population displayed vertically across the nine carrot linkage groups using Checkmatrix.** The full set of mapped markers (N= 894) was analyzed here. The genotypes are arranged along the x-axis and the loci are displayed in linear order along the y-axis. Red indicate parent A allele; blue indicate parent B allele; yellow indicated heterozygote loci; gray indicate missing data. For each chromosome and from right to left; the linkage group (LG) is represented graphically (with genetic distances on the right), followed by a column indicating the number of inconsistent scores (whenever present) for a given map position of the LG, followed by column listing the marker's ID. The horizontal graph in the lower part of the image shows the relative proportion of the two parental haplotypes and the number of double crossovers for each individual.

# Chromosome 1 - Page 2

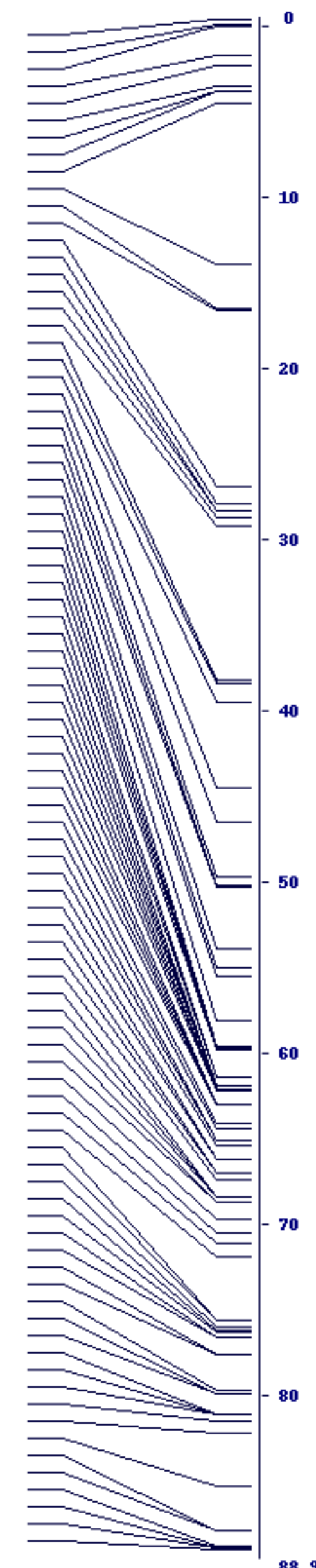
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MARKERS:

- K0900
- K1255
- K0519
- K0764
- K3583
- K1492
- K3774
- K1042
- K2018
- K2557
- K0207
- K3726
- K0209
- K2749
- K3914
- K2604
- K3679
- K1880
- K0541
- K0786
- K1845
- K0782
- K1657
- K1091
- K0166
- K1300
- K3164
- K3159
- K3732
- K3244
- K2020
- K2077
- K0797
- K0902
- K2036
- K2281
- K3488
- K3683
- K3154
- K3179
- K3755
- K1962
- K3596
- K0289
- K1664
- K0862
- K0135
- K3689
- K2709
- K3704
- K1444
- K3955
- K0408
- K0887
- K0572
- K1211
- K2495
- K1841
- K0037
- K2689
- K1319
- K0284
- K0818
- K1697
- K1934
- K1353
- K1964
- K2189
- K0189
- K1021
- K2530
- K0282
- K2014
- K0354
- K1949
- K3671
- K3793
- K3402
- K1524
- K3715
- K0028
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- K0819
- K0272/ESSR-0084
- K1374
- K2914
- K2632
- K0025

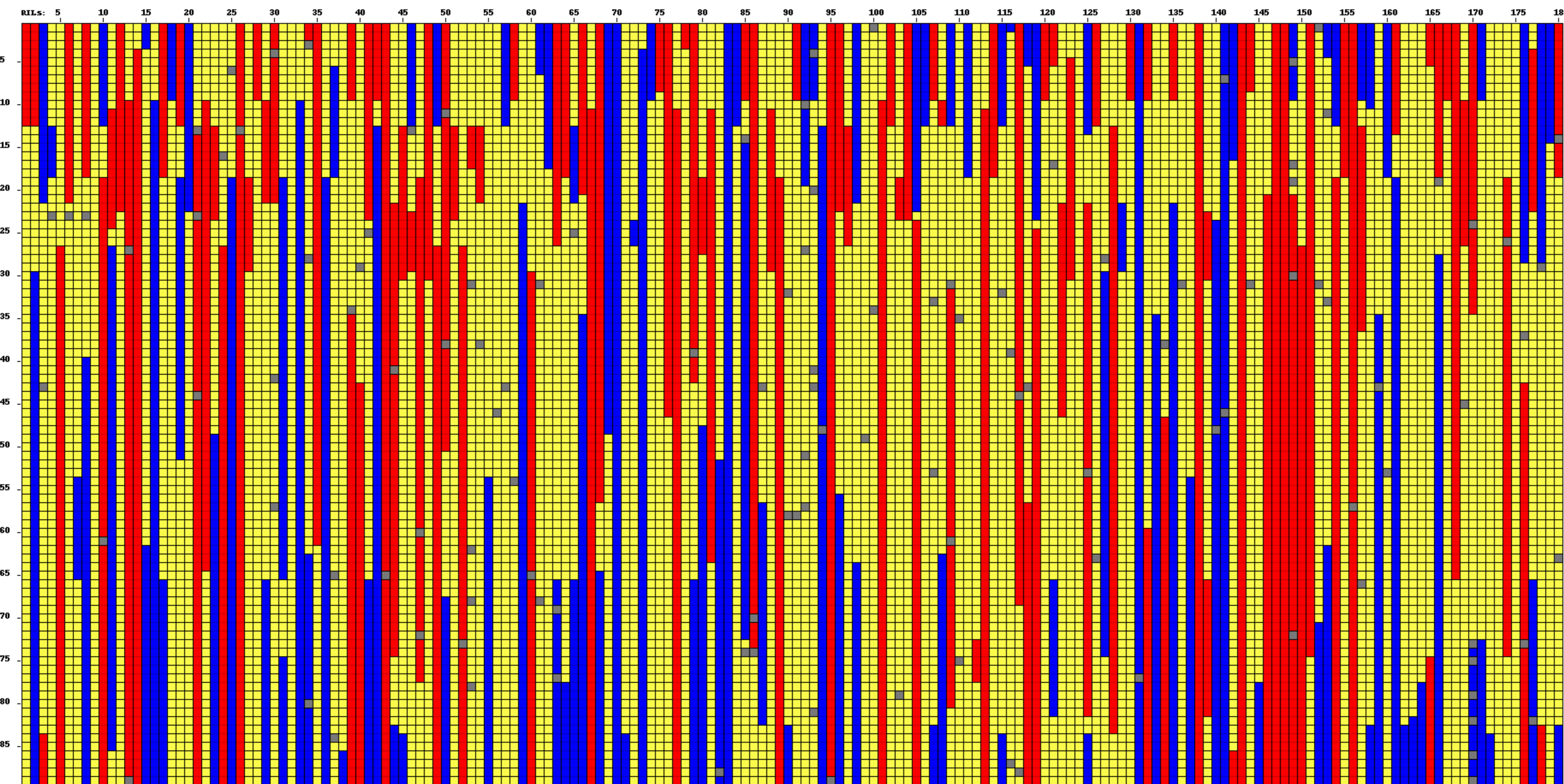
MAP:



proportion of "A" alleles

proportion of "B" alleles

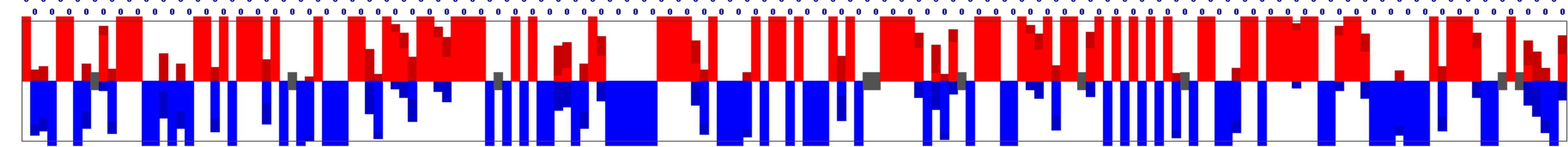
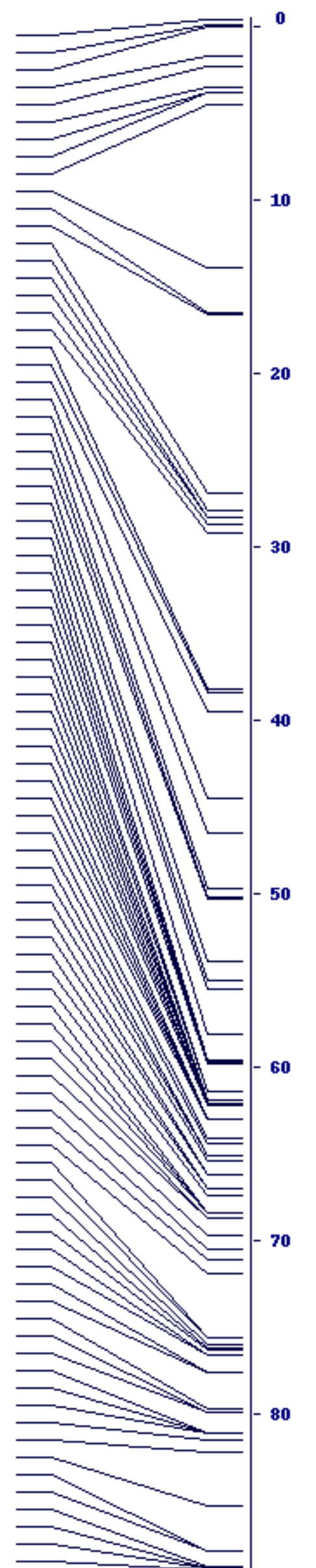
COLOR SCHEME: - A (red) - B (blue) - C : not A (green) - D : not B (orange) - H : A+B (yellow) - no data (grey)



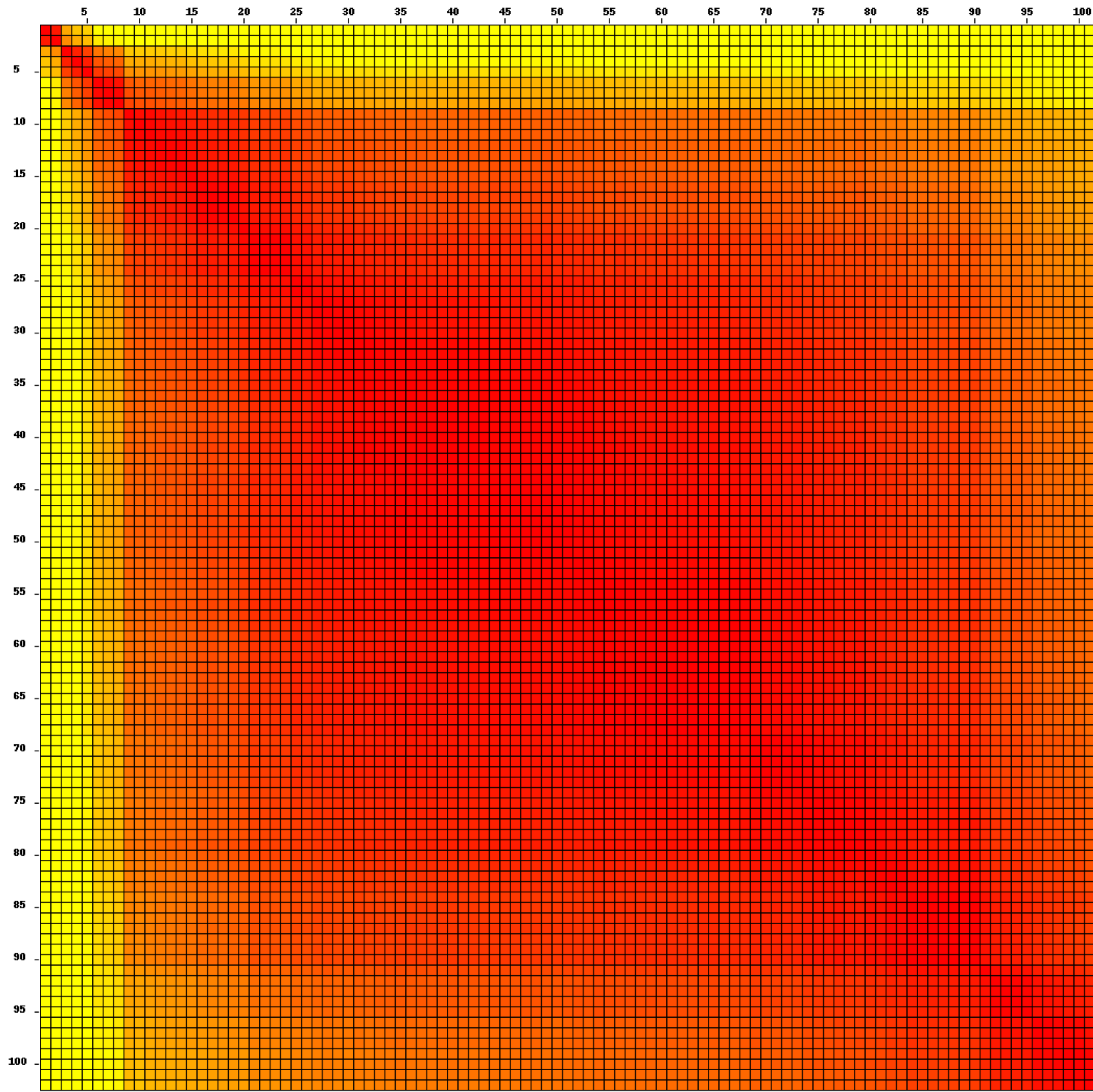
MARKERS:

- K0900 K1255 K0519 K0764 K3583 K1492 K3774 K1042 K2018 K2557 K0207 K3726 K0209 K2749 K3914 K2604 K3679 K1880 K0541 K0786 K1845 K0782 K1657 K1091 K0166 K1300 K3164 K3159 K3732 K3244 K2020 K2077 K0797 K0902 K2036 K2281 K5488 K3683 K3154 K3179 K3755 K1962 K3596 K0289 K1664 K0862 K0135 K3689 K2709 K3704 K1444 K3955 K0408 K0887 K0572 K1211 K2495 K1841 K0037 K2689 K1319 K0284 K0818 K1697 K1934 K1353 K1964 K2189 K0189 K1021 K2530 K0282 K2014 K0354 K1949 K3671 K3793 K3402 K1524 K3715 K0028 K3829 K0483 K0819 K0272/ESSR-0084 K1374 K2914 K2632 K0025

MAP:



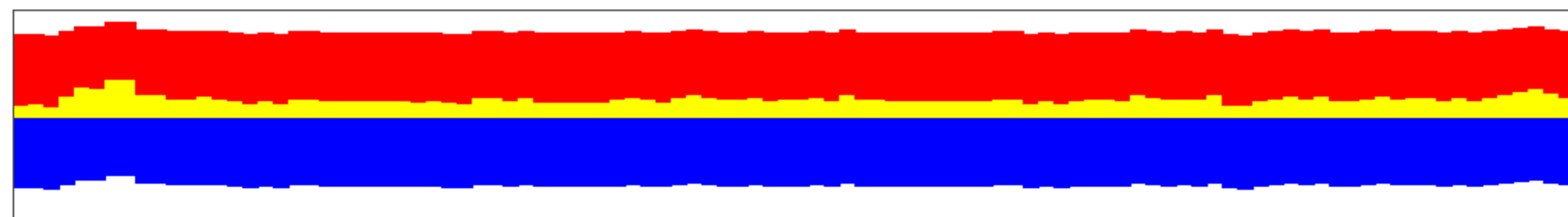
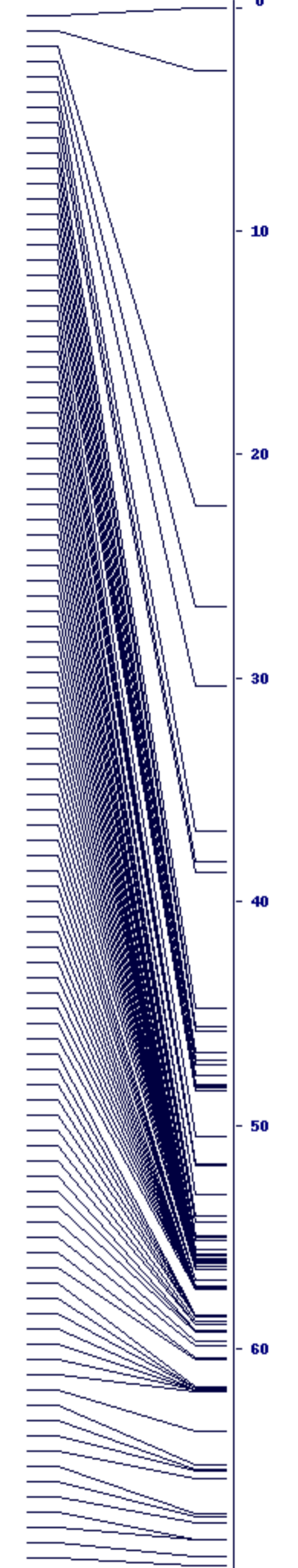
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MARKERS:

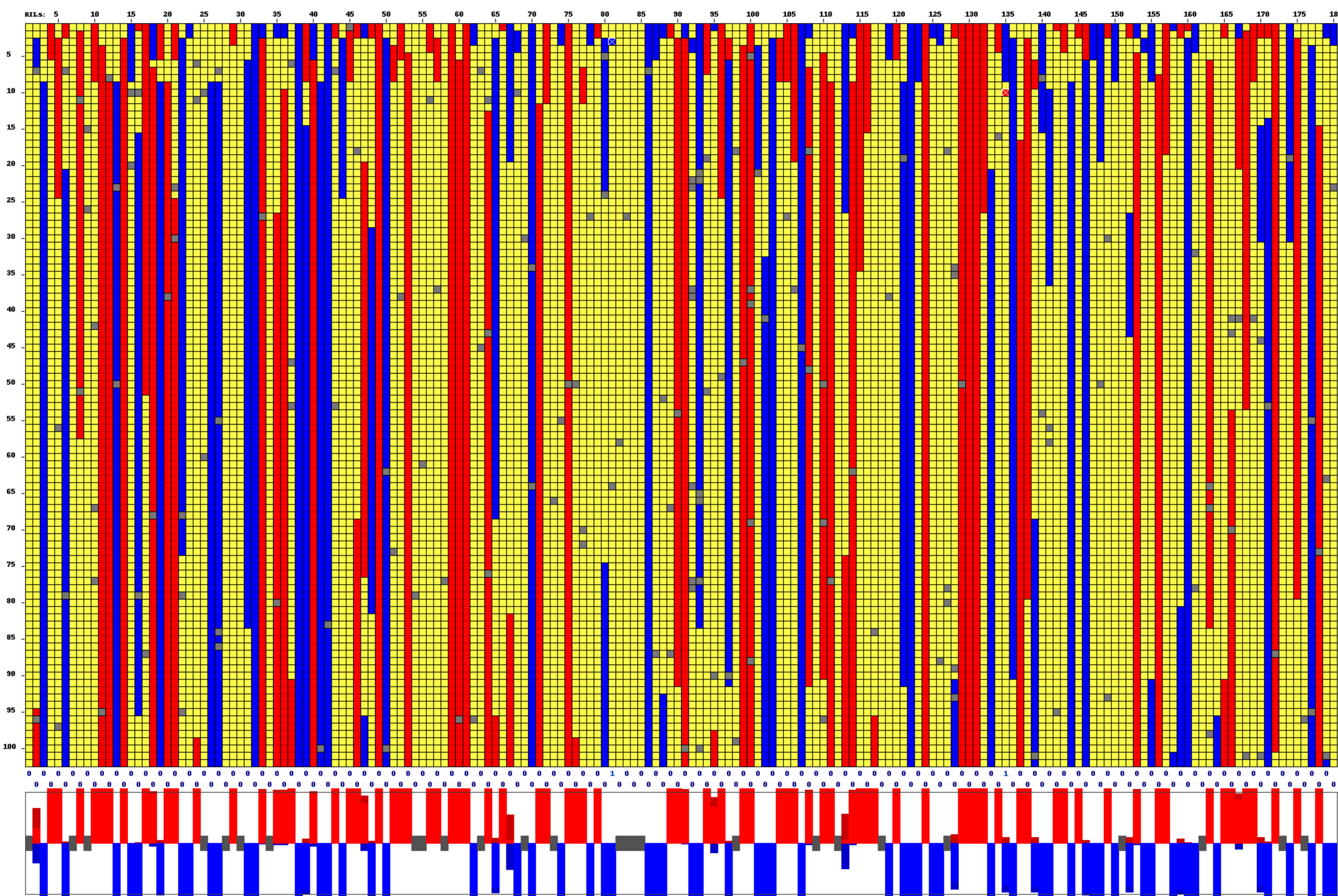
MAP:

- K1006
- K1623
- K1828
- K3849
- K4080
- K3263
- K1189
- K0855
- K3493
- K3438
- K1853
- K0812
- K0220
- K3655
- K3753
- K3894
- K2761
- K2821
- K4077
- K3646
- K1707
- K4069
- K2816
- K2963
- K2024
- K2479
- K2376
- K4088
- K1961
- K3535
- K1007
- K2730
- K2389
- K3839
- K1443
- K3046
- K1159
- K2780
- K2764
- K2368
- K2124
- K3049
- K2174
- K3711
- K1525
- K3572
- K1939
- K1024
- K2666
- K2342
- K0884
- K3684
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- K1861
- K3422
- K2946
- K1251
- K1376
- K0003
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- K2889
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- K3791
- K3283
- K4026
- K0677
- K0161
- K0693
- K3275
- K3483
- K3358
- K1787
- K3607
- K3503
- K0364
- K0923
- K2834
- K0336
- K3194
- K2952
- K1987
- K3333
- K4025
- K2129
- K0970
- K0427
- K0703
- K0896
- K0044
- K1988
- K1384
- K0673
- K0420
- K3115
- K1896
- K2886
- K1413
- K3328
- K2669
- K0723
- K0522
- K3340



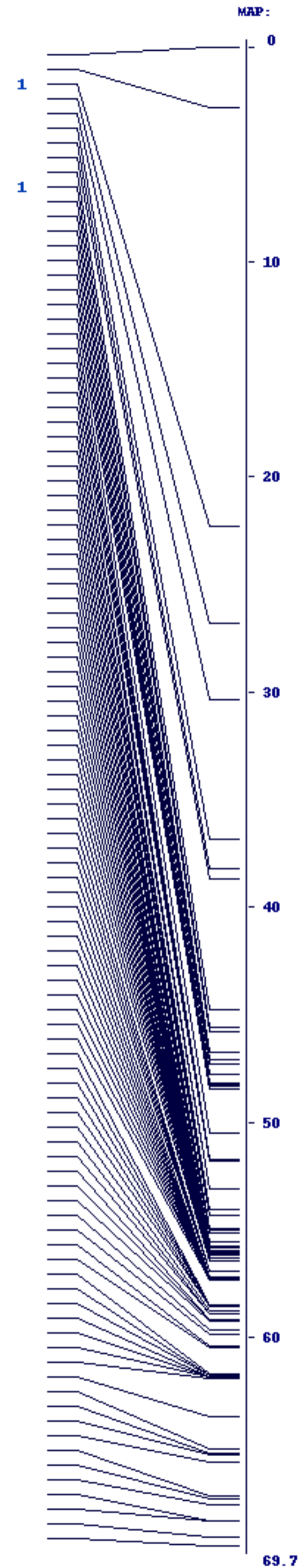
proportion of "A" alleles  
proportion of "B" alleles

COLOR SCHEME: - A (red) - B (blue) - C : not A (green) - D : not B (orange) - K : A+B (yellow) - no data (grey)



MARKERS:

- K1006
- K1623
- K1828
- K3849
- K4080
- K3263
- K1189
- K0855
- K3493
- K3438
- K1853
- K0812
- K0220
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- K4077
- K3646
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- K4069
- K2816
- K2963
- K2024
- K2479
- K2376
- K4088
- K1961
- K3535
- K1007
- K2730
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- K1987
- K3333
- K4025
- K2129
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- K1989
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- K0673
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- K0723
- K0522
- K3340

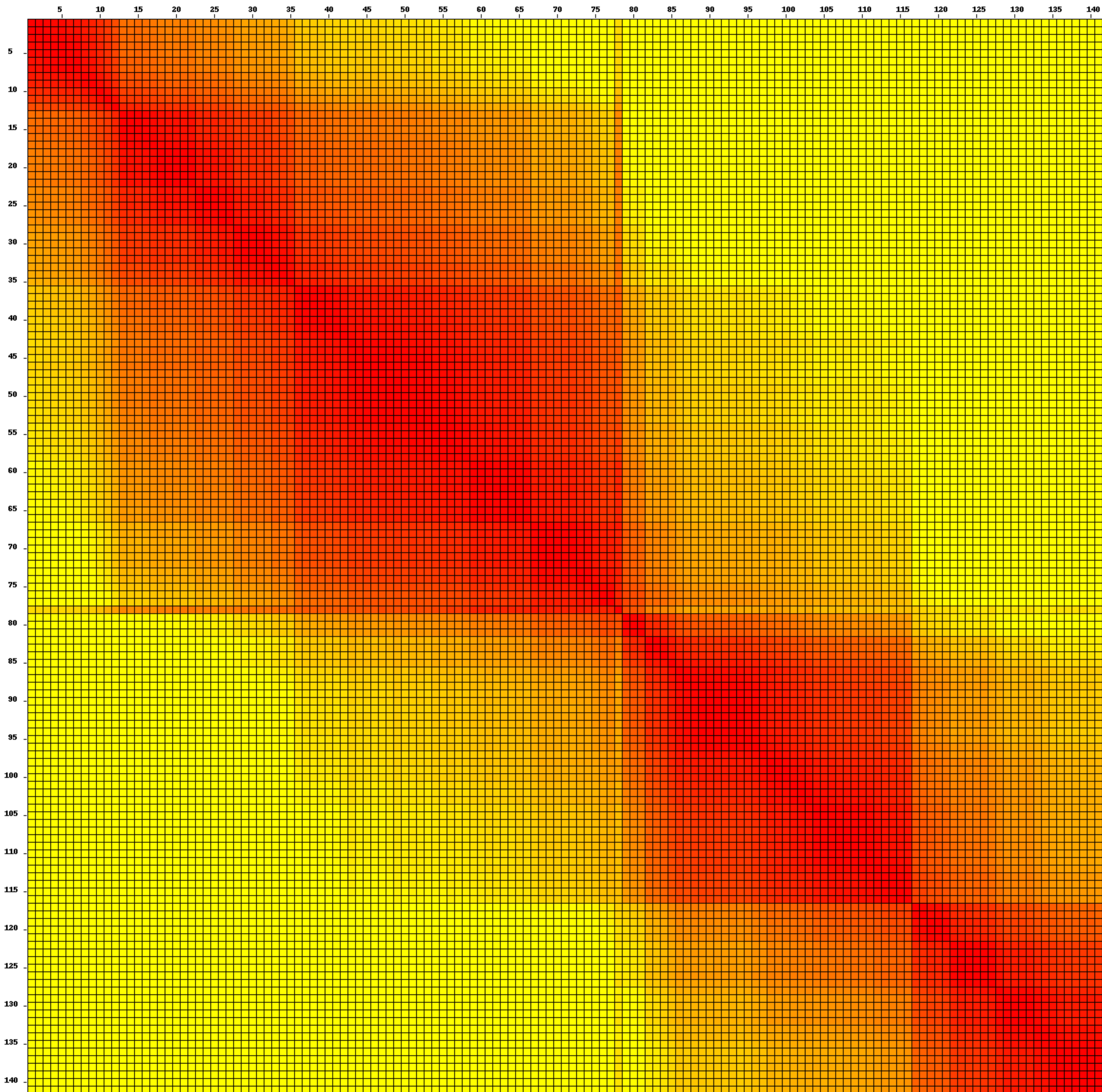


number of double cross overs

proportion of "A" genotype

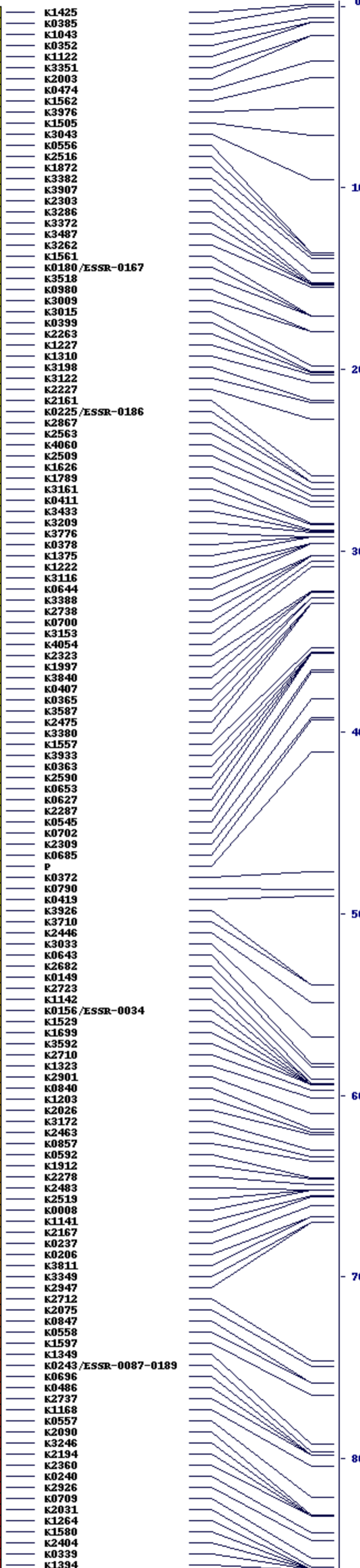
proportion of "B" genotype

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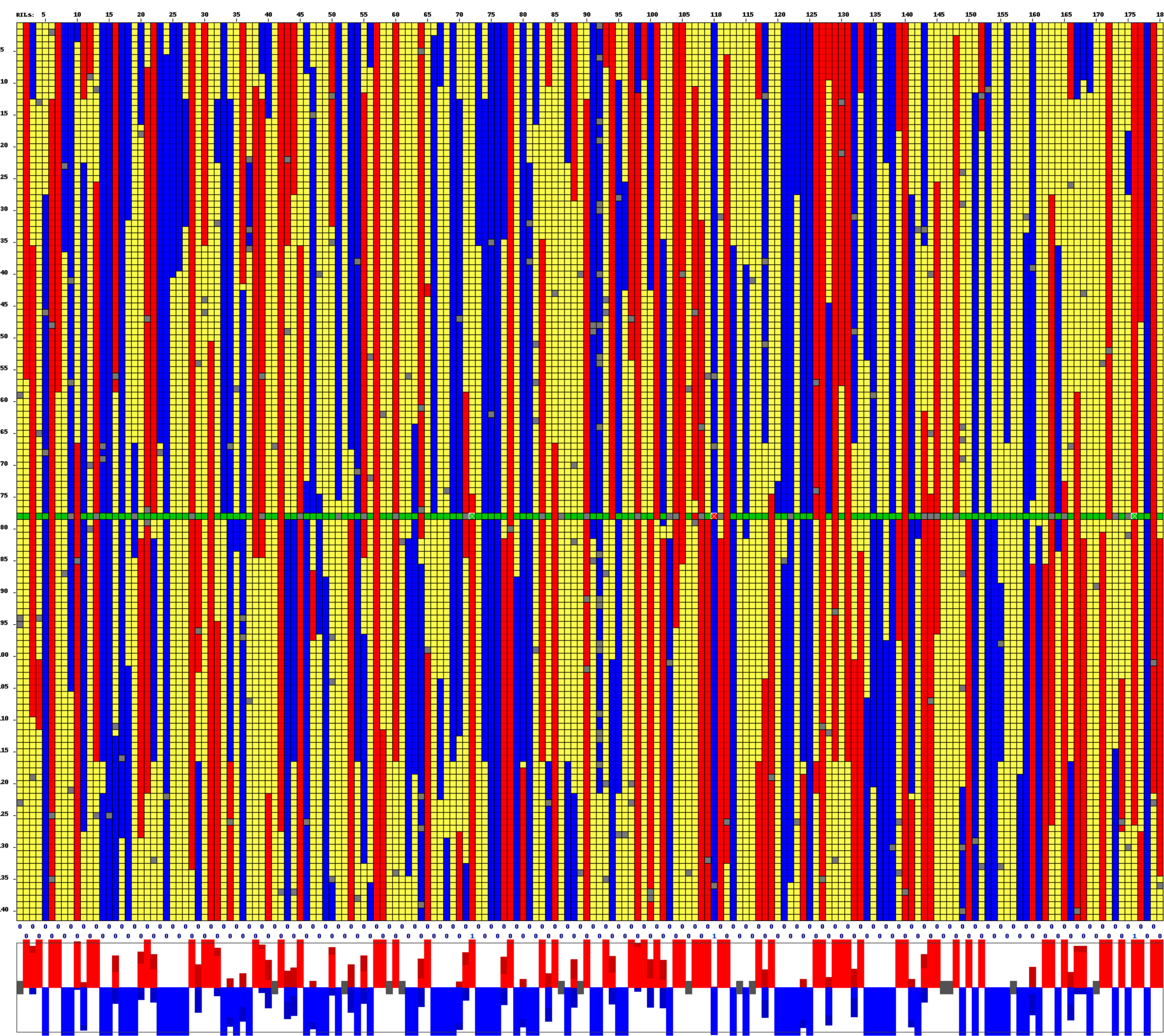
MARKERS:

MAP:



proportion of "A" alleles  
proportion of "B" alleles

COLOR SCHEME: - A (red) - B (blue) - C : not A (green) - D : not B (orange) - H : A+B (yellow) - no data (grey)



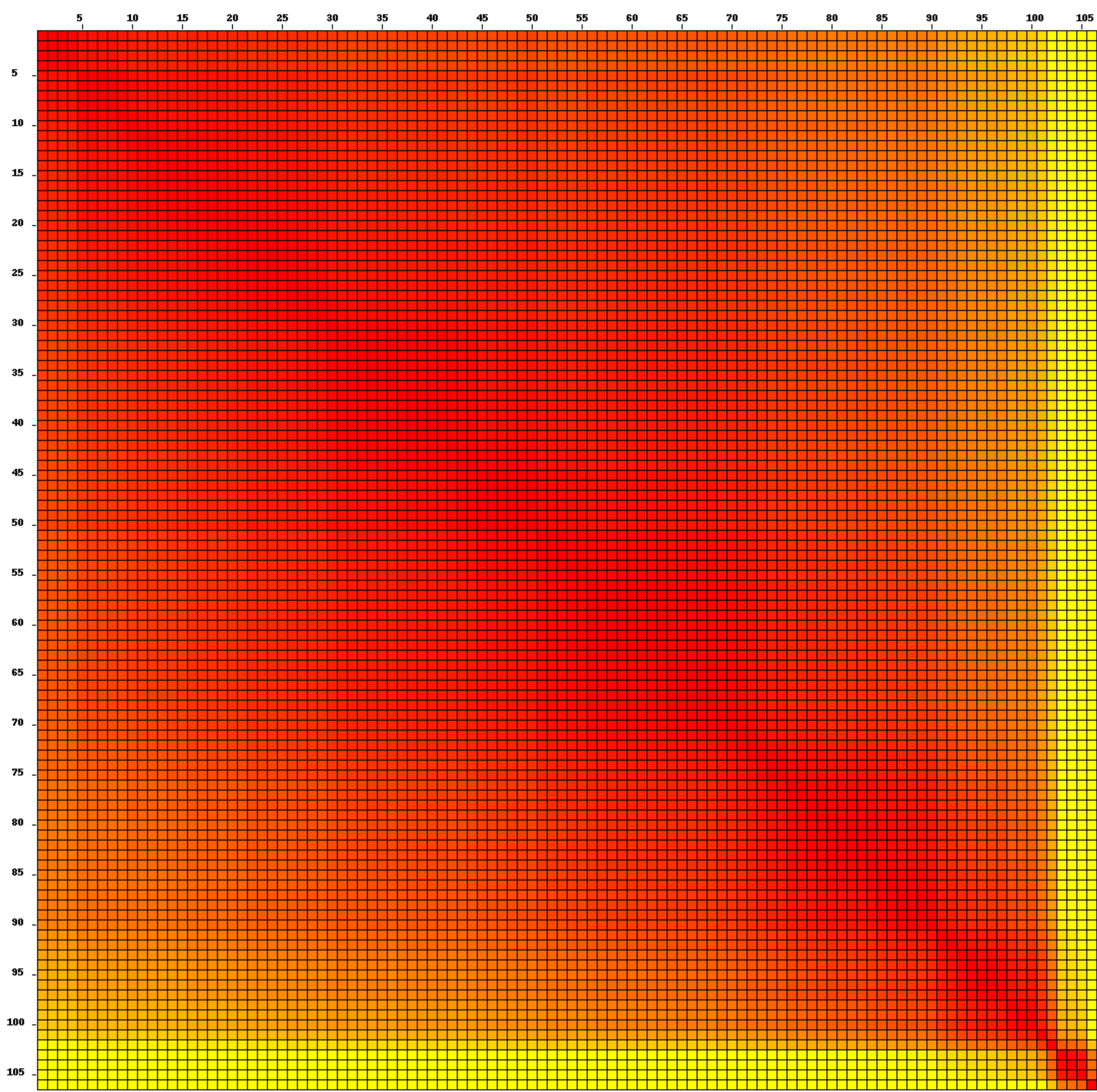
MARKERS:

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- K0385
- K1043
- K0352
- K1122
- K3351
- K2003
- K0474
- K1562
- K3976
- K1505
- K3043
- K0556
- K2516
- K1872
- K3382
- K3907
- K2303
- K3286
- K3372
- K3487
- K3262
- K1581
- K0180/ESSR-0167
- K3518
- K0980
- K3005
- K3015
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- K2263
- K1227
- K1310
- K3198
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- K0696
- K0486
- K2737
- K1168
- K0557
- K2090
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- K2194
- K2350
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- K0709
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- K0339
- K1394

MAP:



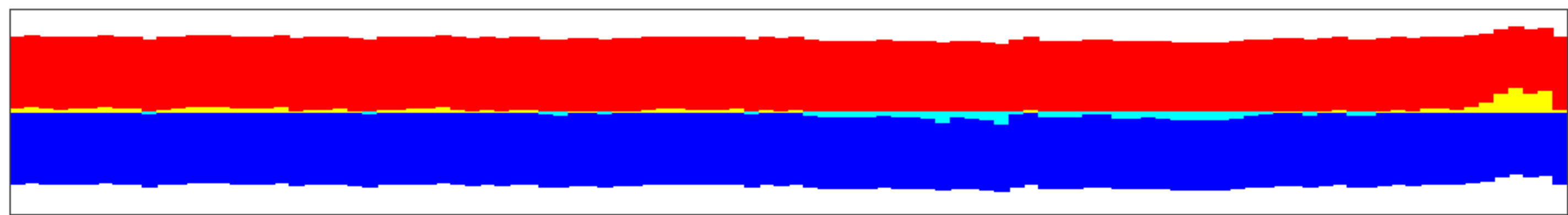
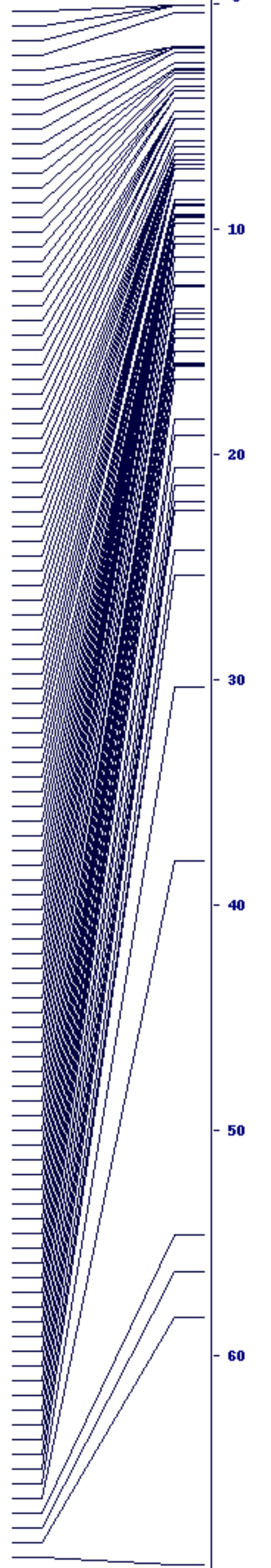
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MARKERS:

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- K3844
- K1909
- K3223
- K1191
- K1000
- K0288
- K3305
- K2943
- K1342
- K3326
- K3977
- K3278
- K3436
- K2037
- K3983
- K2621
- K1766
- K3455
- K2369
- K3442
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- K1679
- K3013
- K4076
- K3534
- K2486
- K1901
- K1905
- K1048
- K1790
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- K1618
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- K0463
- K1374
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- K1429
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- K0440
- K0435
- K0362
- K2146
- K3870
- K0792
- K3660
- K0628
- K1659
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- K2422
- K3851
- K1509
- K2522
- K2691
- K3175
- K3070
- K0670
- K2254
- K3687
- K1837
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- K3591
- K3873
- K3257
- K0204
- K2741
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- K2306

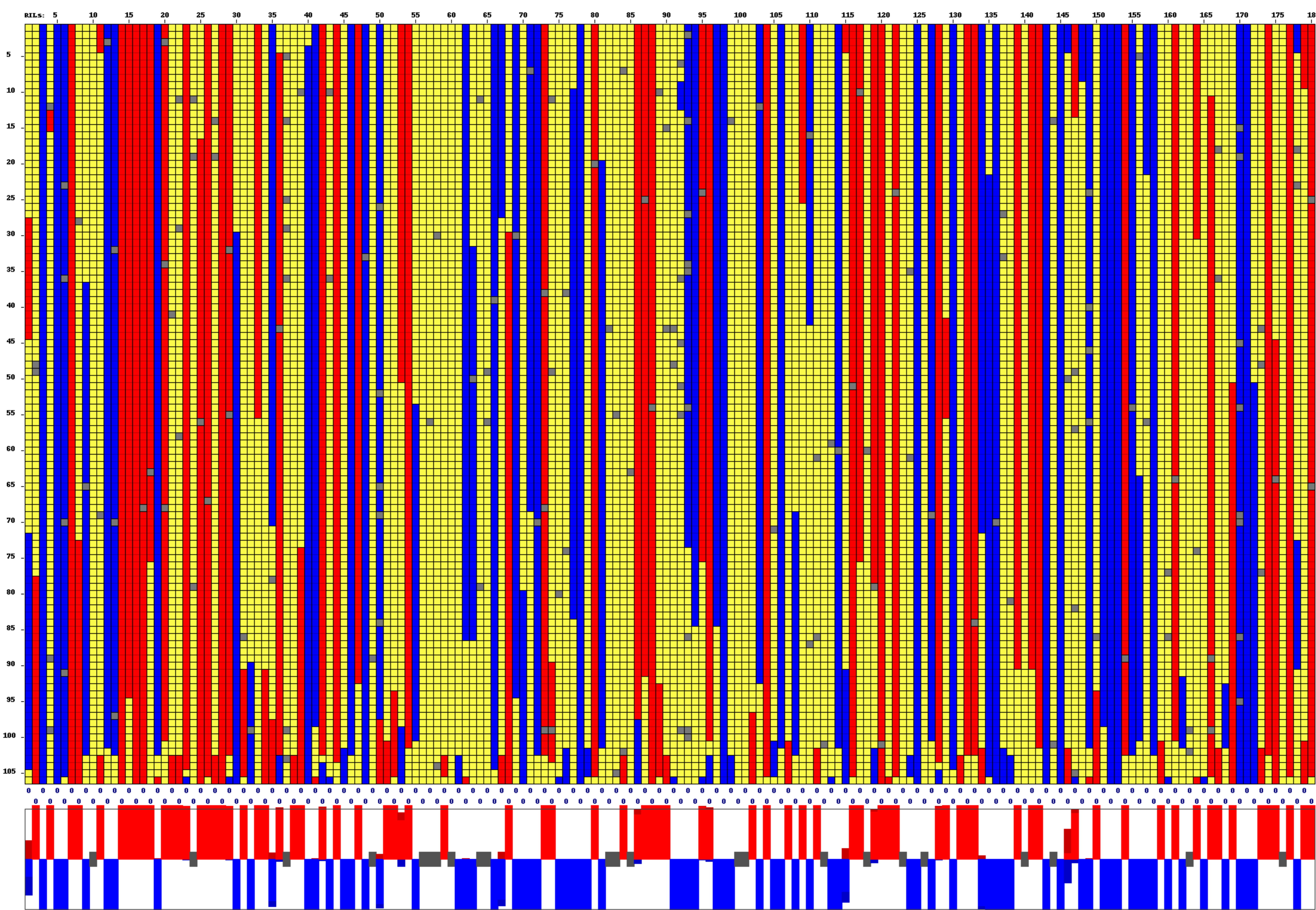
MAP:



proportion of "A" alleles  
proportion of "B" alleles



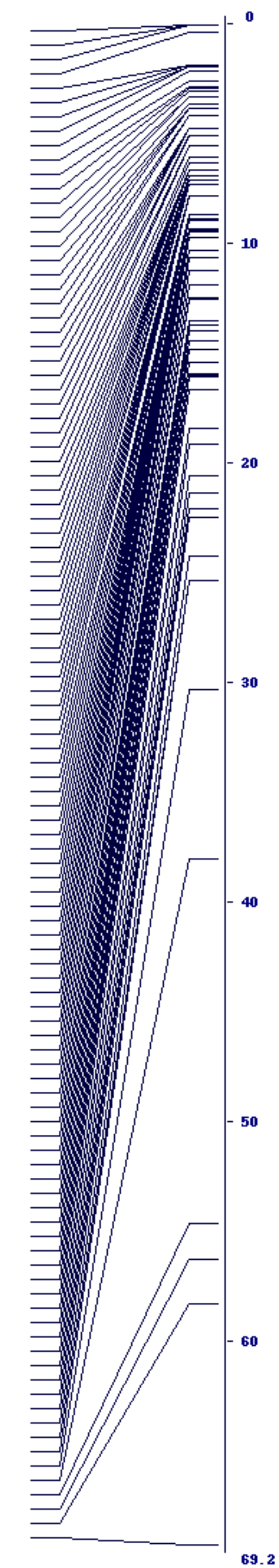
COLOR SCHEME: - A (red), - B (blue), - C : not A (green), - D : not B (orange), - K : A+B (yellow), - no data (grey)



MARKERS:

- K0623
- K3742
- K3844
- K3223
- K1191
- K1000
- K0288
- K3305
- K2943
- K1342
- K3326
- K3977
- K3278
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- K2037
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- K3455
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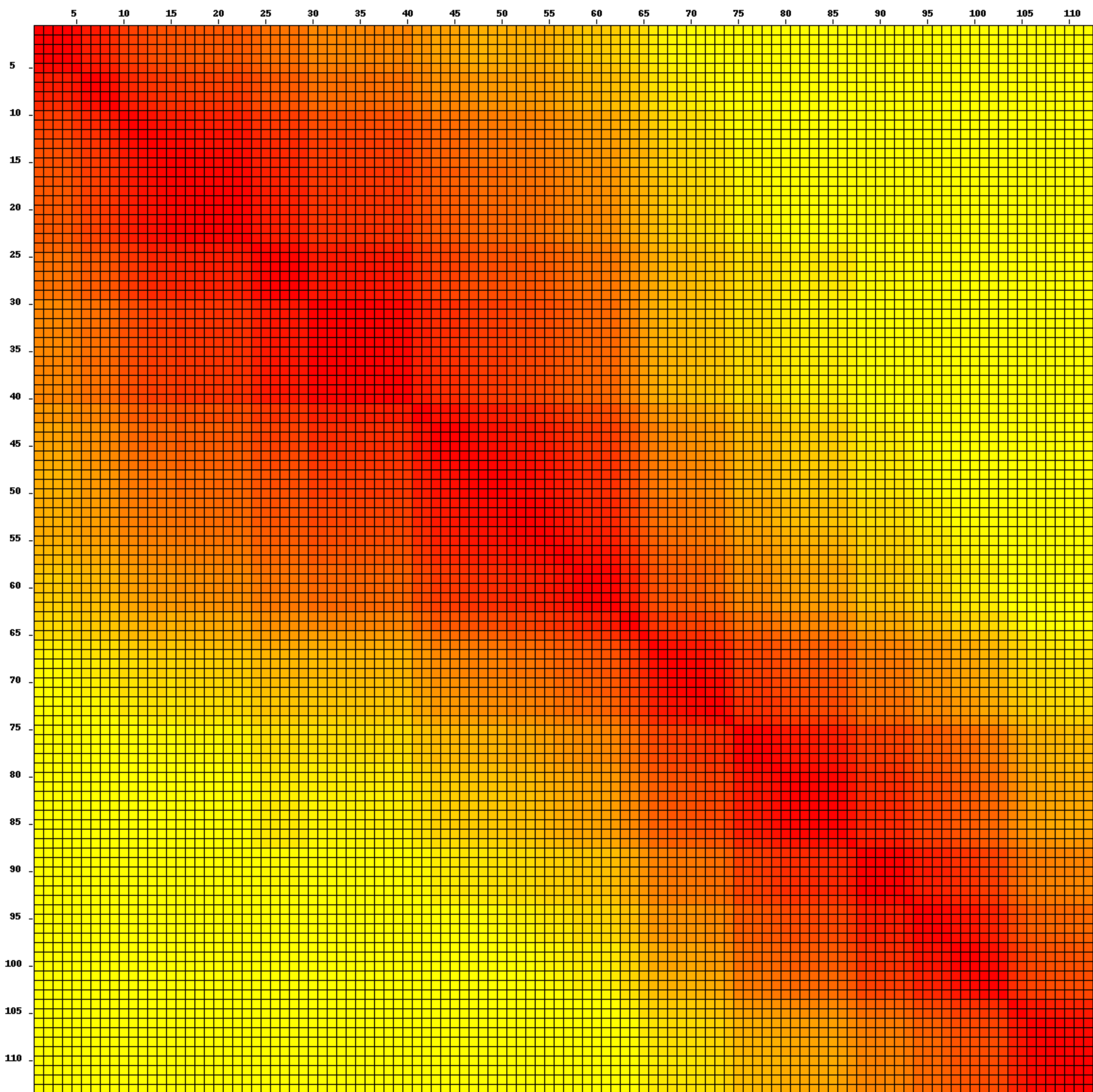
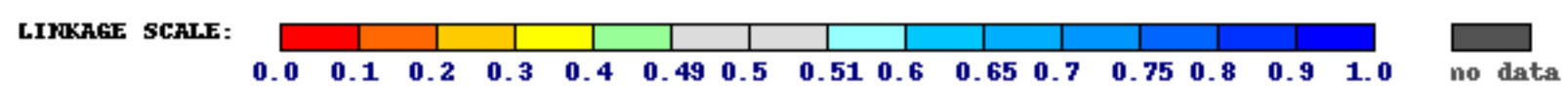
MAP:



number of double cross overs

proportion of "A" genotype

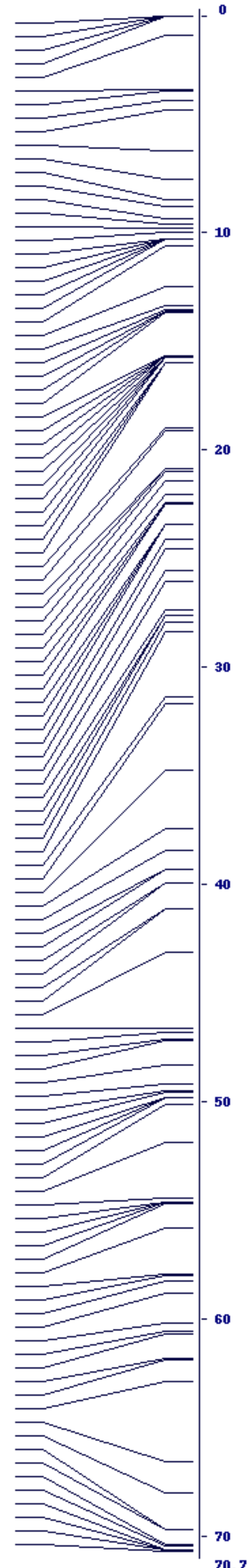
proportion of "B" genotype



MARKERS:

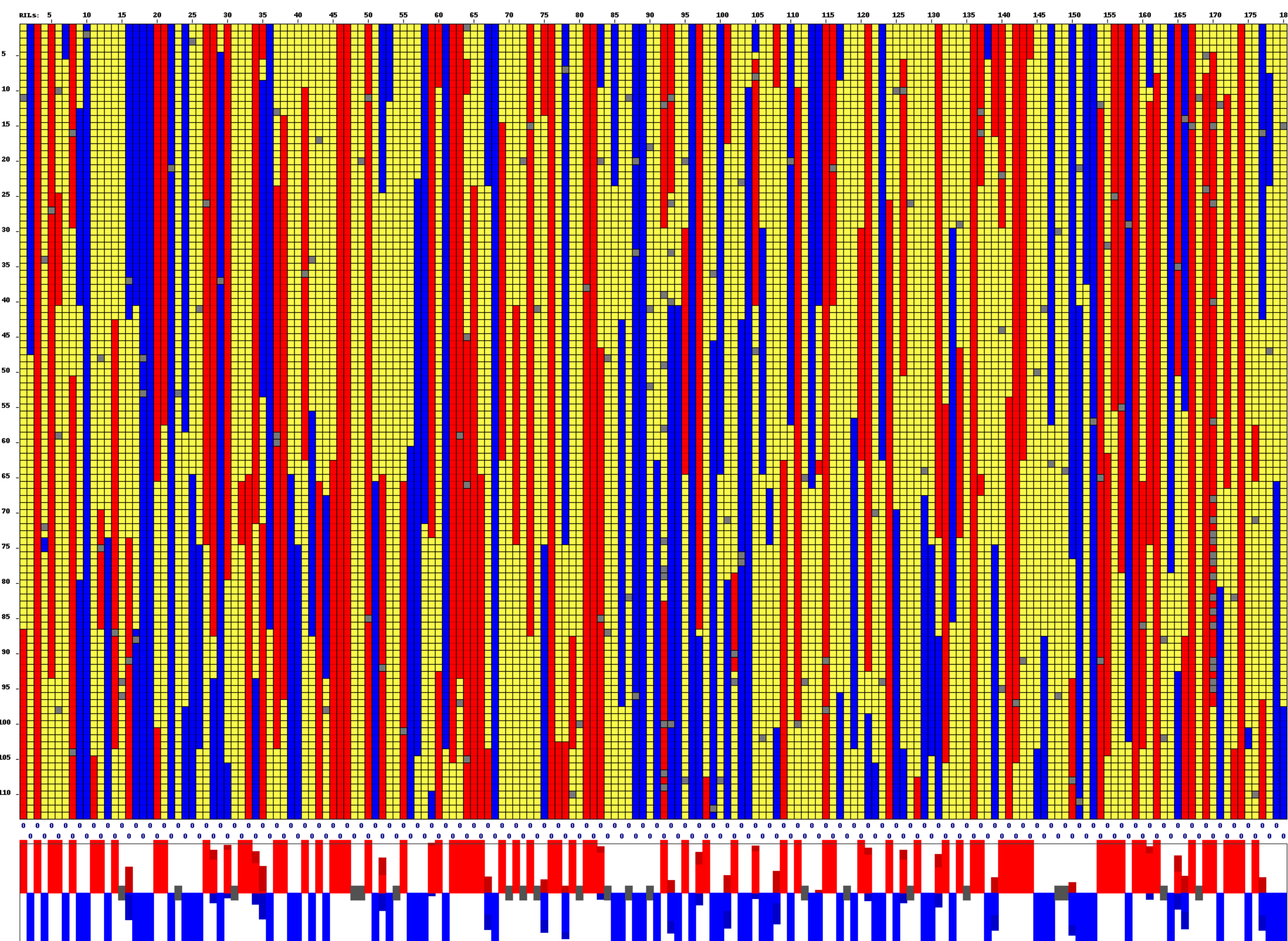
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- K0421
- K3303
- K2170
- K3509
- K1156
- K2051
- K3781
- K4018
- K3163
- K1051
- K3281
- K3214
- K3500
- K2619
- K2513
- K0674
- K0021
- K0322
- K1696
- K2996
- K0796
- K1193
- K3031
- K3578
- K3706
- K1514
- K3964
- K3661
- K3053
- K3962
- K2651
- K2182
- K2226
- K0800
- K3371
- K3853
- K2313
- K3529
- K1398
- K3699
- K3649
- K2019
- K2219
- K0775
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- K0917
- K0013
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- K2040
- K0506
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- K4065
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- K2258
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- K4079
- K0299
- K0441
- K0007
- K1613
- K2879
- K1235
- K1817
- K0119/ESSR-0011
- K0957
- K2694
- K2112
- K0570
- K0531
- K0624
- K2989
- K2114
- K1063
- K1068
- K1487
- K3490
- K0105
- K0827
- K1247
- K0873
- K2562
- K1439
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- K1299
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- K0772
- K0705
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- K0439
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- K1100
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- K2462
- K1582
- K1341

MAP:



proportion of "A" alleles  
proportion of "B" alleles

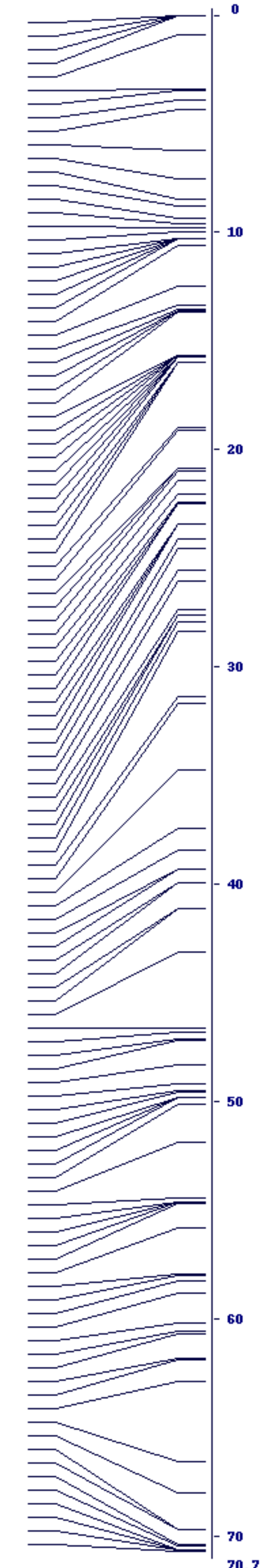
COLOR SCHEME: - A (red), - B (blue), - c : not A (green), - D : not B (orange), - H : A+B (yellow), - no data (grey)



MARKERS:

- K1319
- K0421
- K3303
- K2170
- K3509
- K1156
- K2051
- K3781
- K4018
- K3163
- K1051
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- K0021
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- K0425
- K1832
- K2548
- K3638
- K1297
- K1508
- K0340
- K2531
- K0439
- K1034
- K1225
- K1100
- K0047
- K2462
- K1582
- K1341

MAP:

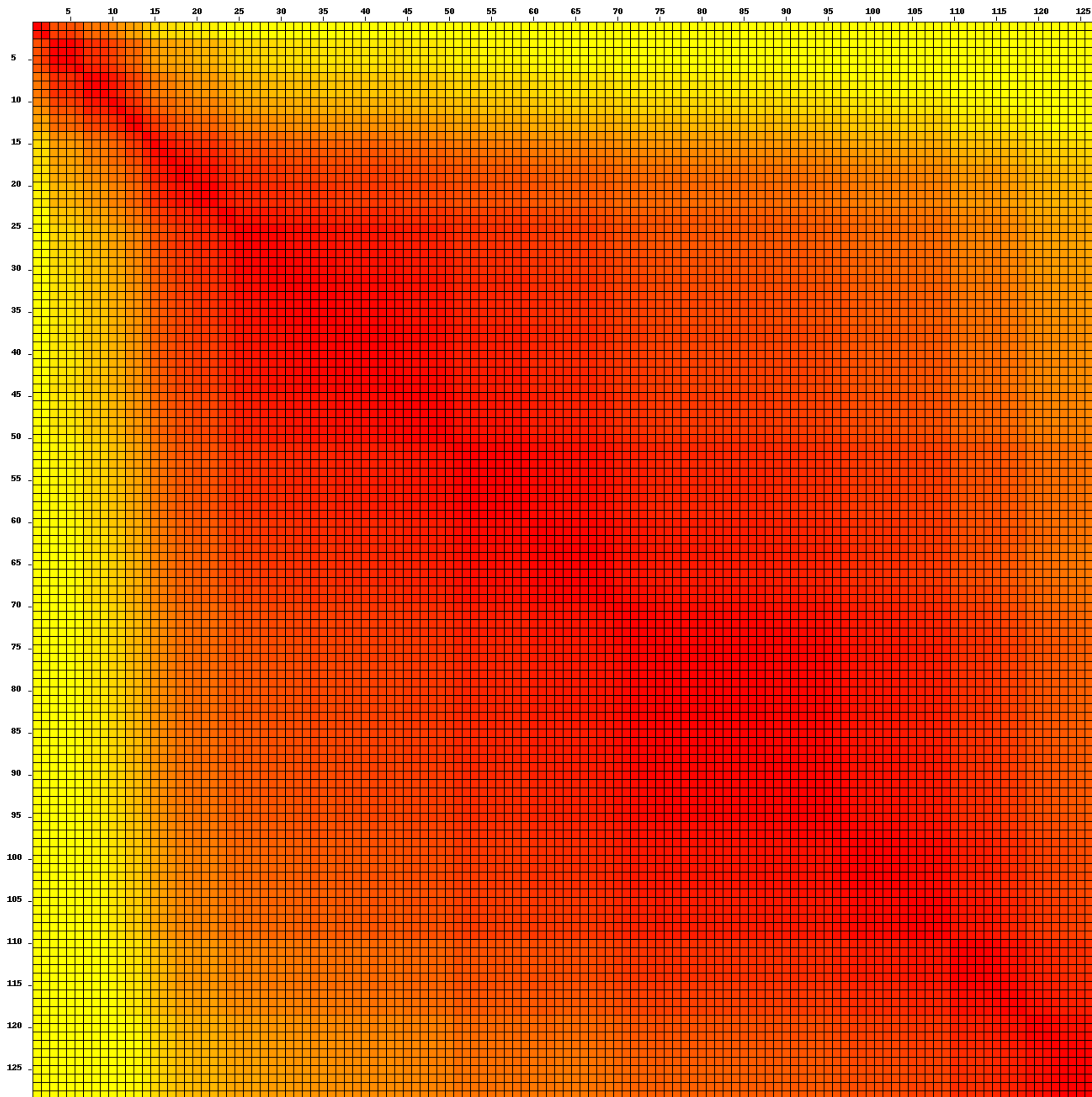


number of double cross overs

proportion of "A" genotype

proportion of "B" genotype

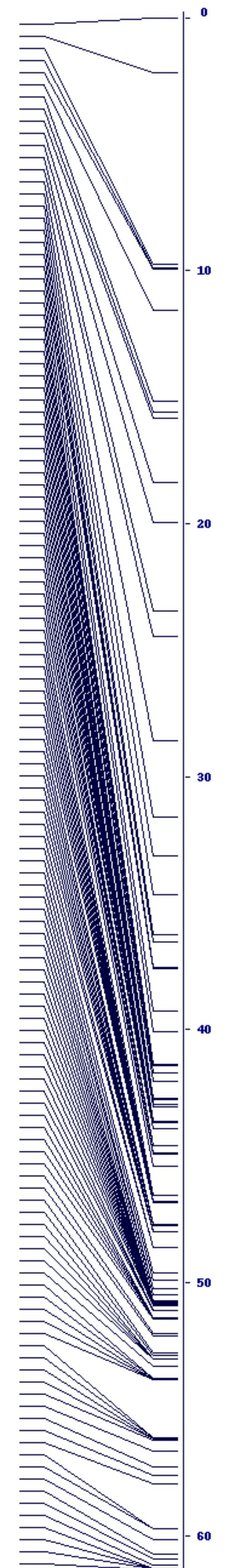
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MARKERS:

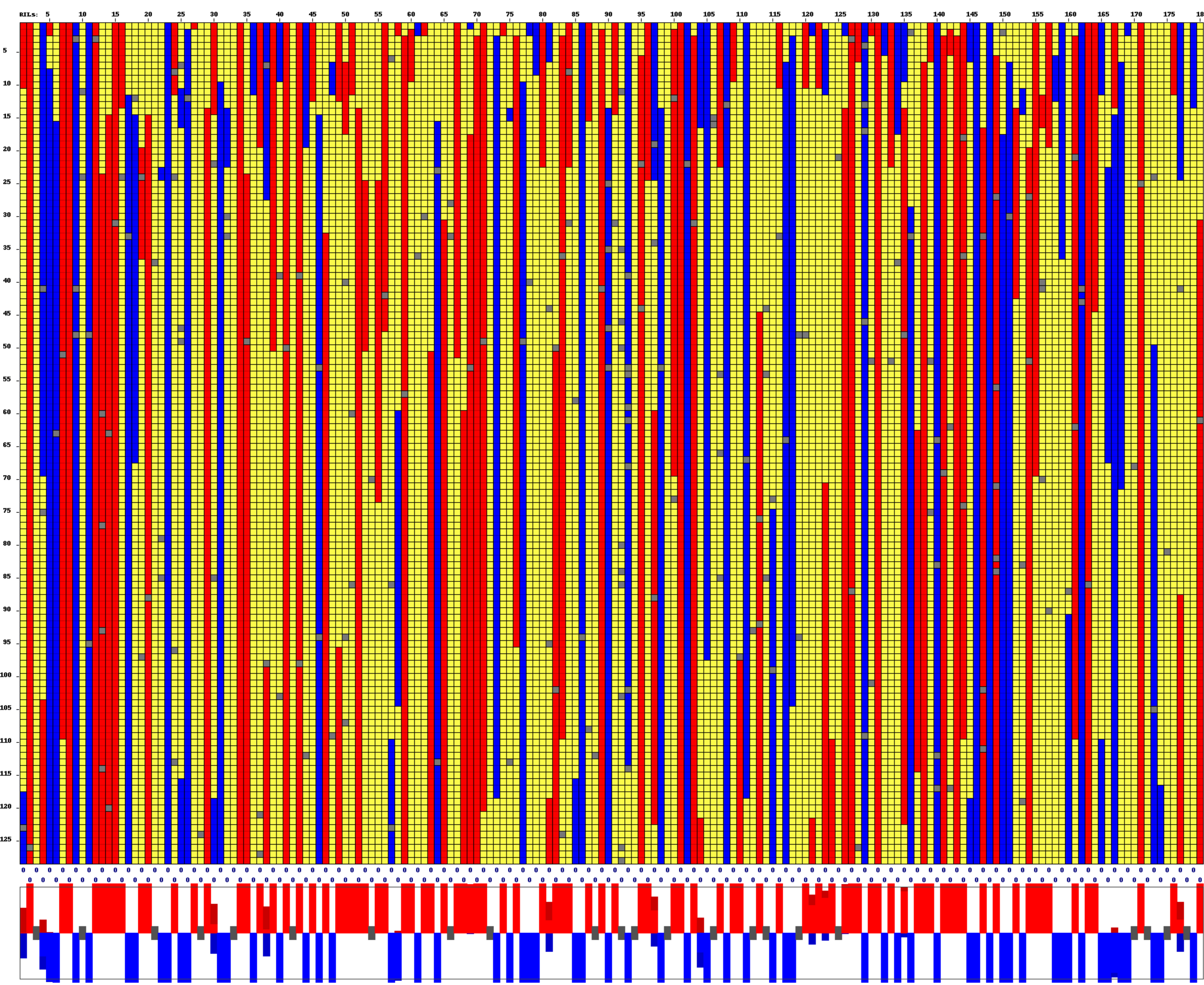
- K1768
- K0264/ESSR-0080
- K2585
- K2288
- K2520
- K2419
- K2882
- K1989
- K1102
- K0103
- K0497
- K0579
- K1700
- K0140/ESSR-0073
- K2581
- K2582
- K0542
- K2930
- K3691
- K0290/ESSR-0183
- K1229
- K0320
- K2388
- K1778
- K0102
- K2082
- K3624
- K3138
- K2662
- K3006
- K3334
- K3981
- K0212
- K0507
- K0646
- K0740
- K0910
- K3863
- K0266/ESSR-0136
- K0715
- K3959
- K2064
- K1516
- K2909
- K1559
- K0815
- K1953
- K1369
- K2829
- K0543
- K2430
- K1087
- K3464
- K3718
- K0281
- K0447
- K0160
- K3403
- K4050
- K2321
- K3966
- K2120
- K4036
- K0601
- K2028
- K1224
- K0024
- K3415
- K2617
- K2521
- K2494
- K2874
- K0890
- K2555
- K0738
- K1435
- K3973
- K2125
- K1549
- K0809
- K1106
- K0293
- K2474
- K0763
- K2857
- K1534
- K2864
- K1947
- K0959
- K0111
- K0371
- K1797
- K1132
- K0766
- K3812
- K1035
- K1593
- K2264
- K2842
- K3512
- K0479
- K2654
- K2228
- K1621
- K0218
- K1248
- K1104
- K1155
- K2514
- K0148
- K1133
- K0780
- K4028
- K2885
- K2791
- K0788
- K0527
- K0893
- K1966
- K0390
- K3183
- K3520
- K2542
- K2854
- K0280
- K2980
- K1926
- K2667

MAP:



proportion of "A" alleles  
proportion of "B" alleles

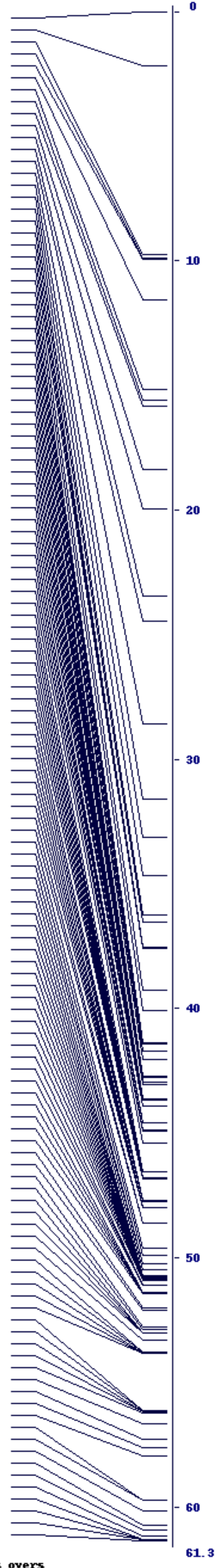
COLOR SCHEME: - A (red) - B (blue) - C : not A (green) - D : not B (orange) - K : A+B (yellow) - no data (grey)



MARKERS:

- K1768
- K0264/ESSR-0080
- K2585
- K2288
- K2520
- K2419
- K2882
- K1389
- K1102
- K0103
- K0497
- K0579
- K1700
- K0140/ESSR-0073
- K2581
- K2582
- K0542
- K2930
- K3691
- K0290/ESSR-0183
- K1229
- K0320
- K2388
- K1778
- K0102
- K2082
- K3624
- K3138
- K2662
- K3006
- K3334
- K3981
- K0212
- K0507
- K0646
- K0740
- K0910
- K3863
- K0266/ESSR-0136
- K0715
- K2393
- K2064
- K1516
- K2909
- K1559
- K0815
- K1953
- K1369
- K2829
- K0543
- K2430
- K1087
- K3464
- K3718
- K0281
- K0447
- K0160
- K3403
- K4050
- K2321
- K3966
- K2120
- K4036
- K0601
- K2028
- K1224
- K0024
- K3415
- K2617
- K2521
- K2494
- K2874
- K0890
- K2535
- K0738
- K1435
- K3973
- K2125
- K1549
- K0809
- K1106
- K0293
- K2474
- K0763
- K2857
- K1534
- K2864
- K1947
- K0959
- K0111
- K0371
- K1797
- K1132
- K0766
- K3812
- K1035
- K1593
- K2264
- K2842
- K3512
- K0479
- K2654
- K2228
- K1621
- K0218
- K1248
- K1104
- K1155
- K2514
- K0148
- K1133
- K0780
- K4028
- K2885
- K2791
- K0788
- K0527
- K0893
- K1966
- K0390
- K3183
- K3520
- K2542
- K2654
- K0280
- K2980
- K1926
- K2667

MAP:



number of double cross overs

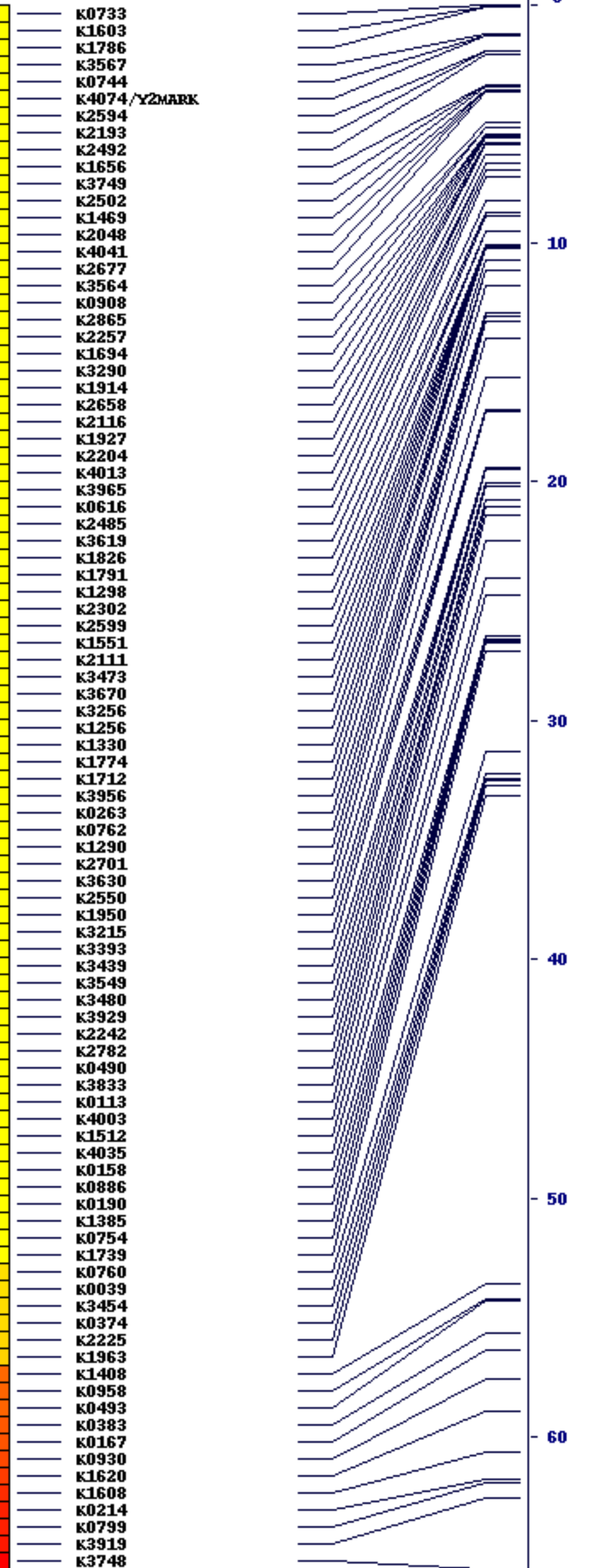
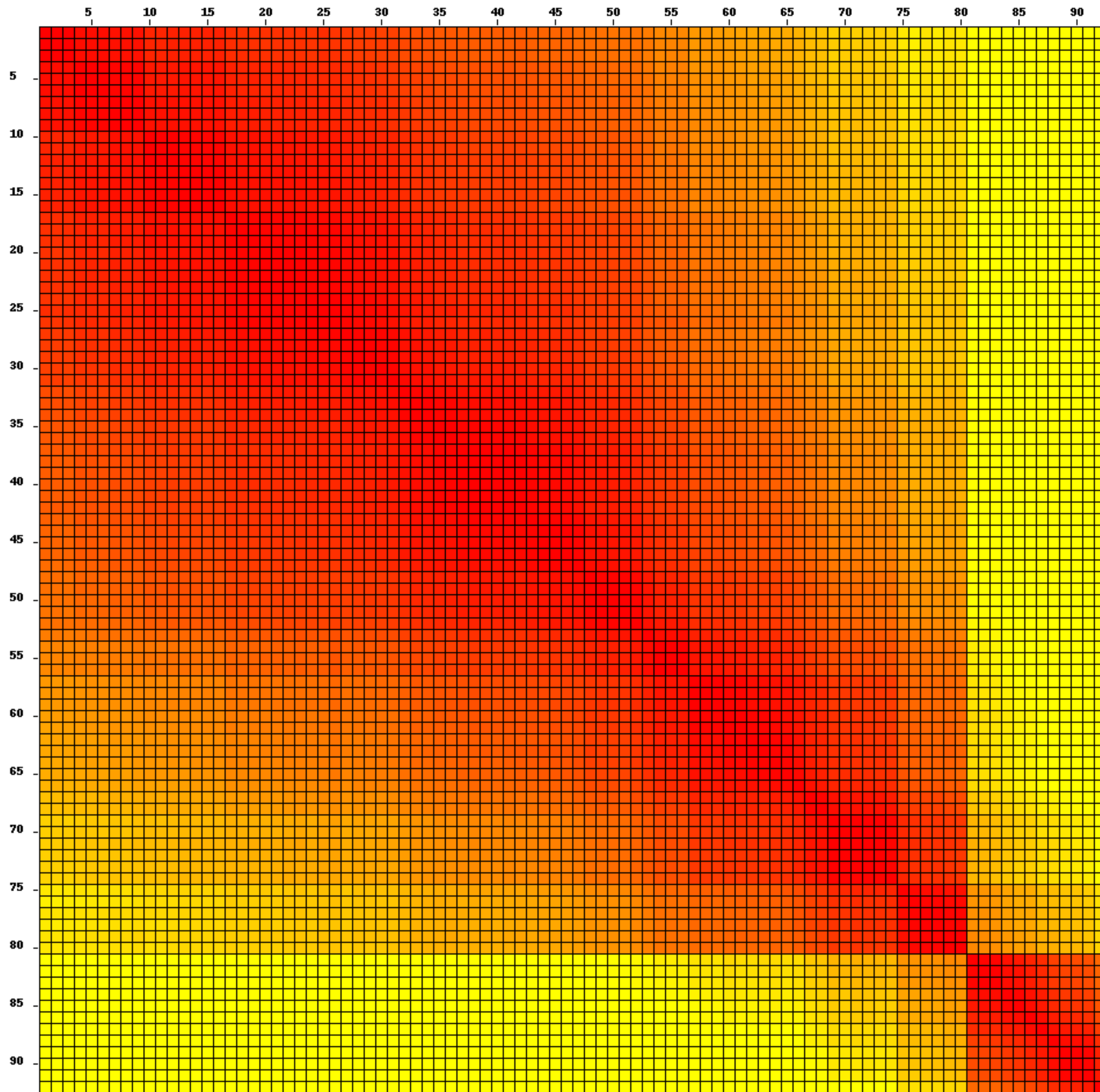
proportion of "A" genotype

proportion of "B" genotype

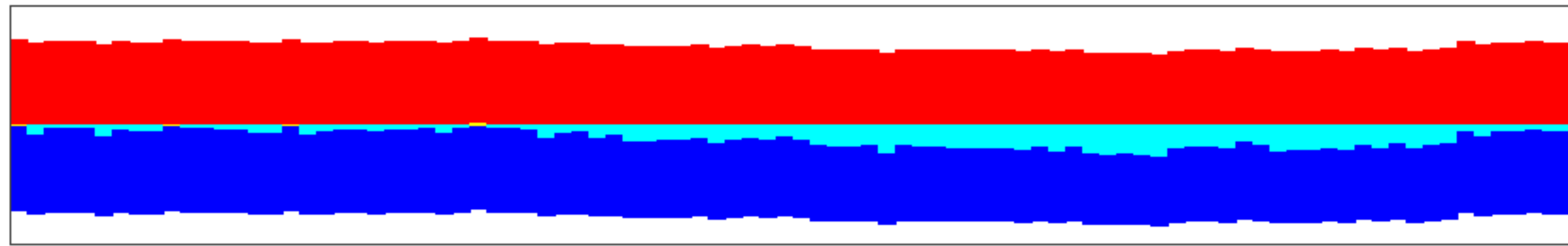
LINKAGE SCALE: 0.0 0.1 0.2 0.3 0.4 0.49 0.5 0.51 0.6 0.65 0.7 0.75 0.8 0.9 1.0 no data

MARKERS:

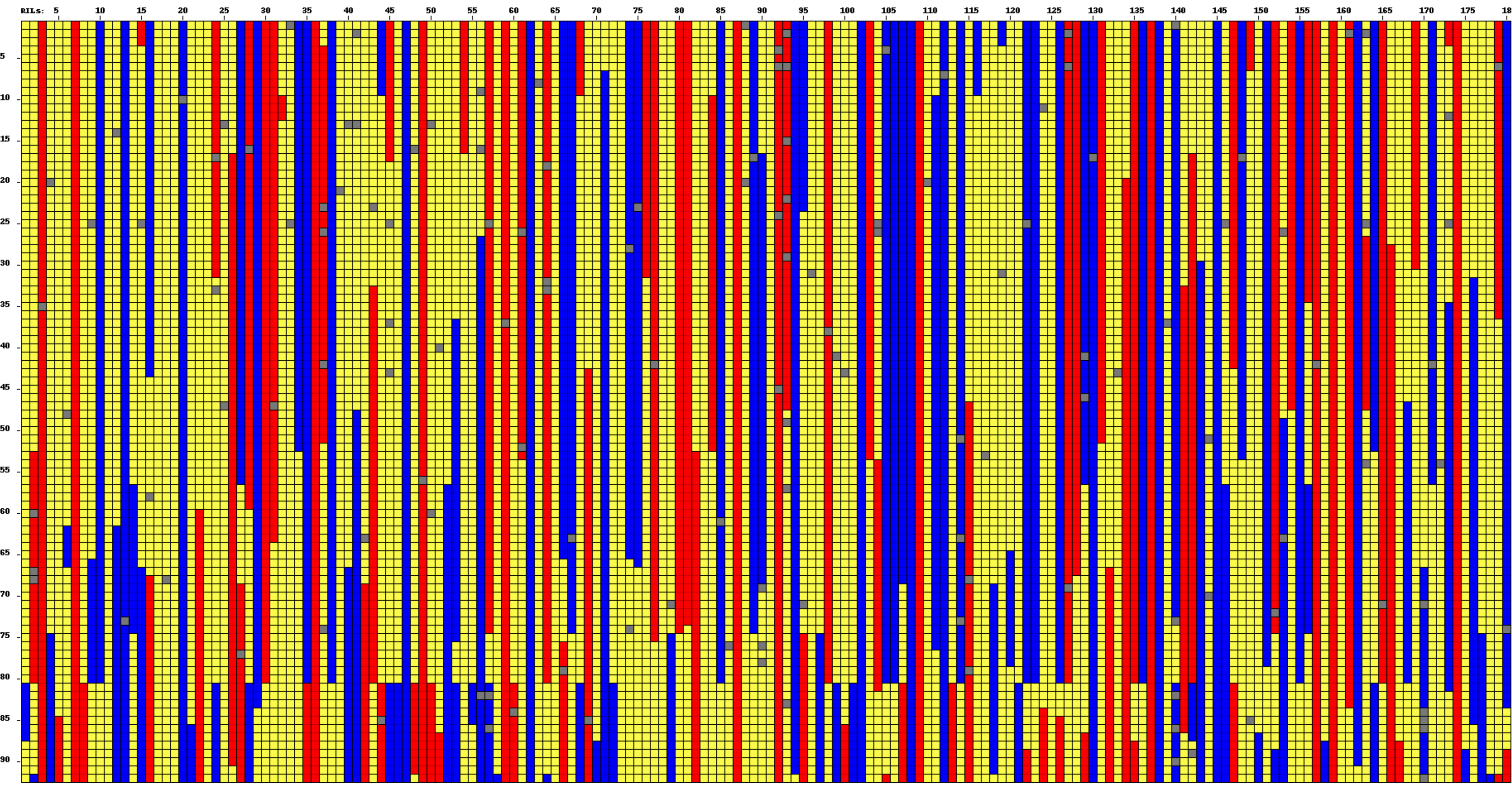
MAP:



proportion of "A" alleles  
proportion of "B" alleles



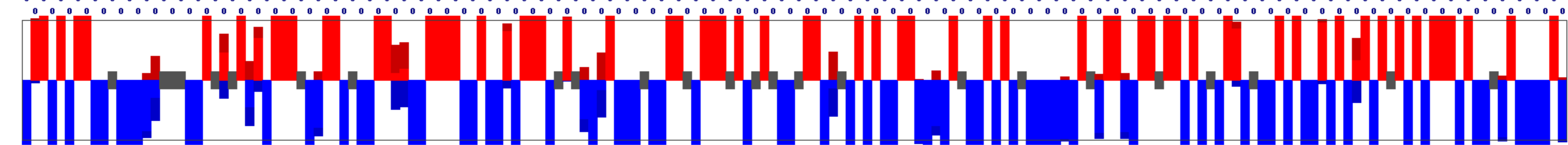
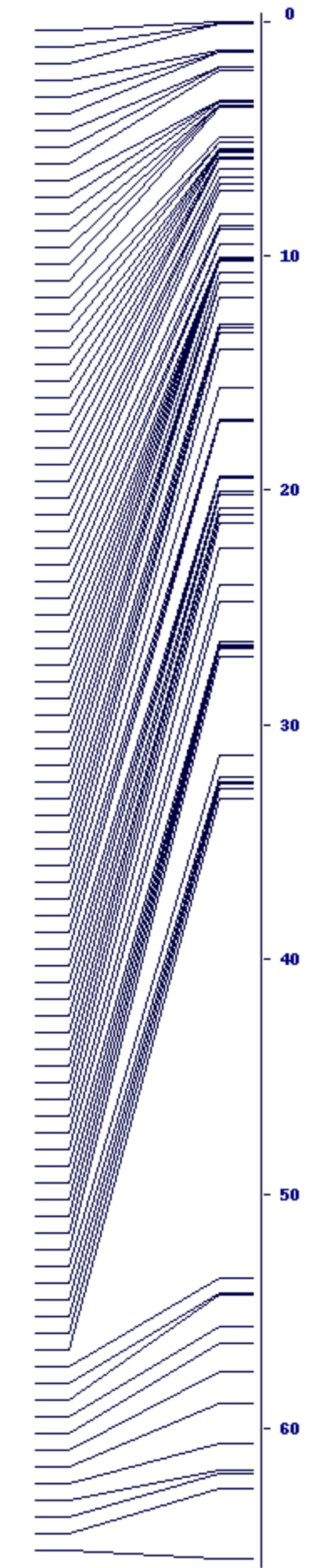
COLOR SCHEME: - A (red), - B (blue), - C : not A (green), - D : not B (orange), - H : A+B (yellow), - no data (grey)

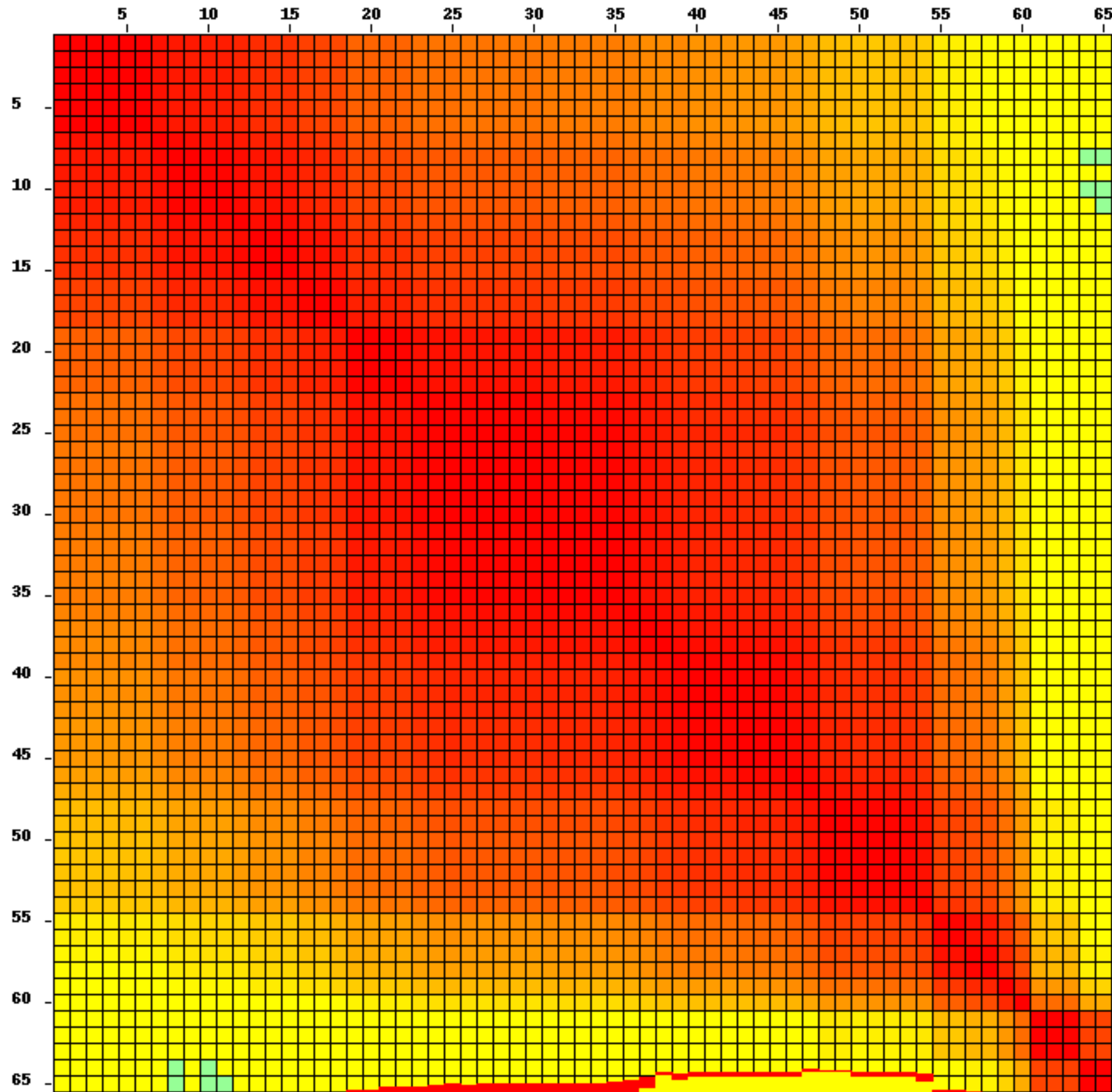
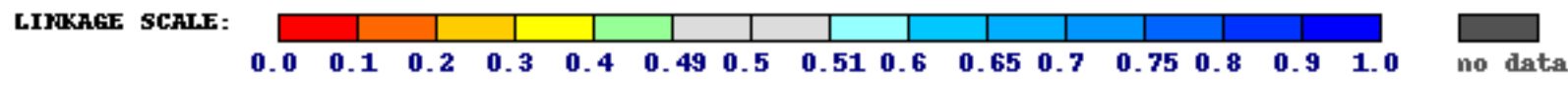


MARKERS:

- K0733, K1603, K1786, K3567, K0744, K4074/Y2MARK, K2594, K2193, K2492, K1656, K3749, K2502, K1469, K2048, K4041, K2677, K3564, K0908, K2665, K2257, K1694, K3290, K1914, K2658, K2116, K1927, K2204, K4013, K3965, K0616, K2485, K3613, K1825, K1791, K1298, K2302, K2599, K1551, K2111, K3473, K3670, K3256, K1256, K1330, K1774, K1712, K3956, K0263, K0762, K1290, K2701, K3630, K2550, K1950, K3215, K3393, K3439, K3549, K3480, K3929, K2242, K2782, K0490, K3833, K0113, K4003, K1512, K4035, K0158, K0886, K0190, K1385, K0754, K1739, K0760, K0039, K3454, K0374, K2225, K1963, K1408, K0958, K0493, K0383, K0167, K0930, K1626, K1608, K0214, K0799, K3919, K3748

MAP:

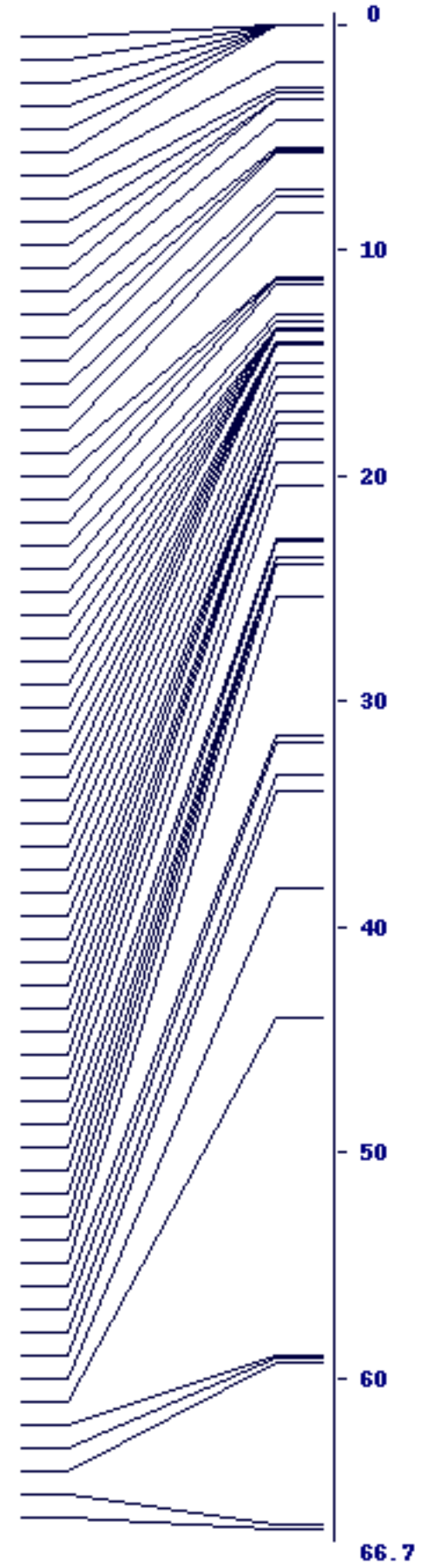




**MARKERS:**

- K1770
- K0706
- K0846
- K1844
- K1833
- K2905
- K0605
- K1930
- K0973
- K1745
- K0991
- K0182/ESSR-0009
- K0801
- K2046
- K3074
- K0699
- K0878
- K1281
- K3915
- K2955
- K3859
- K2553
- K1286
- K3202
- K2097
- K1865
- K0861
- K1145
- K2994
- K1485
- K3571
- K0761
- K0654
- K1578
- K3168
- K3266
- K3526
- K2283
- K2244
- K3834
- K3242
- K3337
- K3307
- K3400
- K3166
- K3301
- K3800
- K3909
- K0210
- K3807
- K2567
- K0520
- K4016
- K3707
- K3406
- K3734
- K3469
- K3813
- K3745
- K3148
- K3037
- K2093
- K3112
- K1875
- K2928

**MAP:**

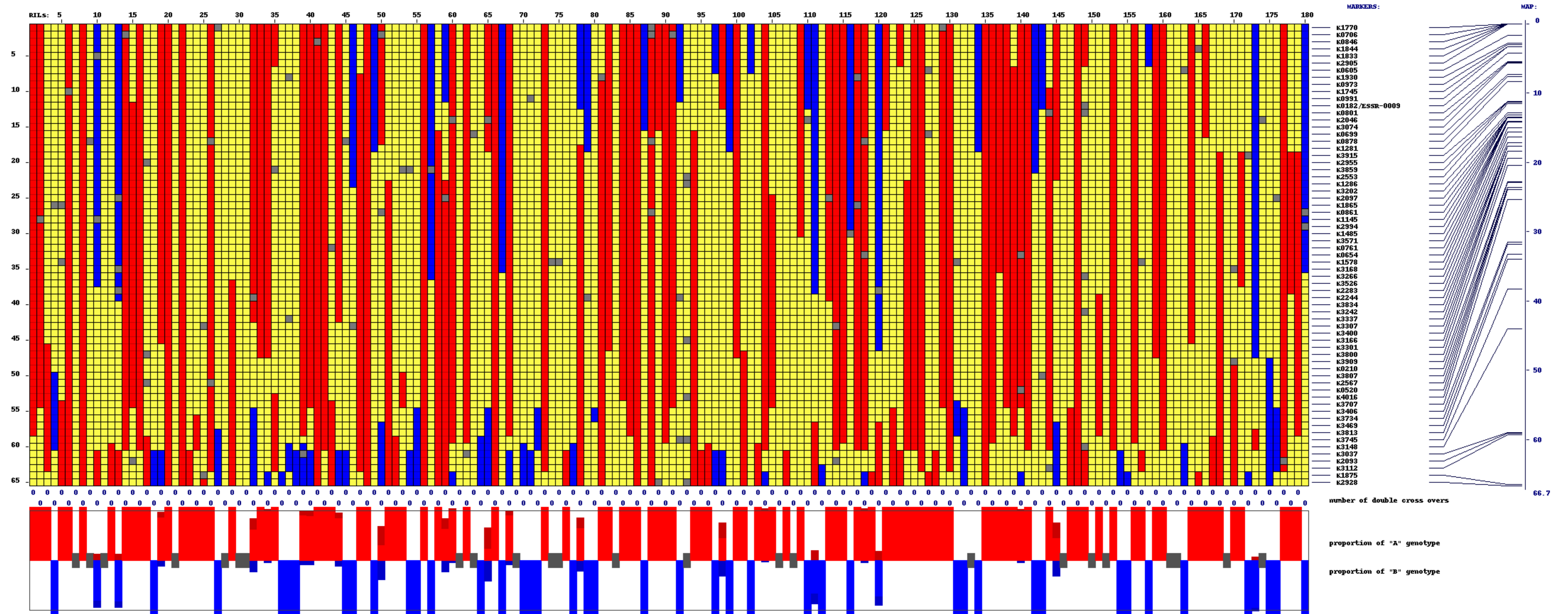


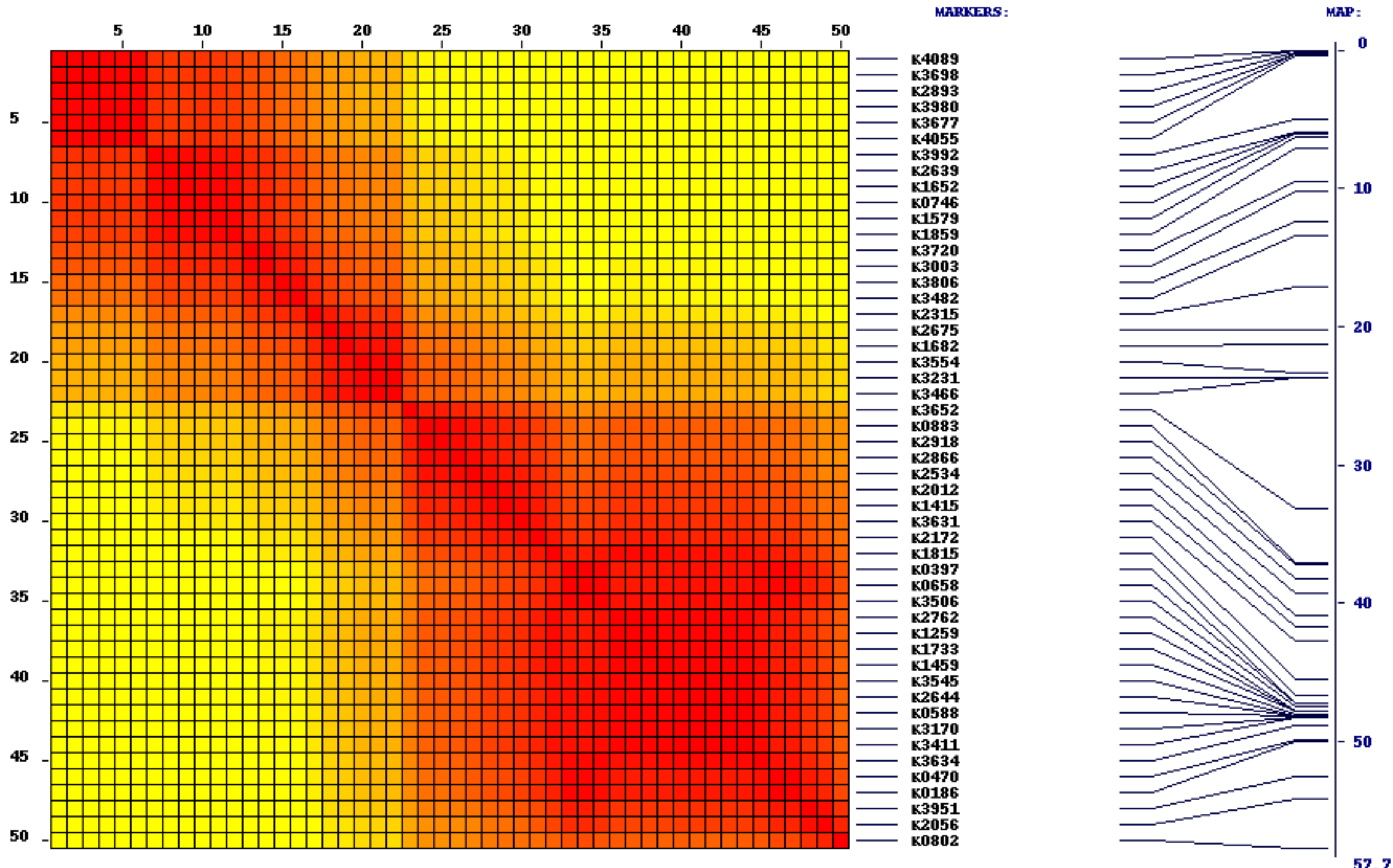
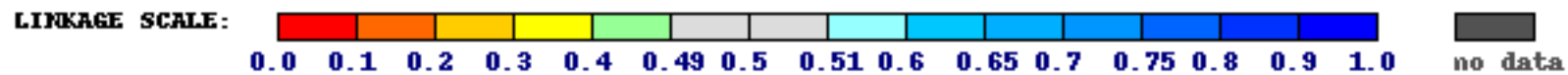
proportion of "A" alleles

proportion of "B" alleles



COLOR SCHEME: ■ - A ■ - B ■ - C : not A ■ - D : not B ■ - H : A+B ■ - no data

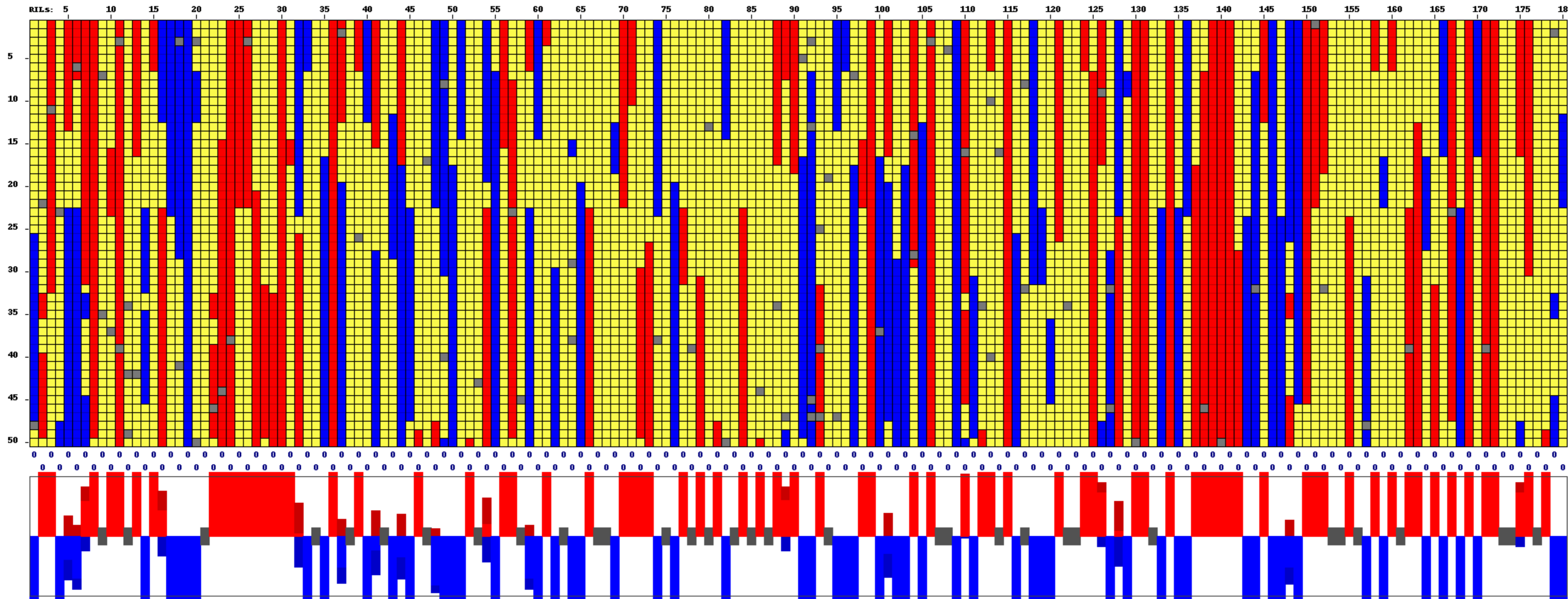




proportion of "A" alleles

proportion of "B" alleles

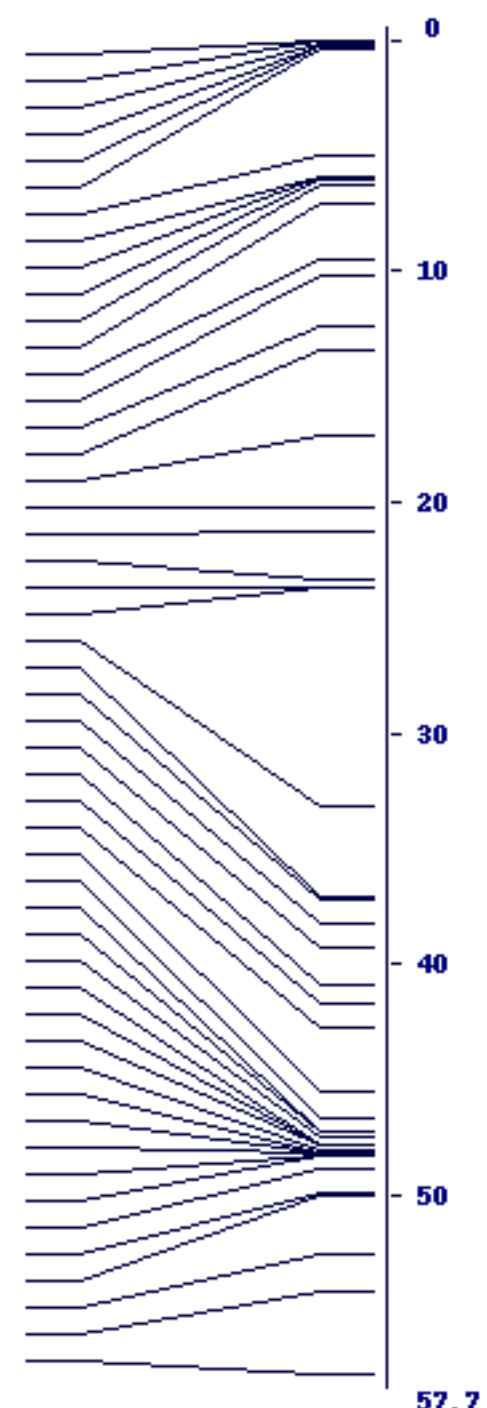
COLOR SCHEME: ■ - A ■ - B ■ - C : not A ■ - D : not B ■ - H : A+B ■ - no data



MARKERS:

- K4089
- K3698
- K2893
- K3980
- K3677
- K4055
- K3992
- K2639
- K1652
- K0746
- K1579
- K1859
- K3720
- K3003
- K3806
- K3482
- K2315
- K2675
- K1682
- K3554
- K3231
- K3466
- K3652
- K0883
- K2918
- K2866
- K2534
- K2012
- K1415
- K3631
- K2172
- K1815
- K0397
- K0658
- K3506
- K2762
- K1259
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- K1459
- K3545
- K2644
- K0588
- K3170
- K3411
- K3634
- K0470
- K0186
- K3951
- K2056
- K0802

MAP:



number of double cross overs

proportion of "A" genotype

proportion of "B" genotype