

Supplementary data

An integrated physical map of simple sequence repeats in bread wheat

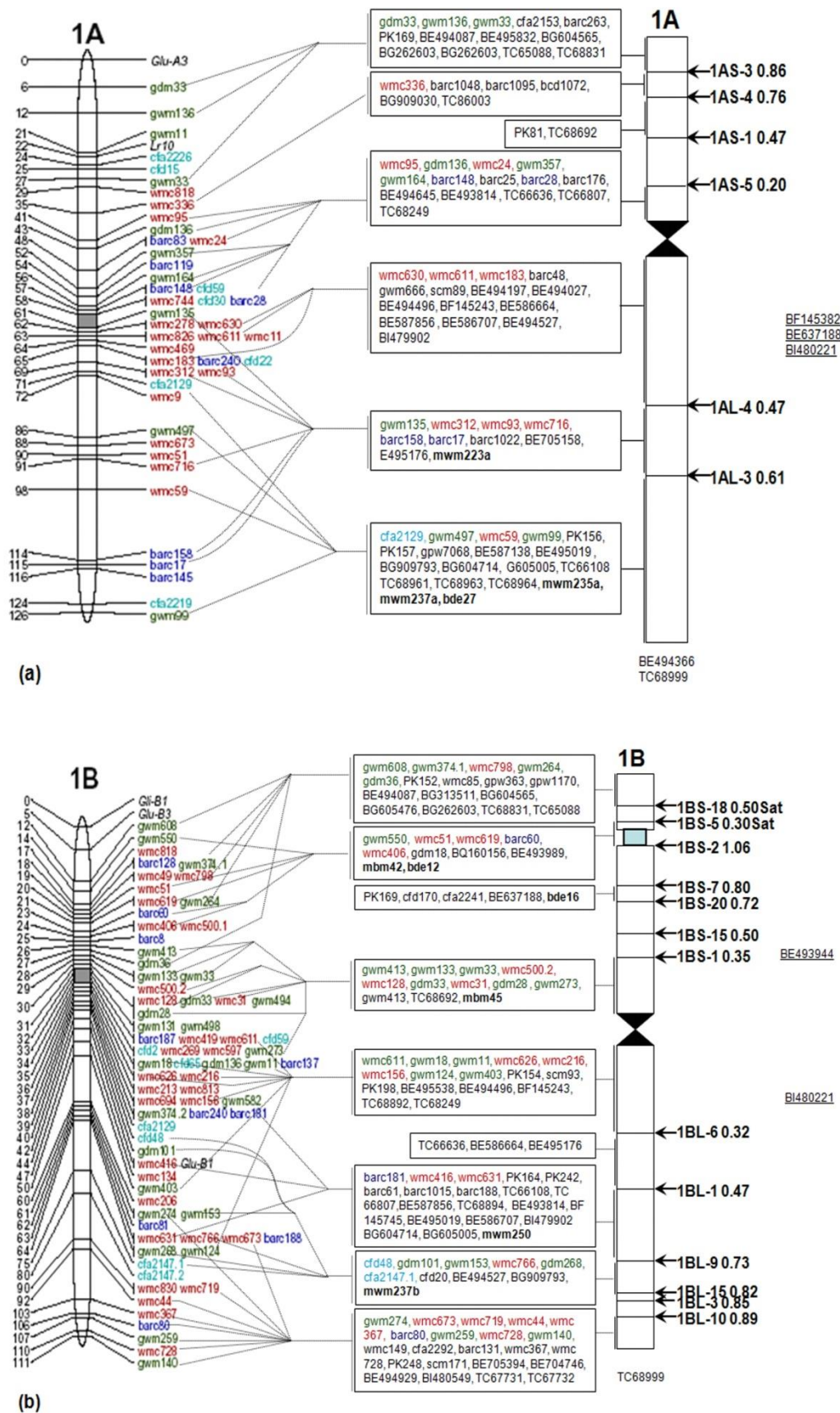
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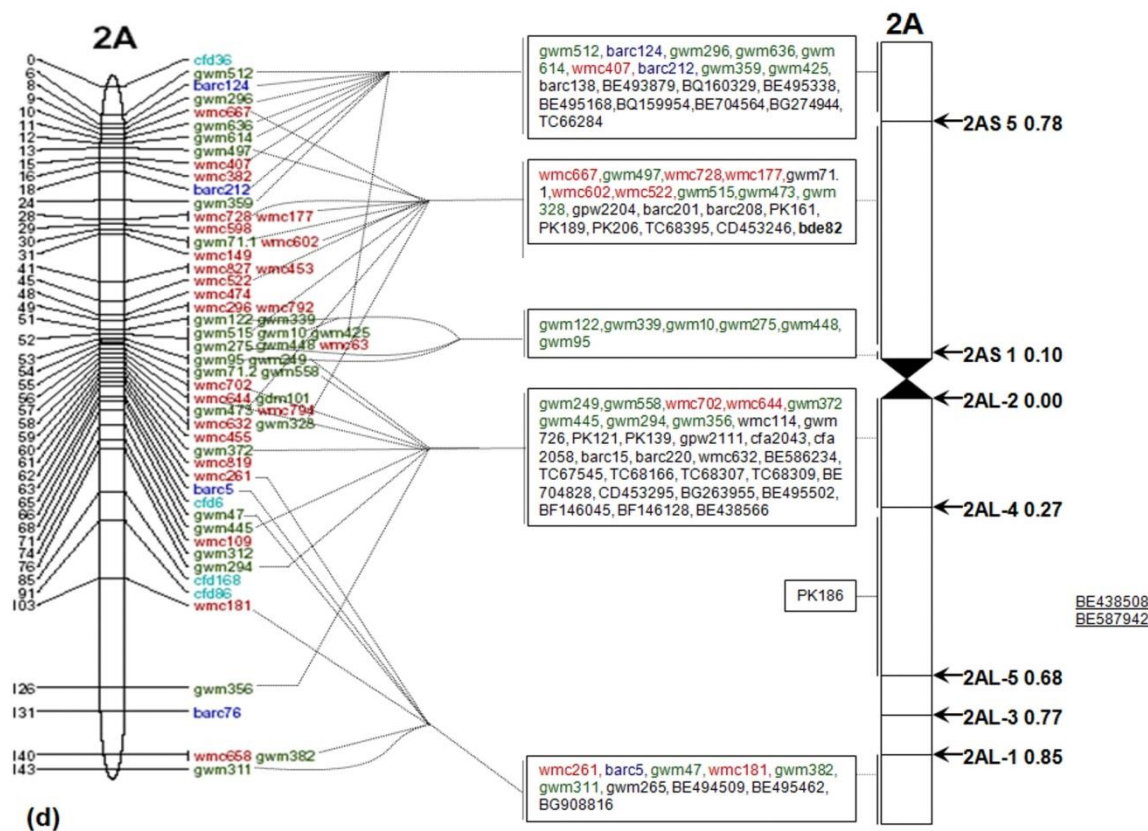
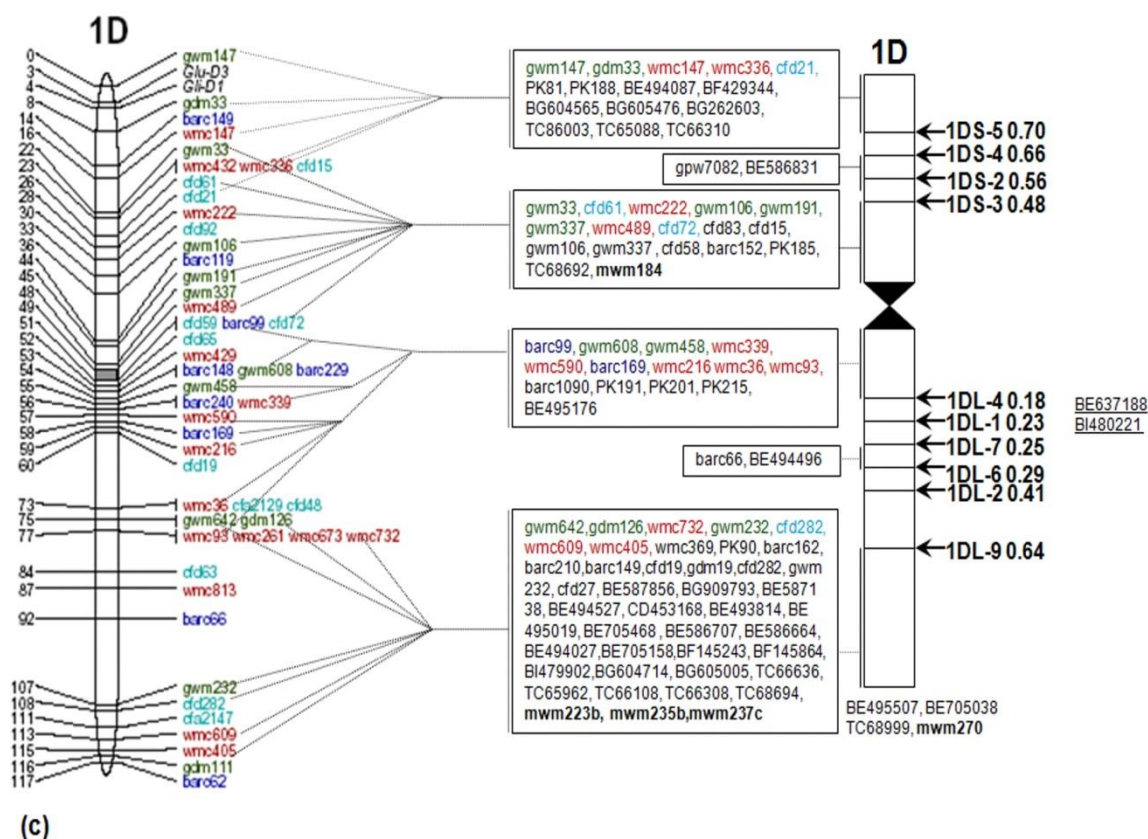
Supplementary Table 1. SSR loci showing perturbations in their map position between genetic and physical maps.

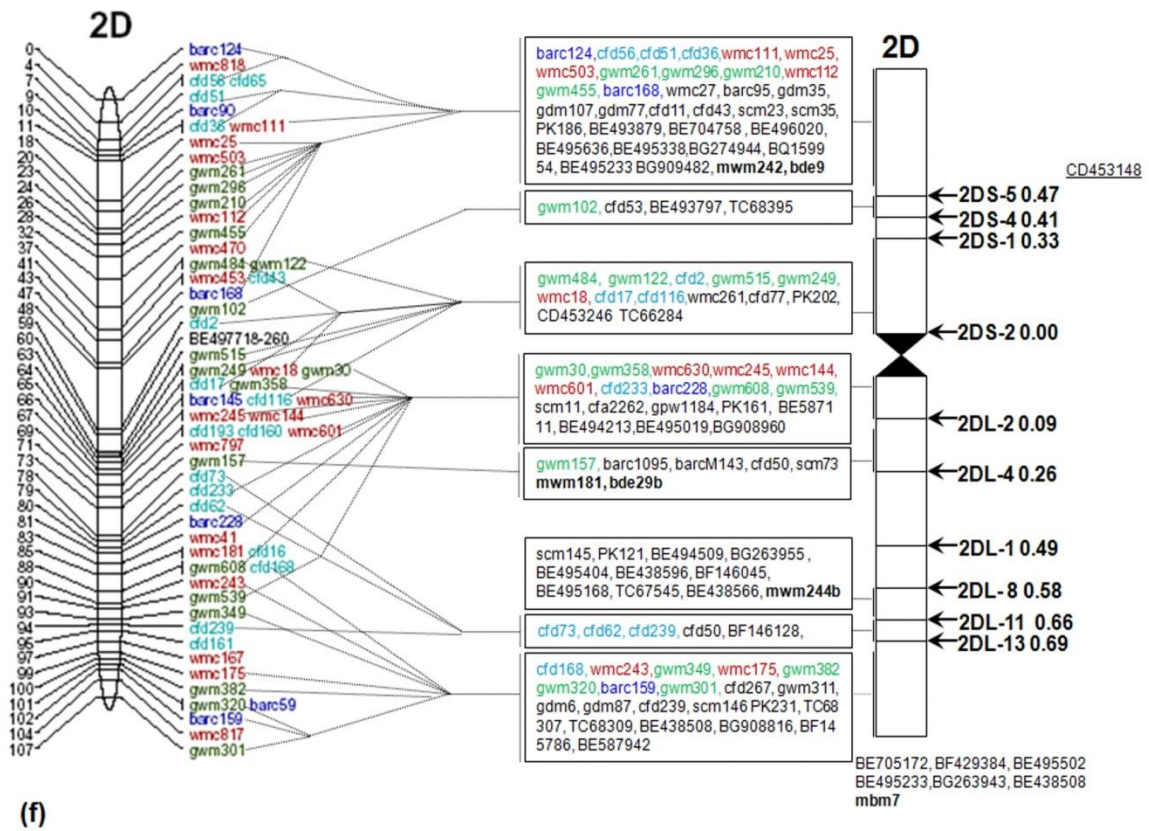
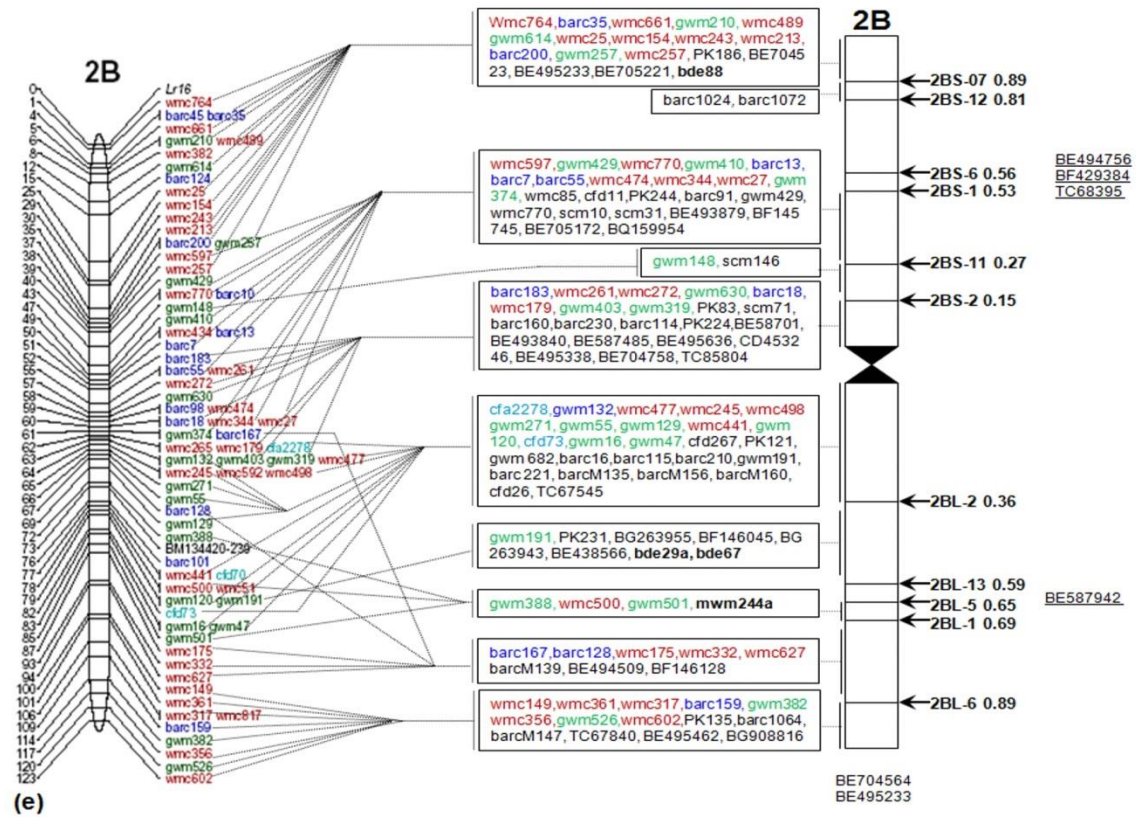
S. No.	SSR loci	Chromosome arms	Map position	
			Genetic map	Physical map
(i) Perturbed SSR loci mapped on same arm of individual chromosomes				
1.	gwm33	1AS	Interstitial	Distal
2.	gwm135	1AL	Centromeric	Interstitial
3.	gdm36	1BS	Centromeric	Distal
4.	gwm124	1BL	Interstitial	Centromeric
5.	gwm274	1BL	Interstitial	Distal
6.	wmc673	1BL	Interstitial	Distal
7.	wmc36	1DL	Interstitial	Centromeric
8.	wmc93	1DL	Interstitial	Centromeric
9.	gwm425	2AS	Centromeric	Distal
10.	gwm356	2AL	Distal	Centromeric
11.	wmc261	2AL	Centromeric	Distal
12.	barc5	2AL	Centromeric	Distal
13.	gwm47	2AL	Centromeric	Distal
14.	wmc257	2BS	Interstitial	Distal
15.	wmc474	2BS	Centromeric	Interstitial
16.	wmc344	2BS	Centromeric	Interstitial
17.	wmc27	2BS	Centromeric	Interstitial
18.	gwm374	2BS	Centromeric	Interstitial
19.	barc128	2BL	Centromeric	Distal
20.	gwm5	3AS	Centromeric	Distal
21.	gwm494	3AL	Interstitial	Distal
22.	gwm162	3AL	Interstitial	Distal
23.	wmc505	3BS	Centromeric	Distal
24.	barc68	3BS	Centromeric	Distal
25.	barc73	3BS	Centromeric	Interstitial
26.	wmc206	3BL	Interstitial	Centromeric
27.	barc77	3BL	Interstitial	Centromeric
28.	barc84	3BL	Interstitial	Distal
29.	wmc630	3DS	Distal	Centromeric
30.	cf106	4DS	Centromeric	Distal
31.	barc196	6DS	Centromeric	Interstitial
32.	barc204	6DL	Interstitial	Centromeric
33.	barc175	6DL	Interstitial	Centromeric
34.	wmc168	7AS	Interstitial	Centromeric
35.	wmc525	7AL	Distal	Centromeric
36.	gwm46	7BS	Centromeric	Interstitial/Distal
37.	wmc606	7BS	Distal	Centromeric
38.	wmc311	7BL	Interstitial	Centromeric
39.	wmc435	7BL	Centromeric	Distal
40.	barc76	7DL	Distal	Centromeric
41.	gwm428	7DL	Distal	Interstitial
42.	wmc48	7DL	Centromeric	Interstitial
43.	wmc671	7DL	Interstitial	Distal
44.	barc111	7DL	Interstitial	Distal
(ii) Perturbed SSR loci on different arms of individual chromosomes				
1.	cf172	1DS	1DL-Centromeric	1DS-Centromeric
2.	gwm473	2AS	2AL-Centromeric	2AS-Centromeric
3.	gwm328	2AS	2AL-Centromeric	2AS-Centromeric
4.	gwm249	2AL	2AS-Centromeric	2AL-Centromeric

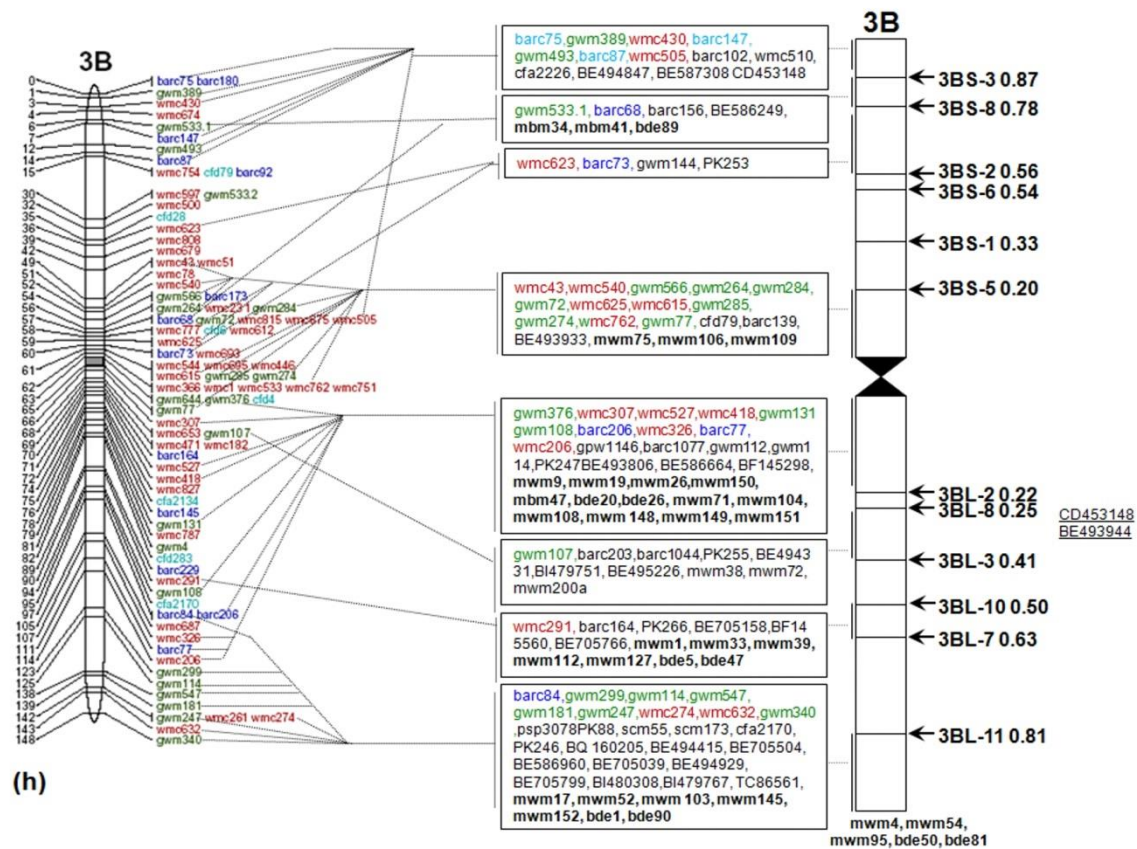
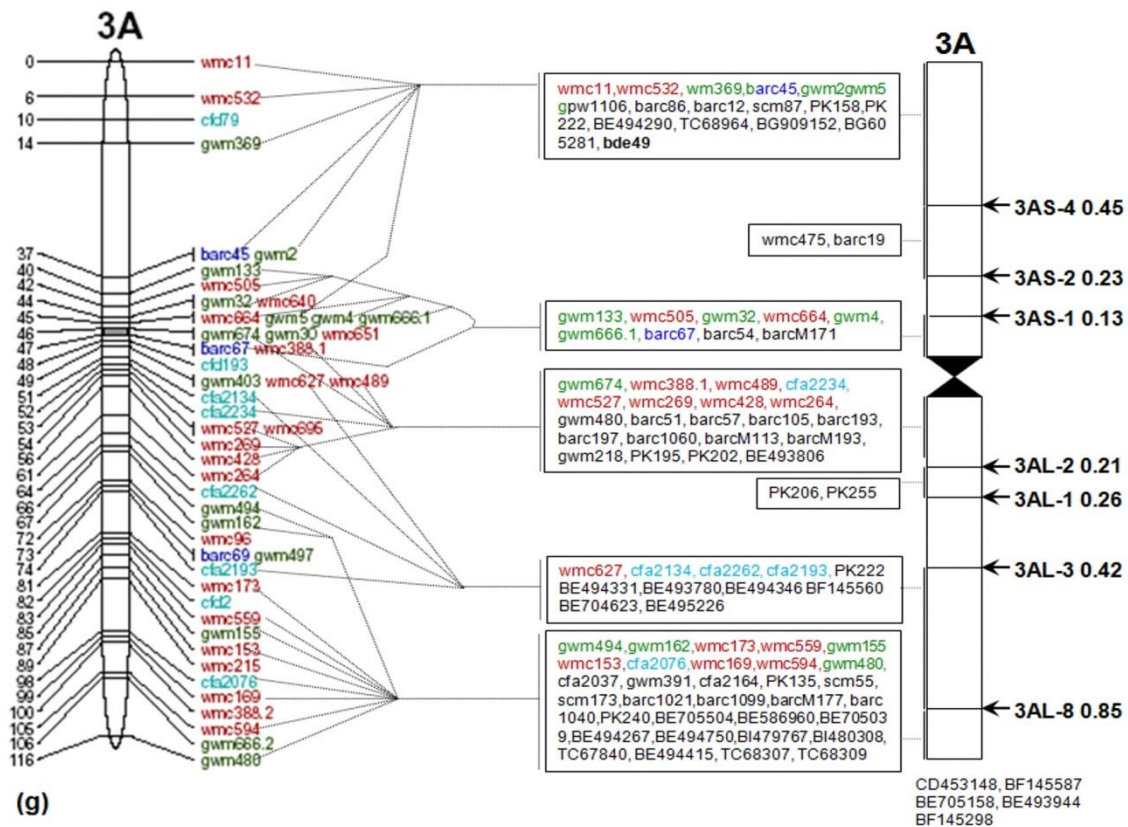
5.	gwm403	2BS	2BL-Centromeric	2BS-Centromeric
6.	gwm319	2BS	2BL-Centromeric	2BS-Centromeric
7.	barc167	2BL	2BS-Centromeric	2BL-Distal
8.	cfid17	2DS	2DL-Centromeric	2DS-Centromeric
9.	cfid116	2DS	2DL-Centromeric	2DS-Centromeric
10.	barc67	3AS	3AL-Centromeric	3AS-Centromeric
11.	gwm674	3AL	3AS-Centromeric	3AL-Centromeric
12.	gwm77	3BS	3BL-Centromeric	3BS-Centromeric
13.	gwm376	3BL	3BS-Centromeric	3BL-Centromeric
14.	cfid2	3DS	3DL-Centromeric	3DS-Distal
15.	cfid70	3DS	3DL-Centromeric	3DS-Distal
16.	gwm341	3DS	3DL-Centromeric	3DS-Interstitial
17.	gwm52	3DS	3DL-Centromeric	3DS-Centromeric
18.	gwm456	3DS	3DL-Centromeric	3DS-Centromeric
19.	gwm191	3DS	3DL-Centromeric	3DS-Centromeric
20.	gwm664	3DL	3DS-Centromeric	3DL-Centromeric
21.	cfid2	4AS	4AL-Distal	4AS-Distal
22.	cfid71	4AS	4AL-Centromeric	4AS-Centromeric
23.	gwm368	4BS	4BL-Interstitial	4BS
24.	barc20	4BS	4BL-Interstitial	4BS
25.	gwm6	4BL	4BS-Interstitial	4BL-Distal
26.	cfid39	4BL	4BS-Centromeric	4BL-Distal
27.	barc98	4DS	4DL-Centromeric	4DS-Distal
28.	barc186	5AL	5AS-Centromeric	5AL-Centromeric
29.	wmc435	5BS	5BL-Centromeric	5BS-Interstitial
30.	gwm67	5BL	5BS-Centromeric	5BL-Centromeric
31.	barc89	5BL	5BS-Centromeric	5BL-Centromeric
32.	cfa2070	5BL	5BS-Centromeric	5BL-Interstitial
33.	barc4	5BL	5BS-Centromeric	5BL-Interstitial
34.	wmc805	5DS	5DL-Centromeric	5DS-Centromeric
35.	wmc786	6AS	6AL-Centromeric	6AS-Centromeric
36.	barc198	6BS	6BL-Centromeric	6BS-Interstitial
37.	gwm361	6BS	6BL-Centromeric	6BS-Centromeric
38.	gwm644	6BS	6BL-Centromeric	6BS-Centromeric
39.	cfid287	6DL	6DS-Centromeric	6DL-Interstitial
40.	barc85	7BL	7BS-Centromeric	7BL-Centromeric
41.	barc72	7BL	7BS-Centromeric	7BL-Centromeric
42.	cfid14	7DS	7DL-Centromeric	7DS-Centromeric
43.	gwm121	7DS	7DL-Centromeric	7DS-Centromeric

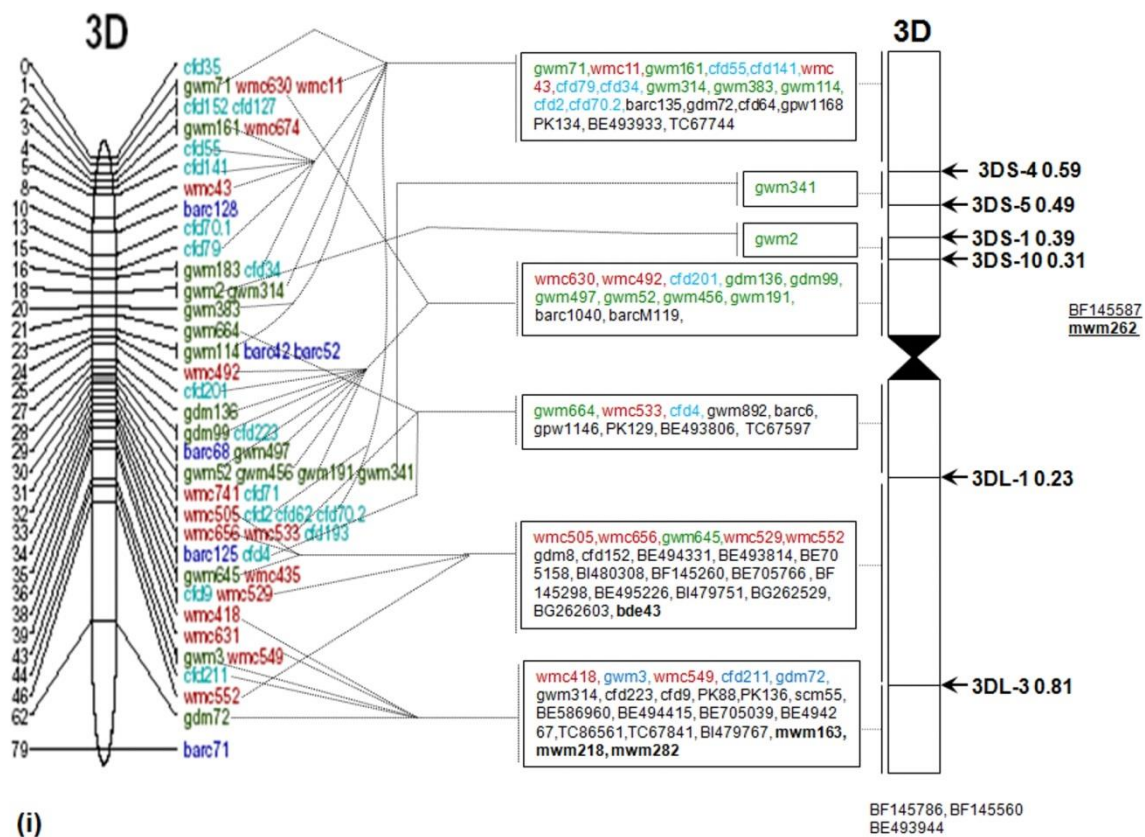
Supplementary Fig 1a-u. Integrated physical map of SSRs in bread wheat prepared using wet-lab approach (right hand side) and its comparison with available consensus genetic map (left hand side). Arrows and description on the right side of integrated physical map are deletion break points, deletion designation and fraction length; individual boxes on the left side contain markers mapped within individual bins covered by a vertical line; corresponding SSR loci in physical and genetic maps are connected by dotted lines. Markers in bold face (mwm, mbm and bde) are physically mapped in the present study.



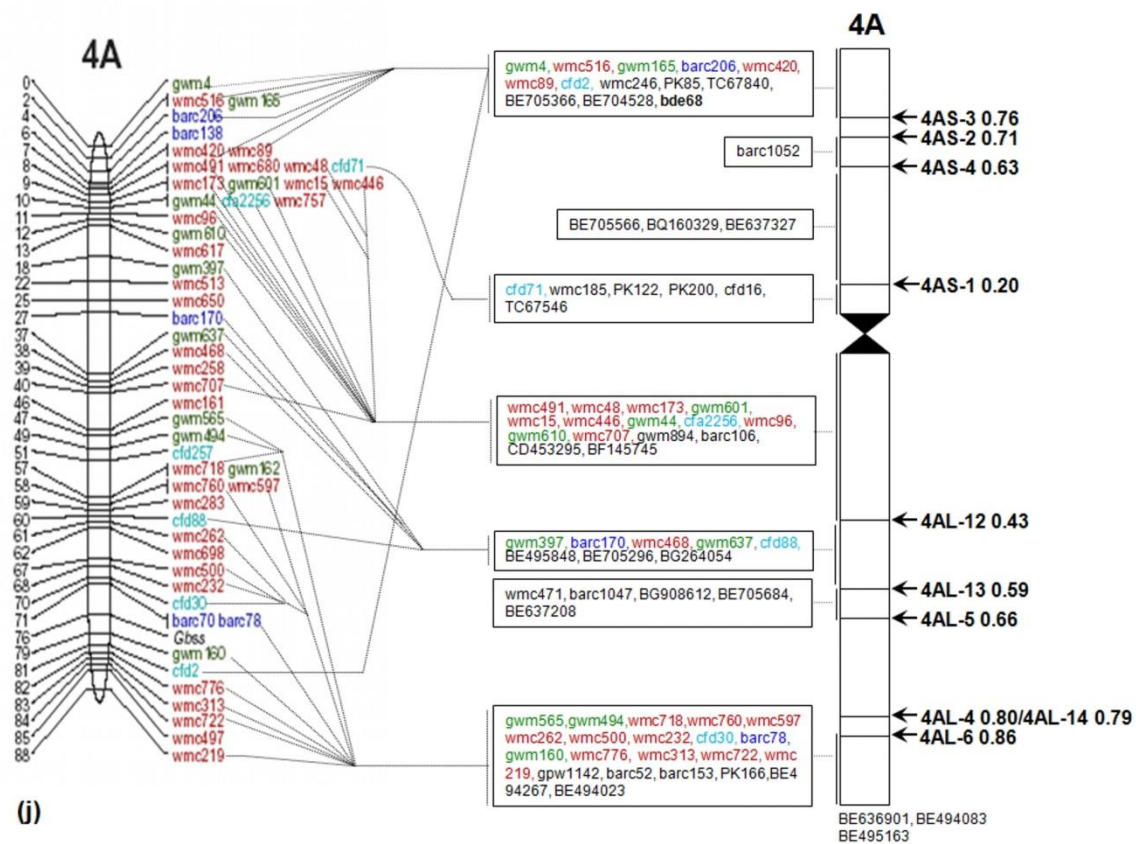




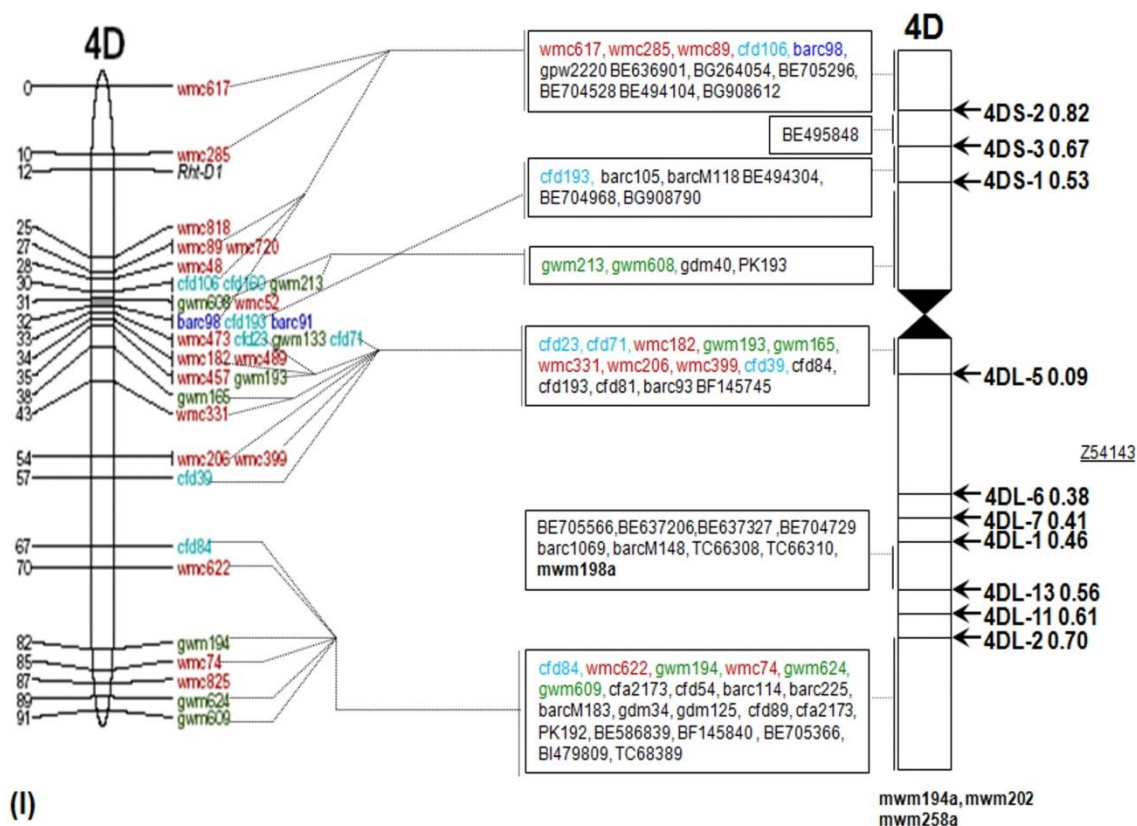
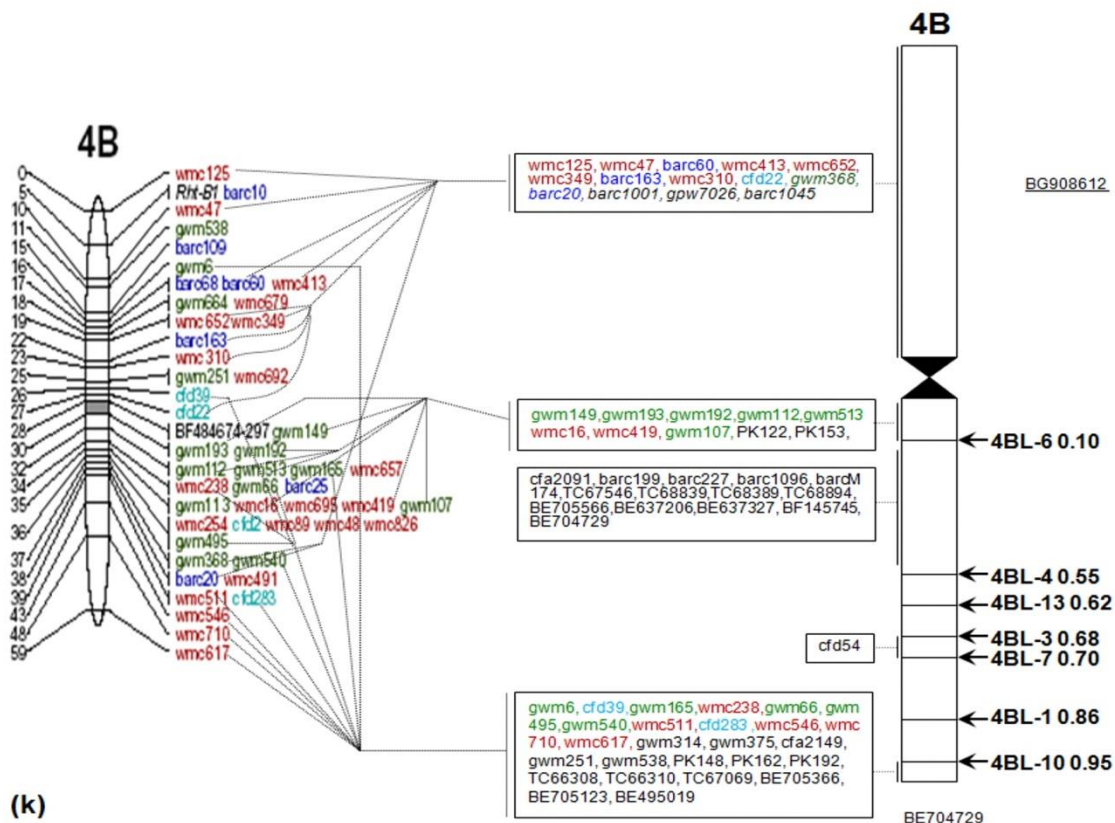


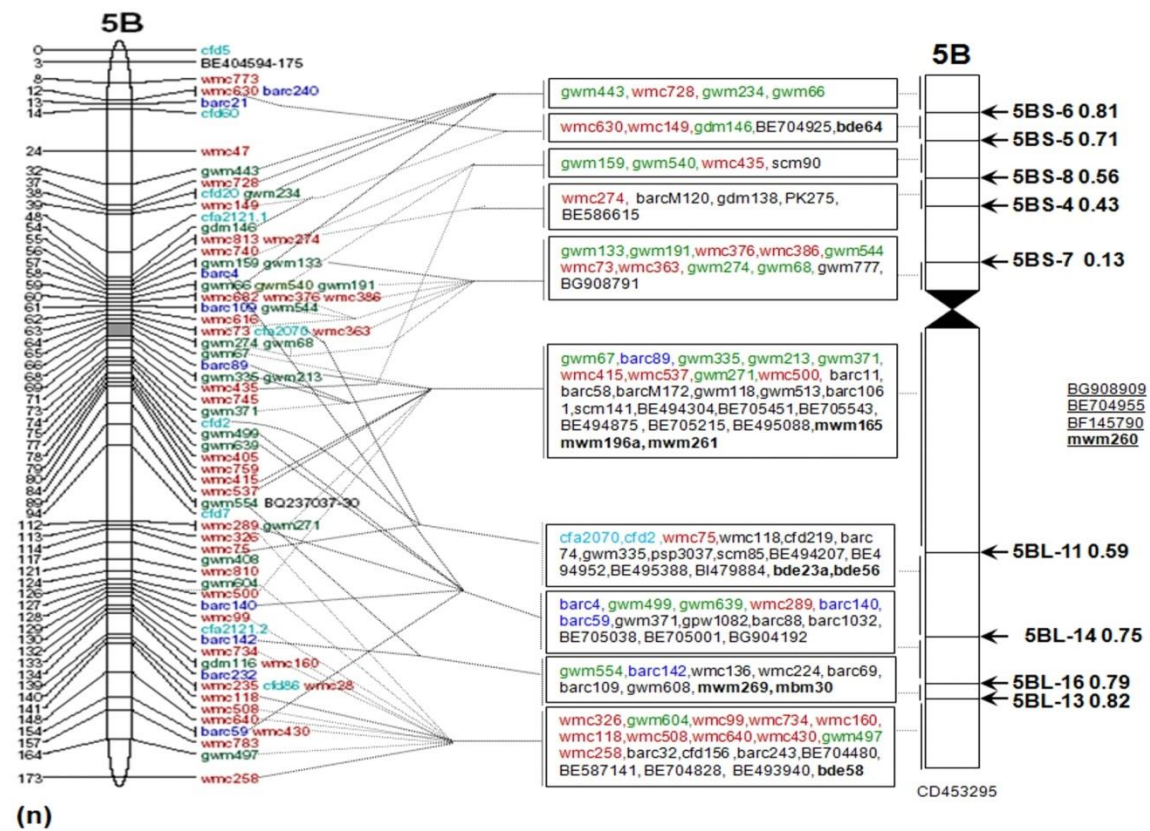
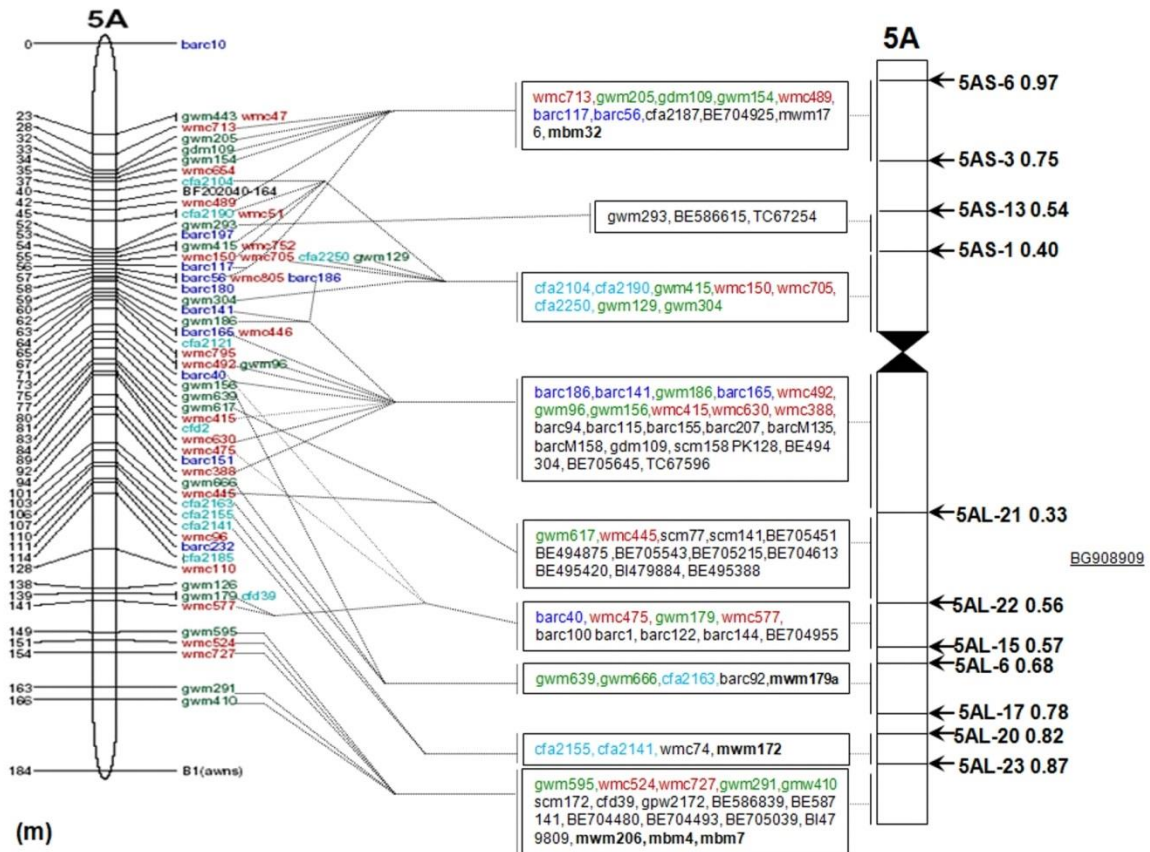


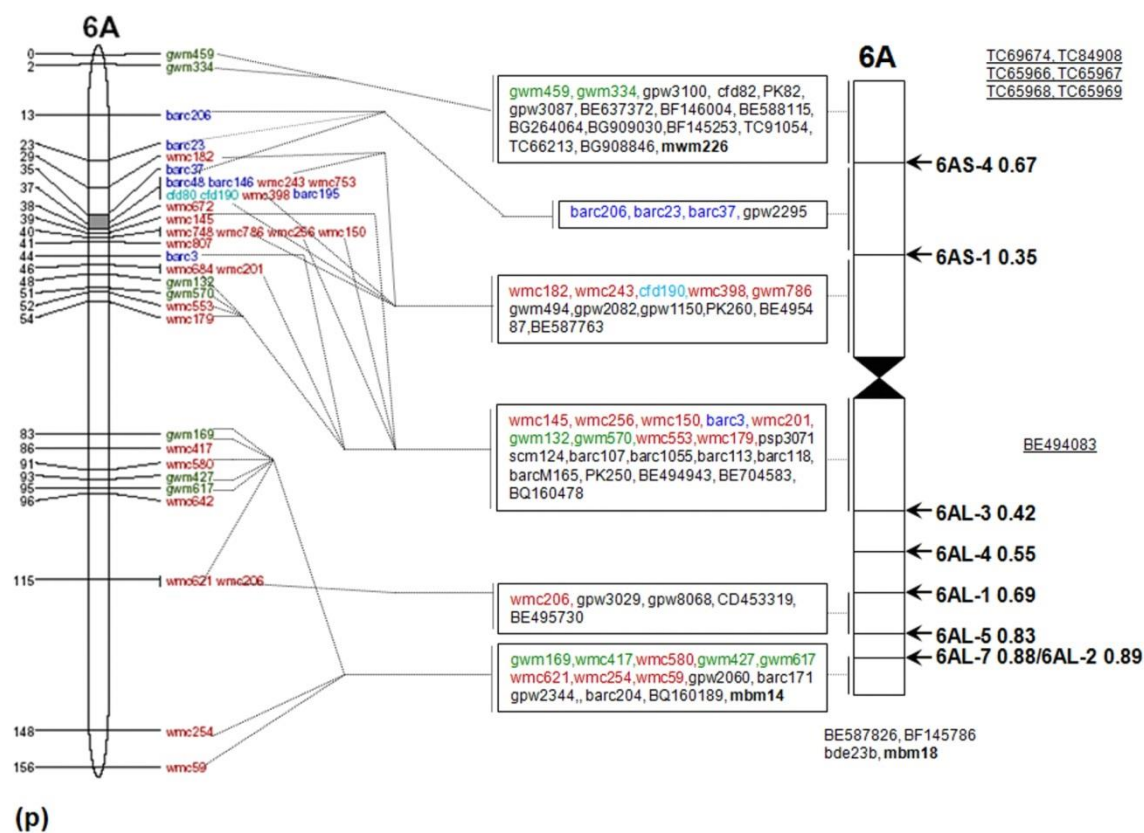
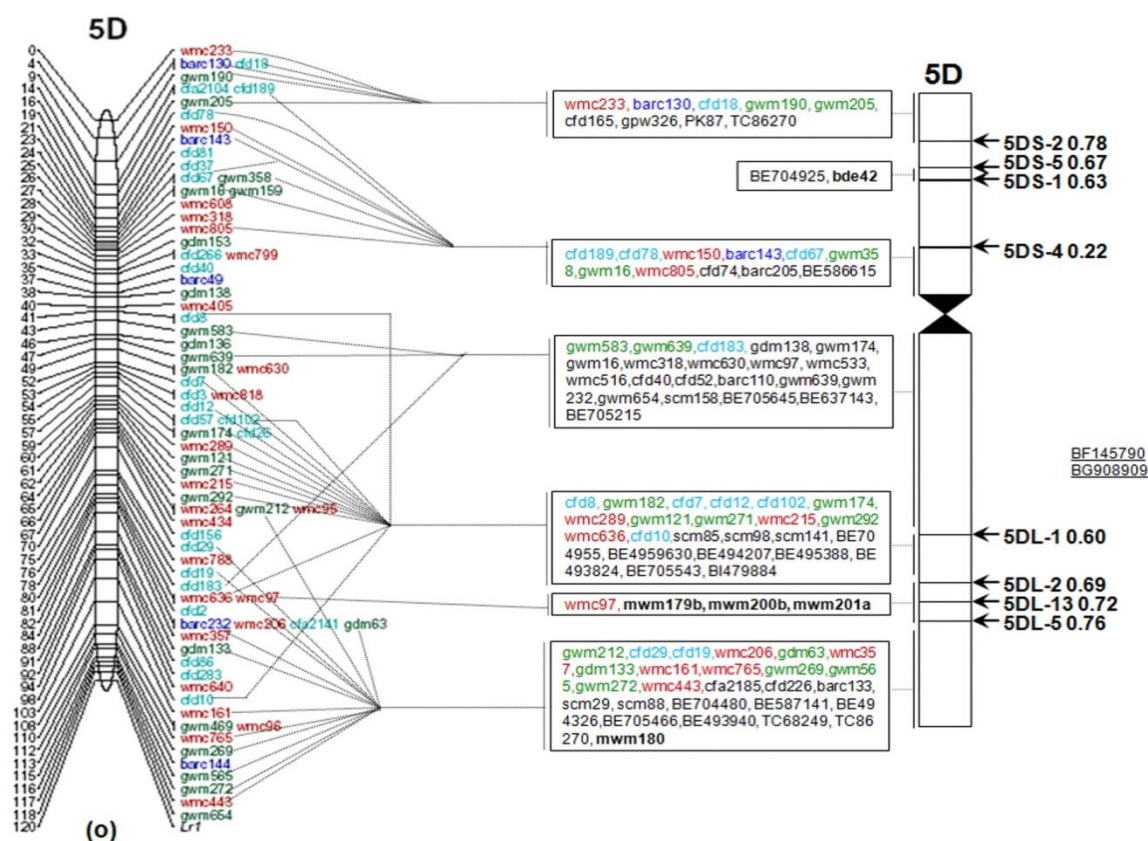
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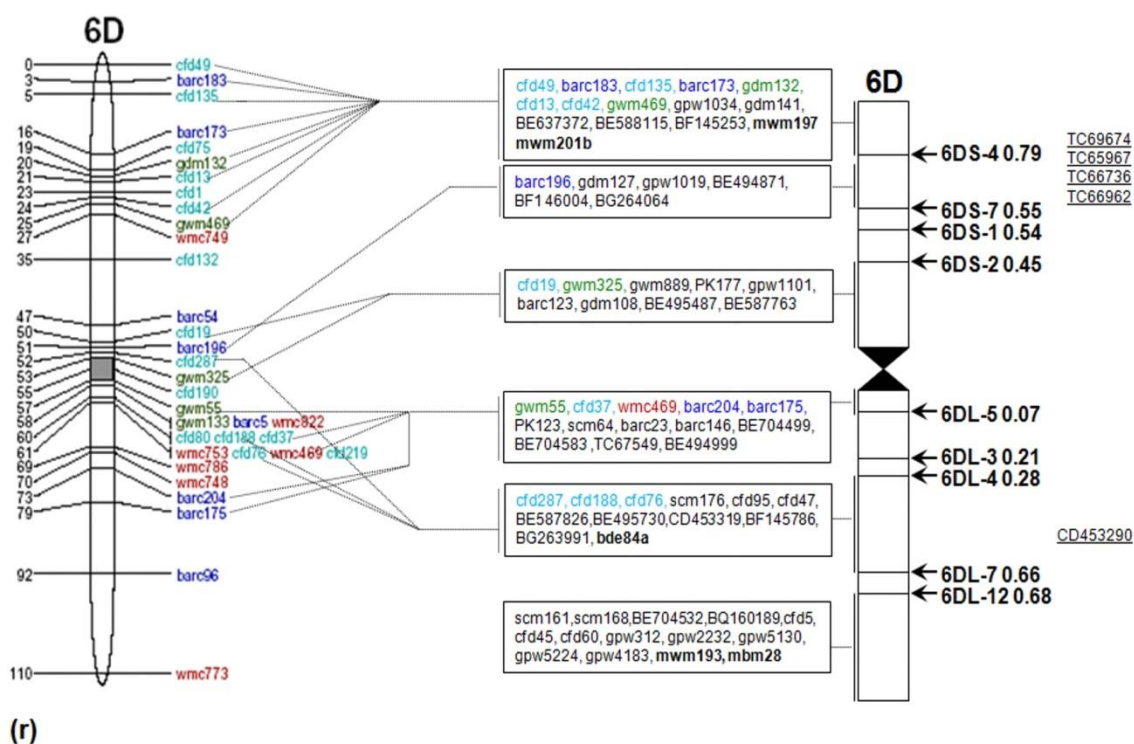
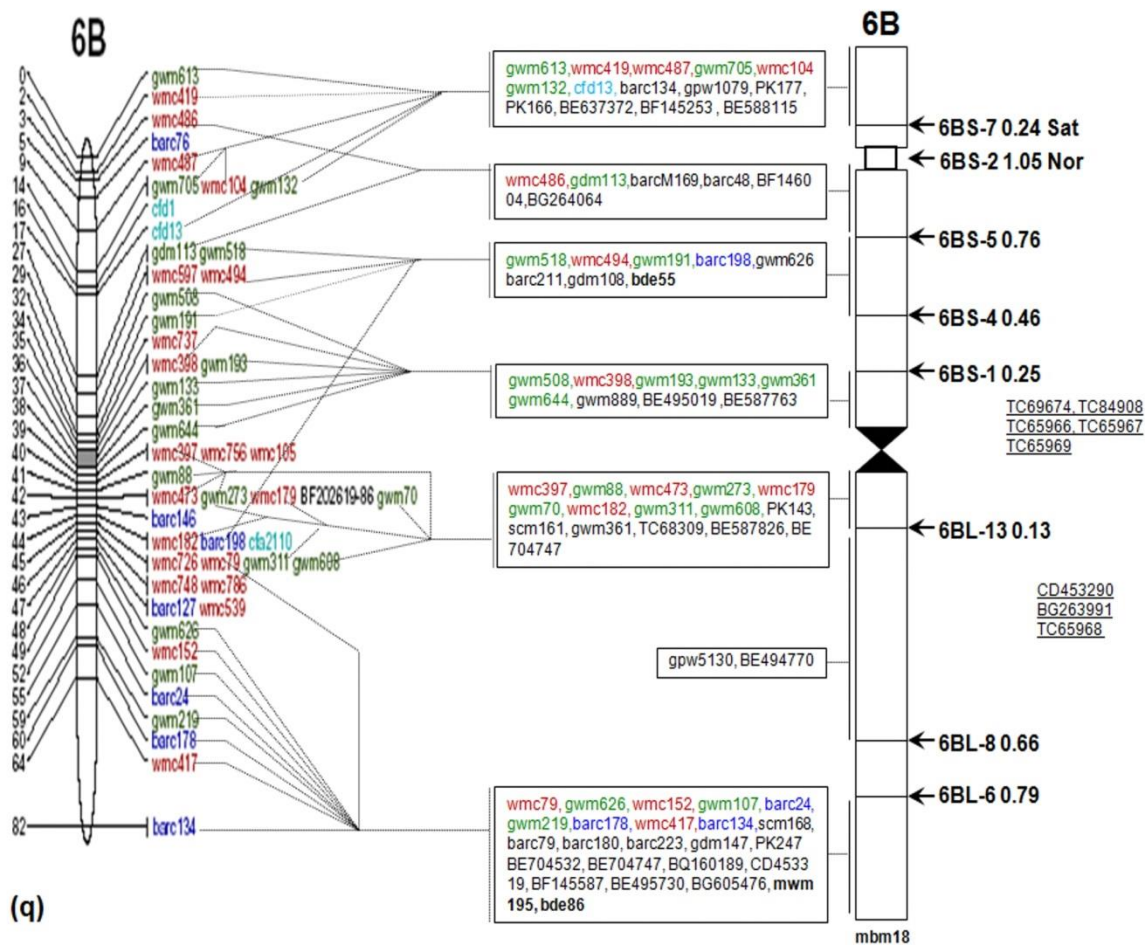


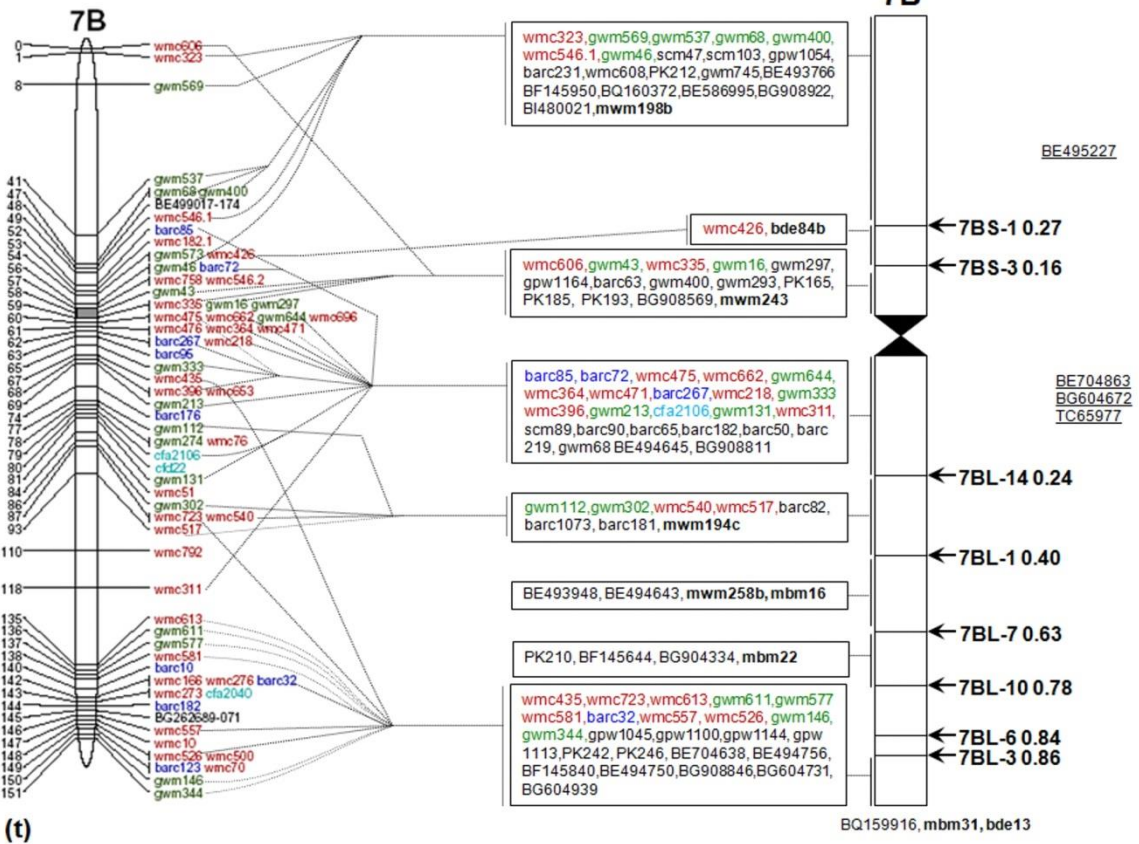
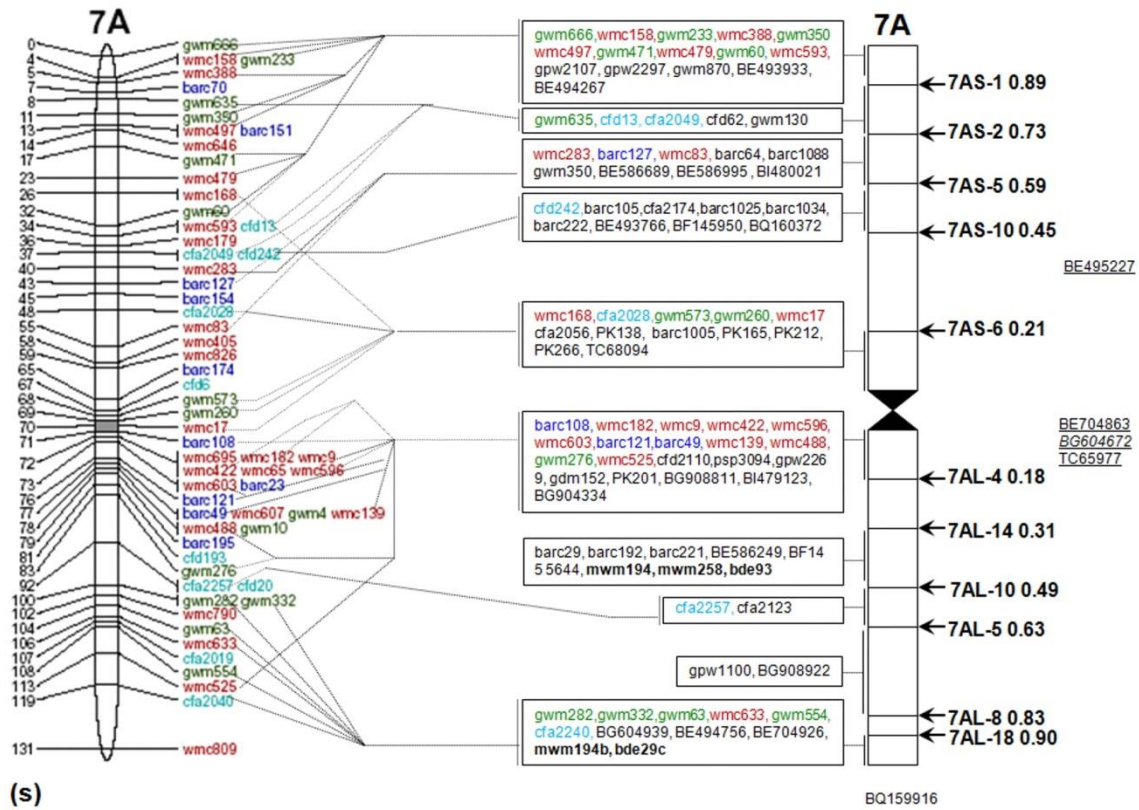
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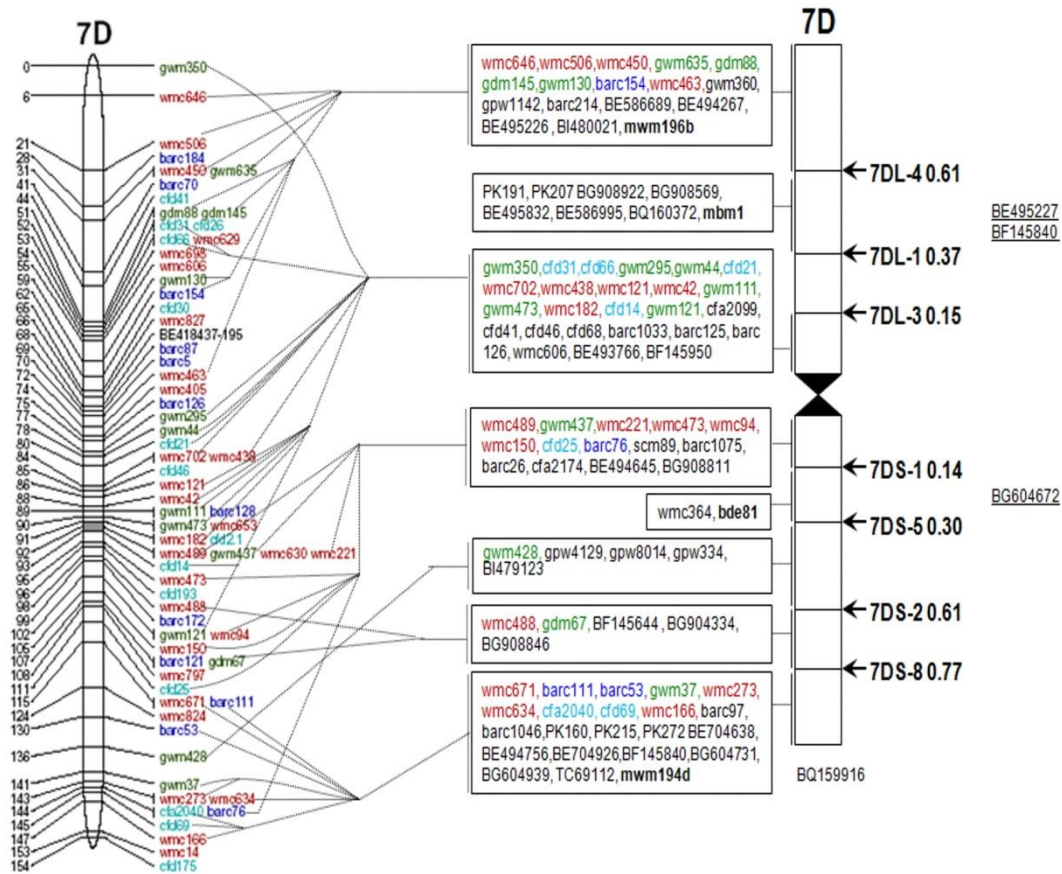






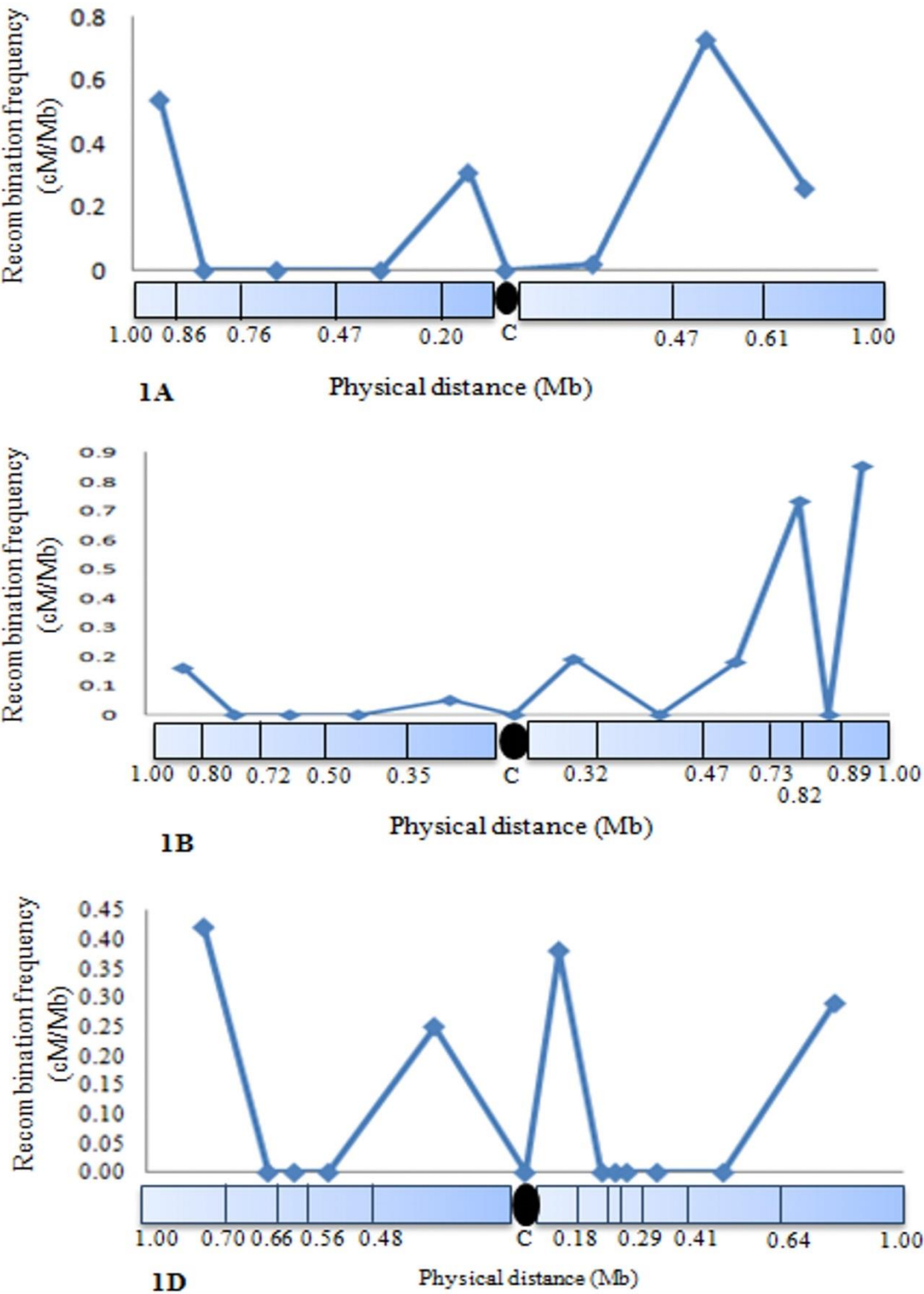




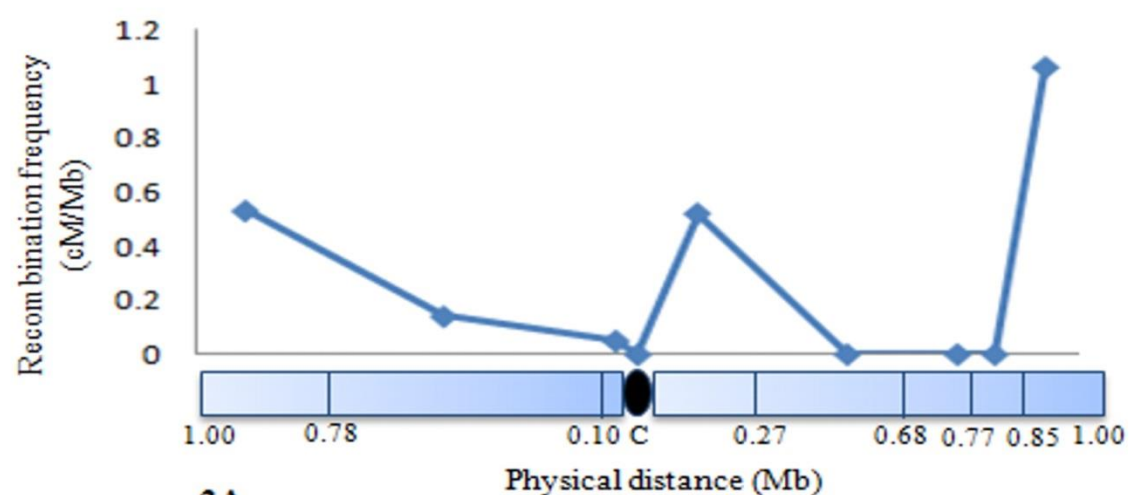


(u)

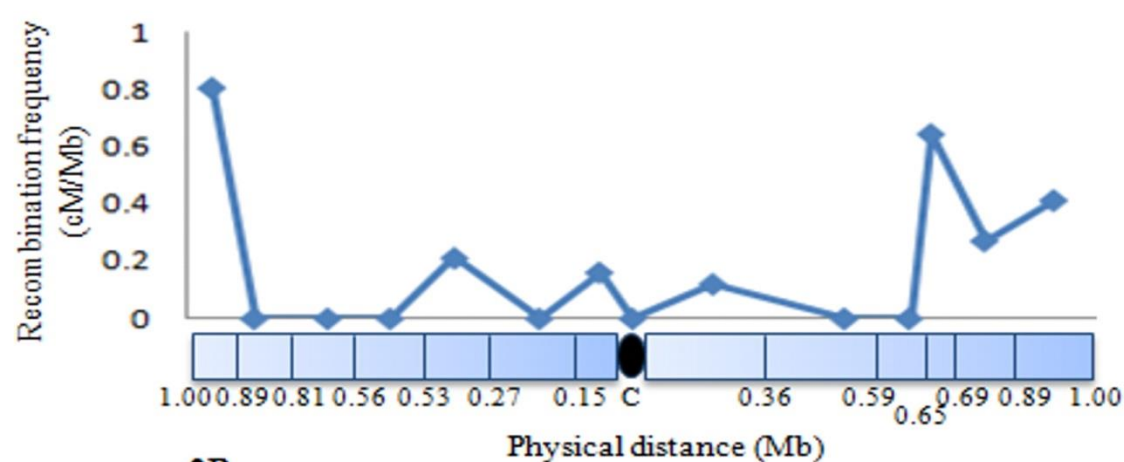
Supplementary Fig 2a-g. Graph plots showing physical distribution of recombination frequency (cM/Mb) along individual wheat chromosome. The frequency of recombination was calculated by dividing the length of a genetic sub-region in cM by the length of the corresponding physical sub-region (bin) in Mb and was plotted at the midpoint of each physical sub-region or bin. The oval shaped black dot indicates physical position of the centromere, which is also represented by 'C'. Vertical lines on the chromosome ideogram indicate break points that divide the chromosome into sub-regions or bins. Name and fraction length of each bin is given below the break point and along the chromosome.



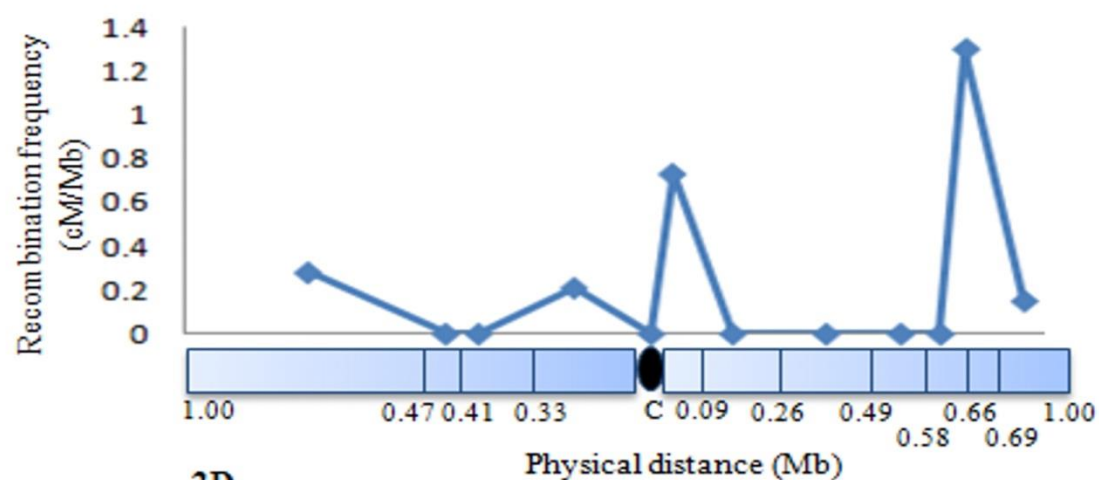
(a)



2A

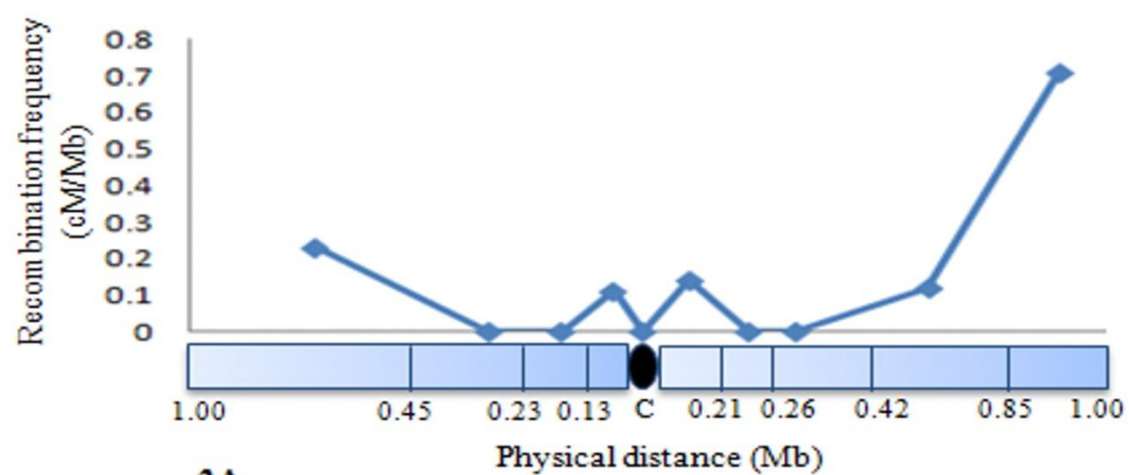


2B

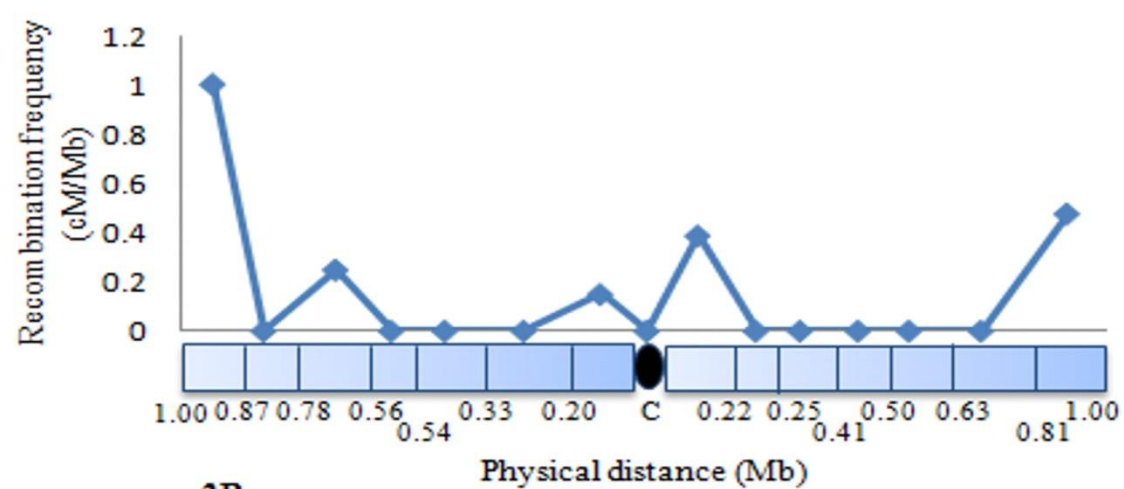


2D

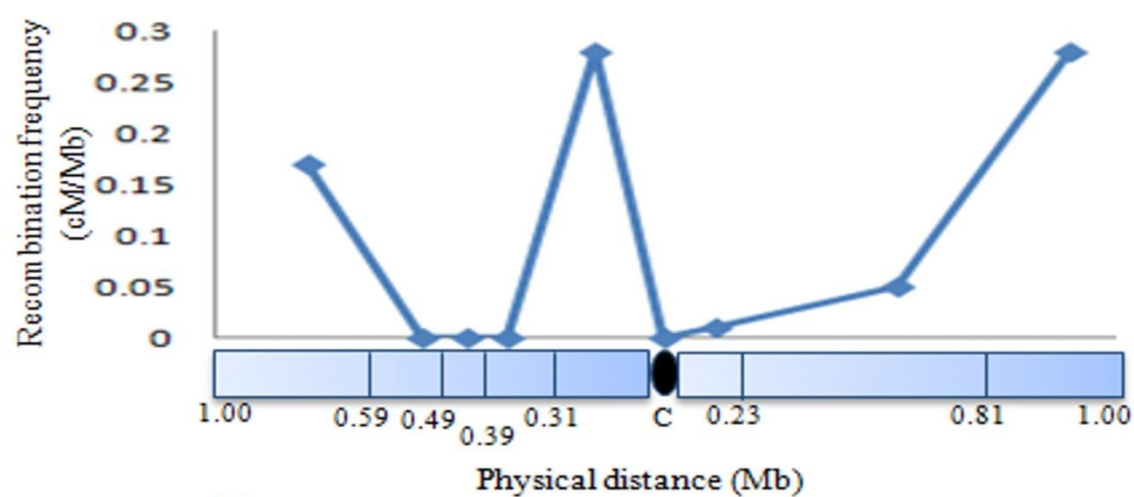
(b)



3A

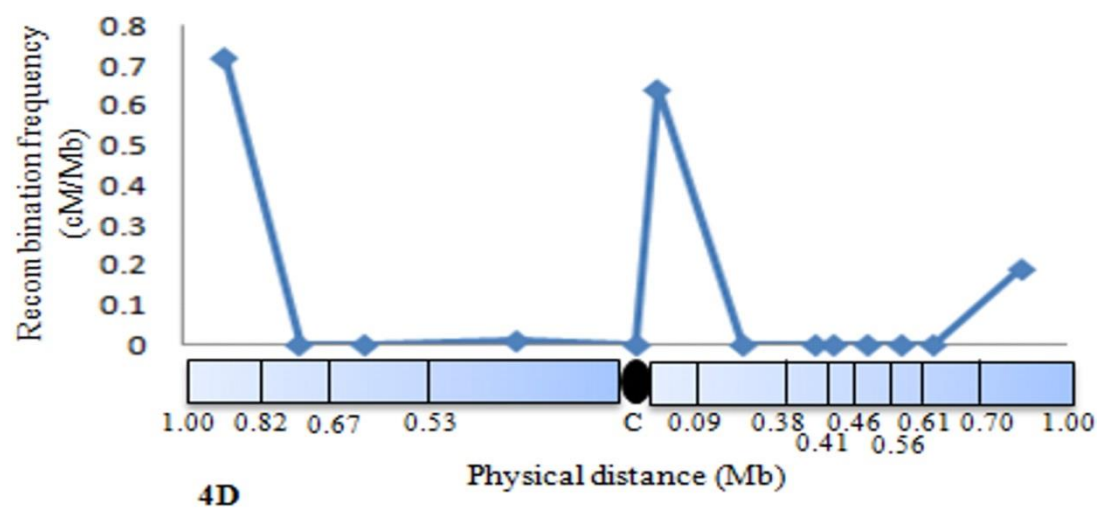
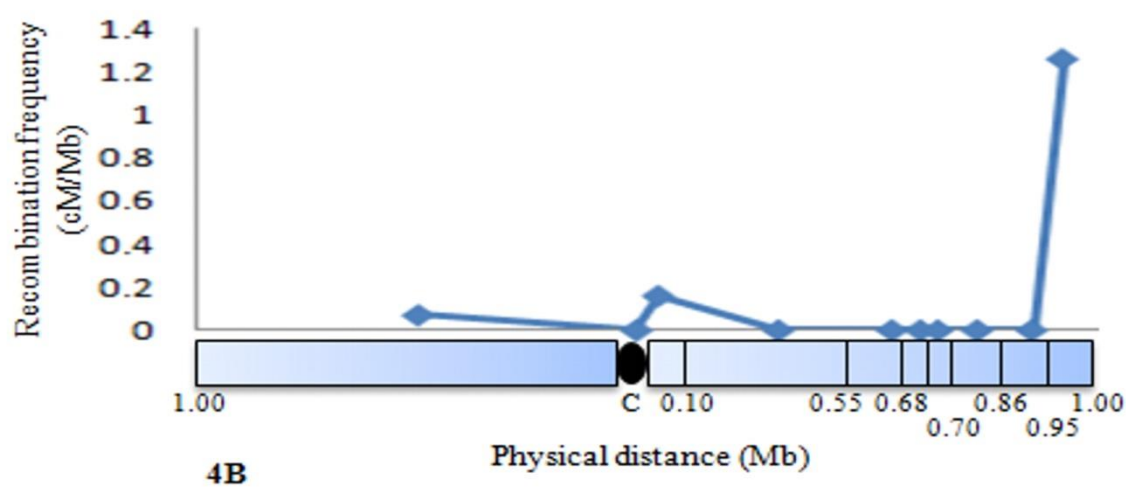
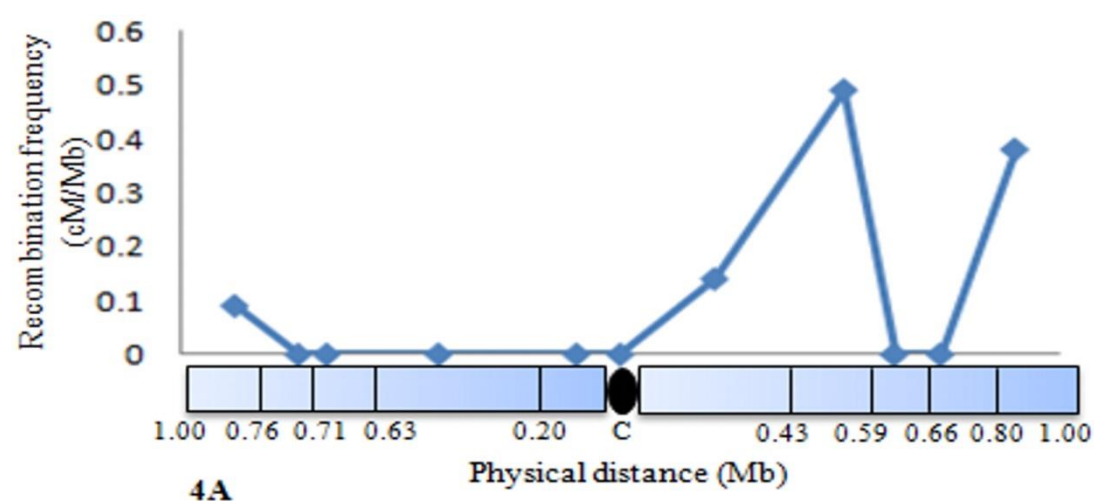


3B

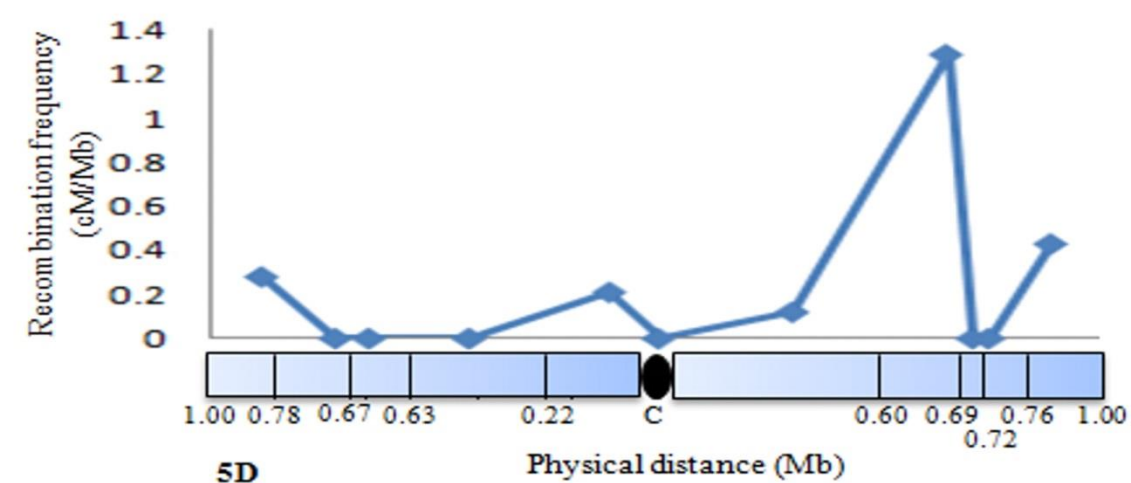
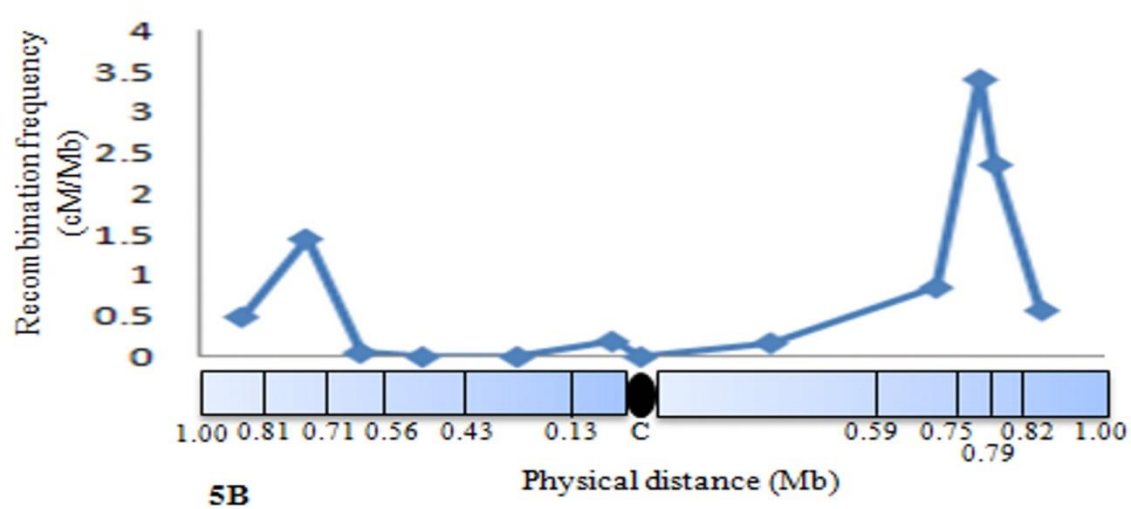
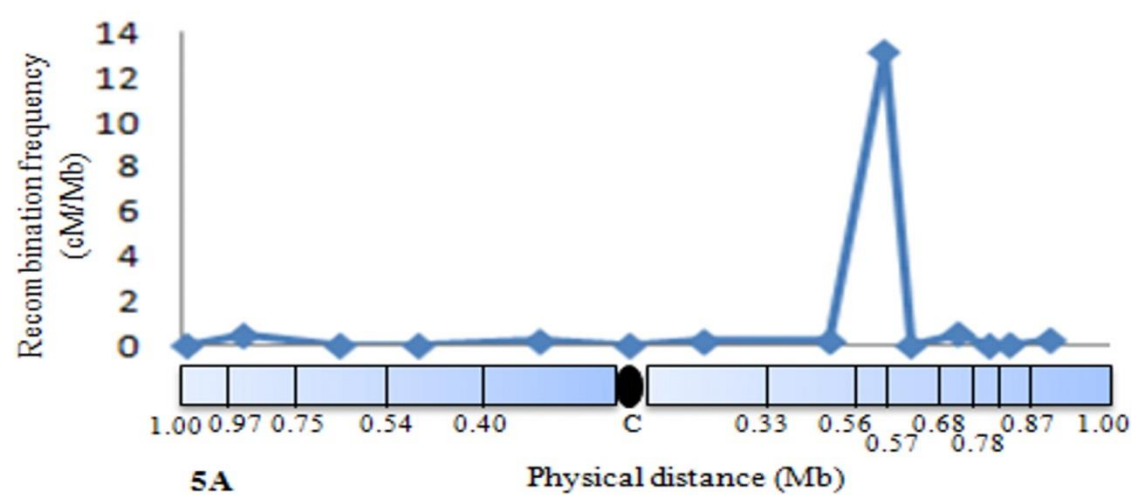


3D

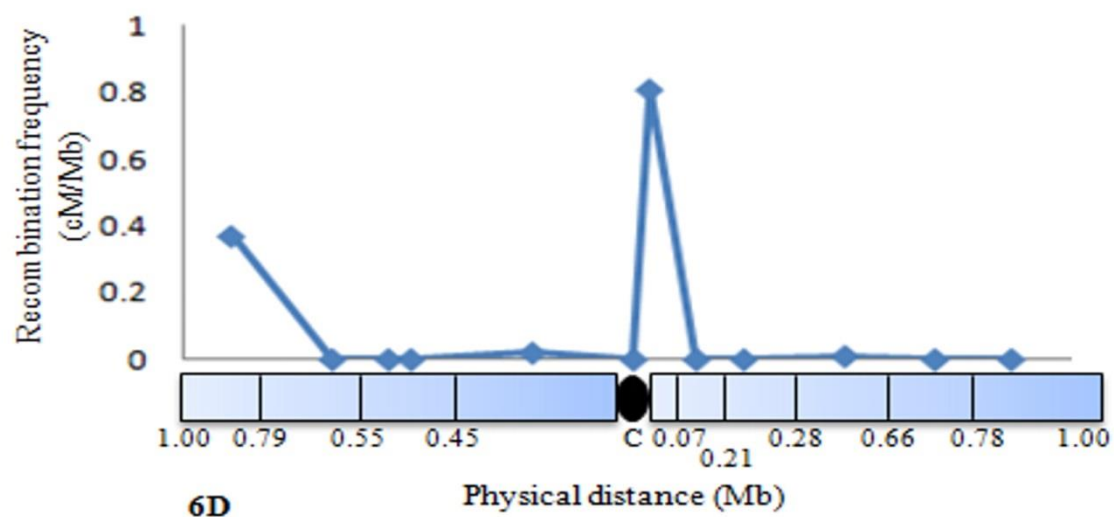
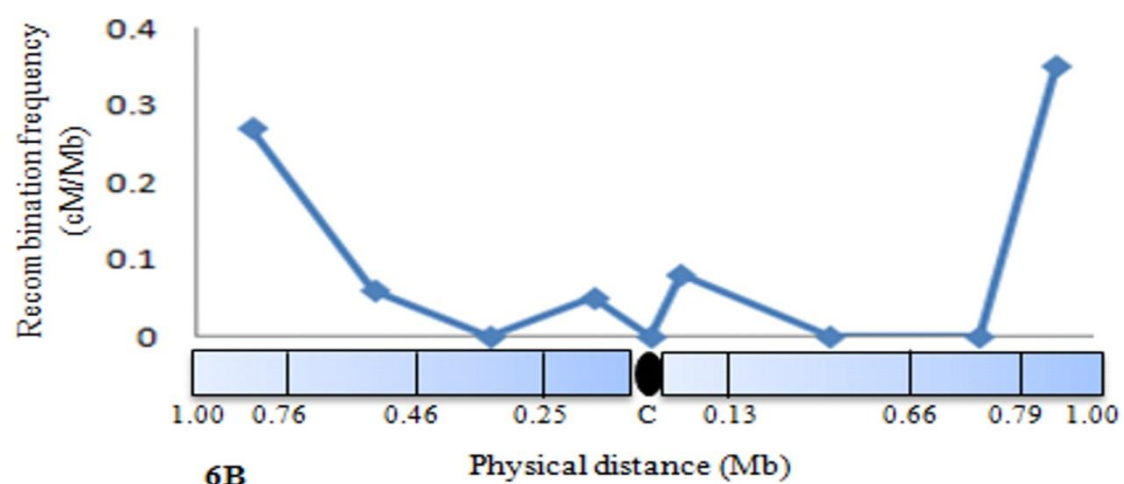
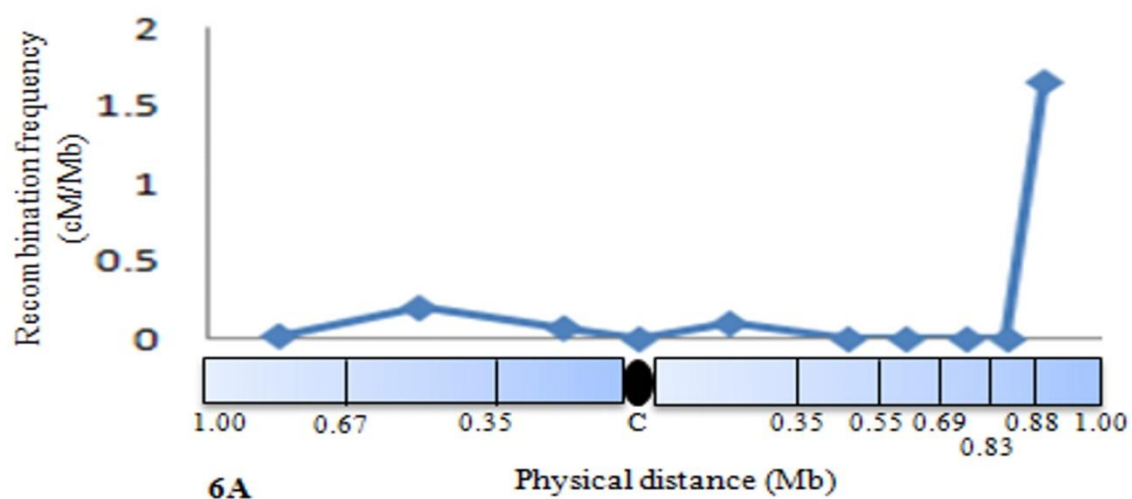
(c)



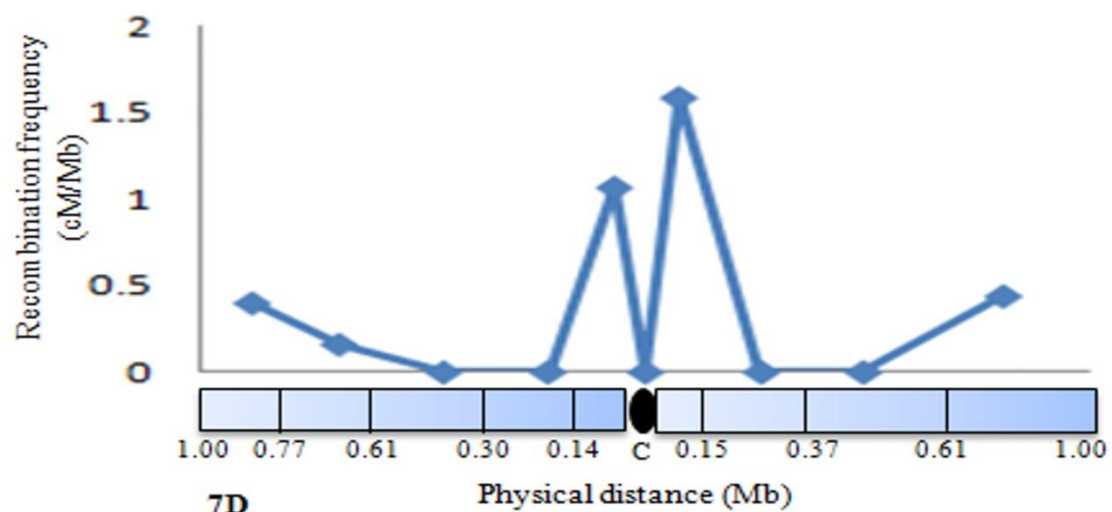
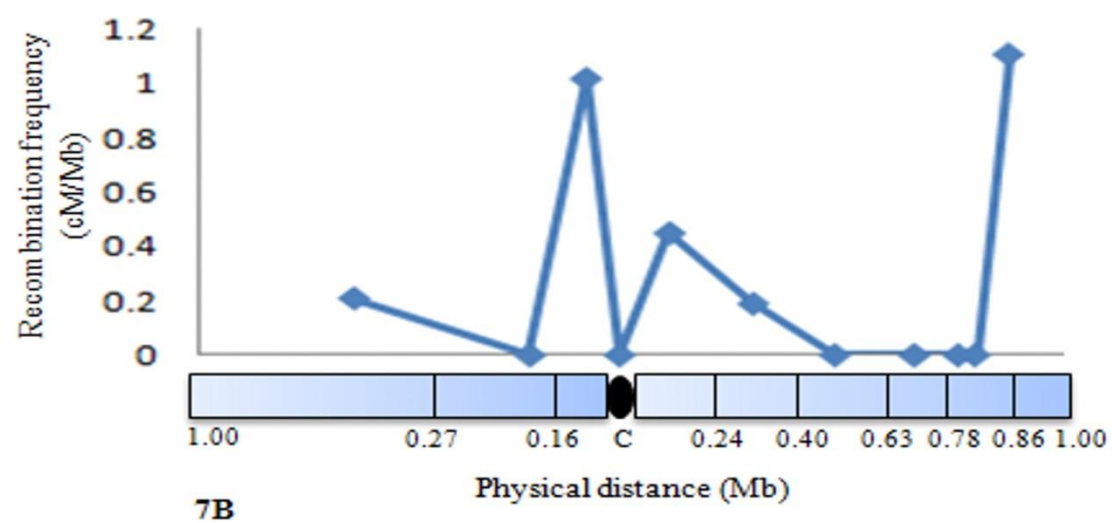
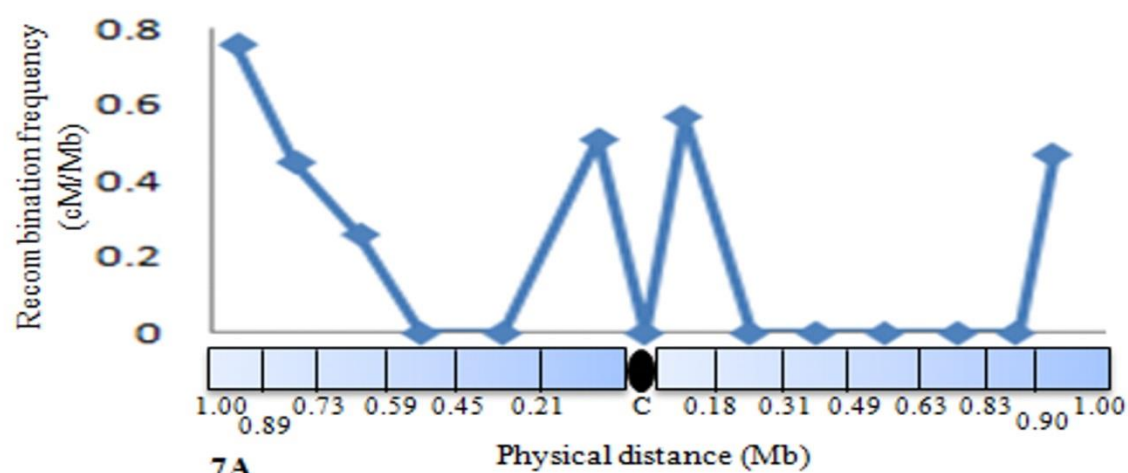
(d)



(e)



(f)



(g)