Updated tomato genome assembly based on FISH results

Using FISH results Steven Stack, the tomato genome scaffolds were re-ordered, re-oriented, and gap sizes between scaffolds were set. The citation for the FISH and optical mapping work is

Lindsay A. Shearer, Lorinda K. Anderson, Hans de Jong, Sandra Smit, José Luis Goicoechea, Bruce A. Roe, Axin Hua, James J. Giovannoni, and Stephen M. Stack. 2014. Fluorescence in situ hybridization and optical mapping To correct scaffold arrangement in the tomato genome.G3 g3.114.011197; doi:10.1534/g3.114.011197 (http://www.g3journal.org/content/early/2014/05/30/g3.114.011197.abstract)

Tiling Path Files (TPF) were modified using perl scripts in the Bio::GenomeUpdate package (authored by Surya Saha and Jeremy Edwards at SGN) available at https://github.com/solgenomics/Bio-GenomeUpdate. Accessioned Golden Path (AGP) and assembled chromosome and scaffold sequences were generated from the TPFs by tools available through the NCBI Genome Reference Consortium (GRC). Table 1 lists the order and orientation changes made. Table 2 lists the gap sizes that were set. Figures 1-12 show the dotplot alignments between the original chromosome sequences and the new assemblies based on FISH results.

Table 1. Order and orientation of scaffolds from FISH results.

Chr.	Scaffold	Original Scaffold#	Reversed
1	SL2.40sc04133	1	
1	SL2.40sc04191	3	yes
1	SL2.40sc03666	2	
1	SL2.40sc03594	4	
1	SL2.40sc05010	5	
1	SL2.40sc05941	6	
1	SL2.40sc06917	8	
1	SL2.40sc06903	7	
1	SL2.40sc04323	9	
2	SL2.40sc04732	4	yes
2	SL2.40sc04208	6	yes
2	SL2.40sc05776	5	
2	SL2.40sc06593	1	
2	SL2.40sc04142	2	
2	SL2.40sc03766	3	
2	SL2.40sc03665	7	

3	SL2.40sc04439	1	
3	SL2.40sc04696	4	
3	SL2.40sc05330	5	
3	SL2.40sc04126	6	
3	SL2.40sc04616	9	
3	SL2.40sc06725	7	
3	SL2.40sc04704	8	
3	SL2.40sc04822	2	yes
3	SL2.40sc03721	12	
3	SL2.40sc03806	10	
3	SL2.40sc03796	11	
3	SL2.40sc06911	3	yes
3	SL2.40sc03701	13	
4	SL2.40sc03604	1	
4	SL2.40sc05339	3	yes
4	SL2.40sc03683	2	yes
4	SL2.40sc06101	4	
4	SL2.40sc04680	5	
4	SL2.40sc04135	6	
5	SL2.40sc03726	1	
5	SL2.40sc06155	2	yes
5	SL2.40sc03902	3	
6	SL2.40sc04474	1	
6	SL2.40sc06140	3	yes
6	SL2.40sc05383	2	
6	SL2.40sc04279	4	
6	SL2.40sc05188	5	yes
6	SL2.40sc05732	6	
6	SL2.40sc05054	7	
6	SL2.40sc03622	8	
7	SL2.40sc03731	1	
7	SL2.40sc05397	2	
7	SL2.40sc03685	3	
7	SL2.40sc04626	4	
8	SL2.40sc04813	1	
8	SL2.40sc03770	2	
8	SL2.40sc04167	7	
8	SL2.40sc03749	5	yes
8	SL2.40sc04236	6	yes
8	SL2.40sc03835	3	yes
8	SL2.40sc04701	4	yes
8	SL2.40sc04948	8	

8	SL2.40sc03923	9	
9	SL2.40sc03771	1	
9	SL2.40sc06916	2	
9	SL2.40sc04008	4	
9	SL2.40sc04950	3	yes
9	SL2.40sc04785	5	
9	SL2.40sc04777	6	
9	SL2.40sc05269	7	
9	SL2.40sc03852	8	
9	SL2.40sc04828	9	
9	SL2.40sc06214	10	
10	SL2.40sc05925	1	
10	SL2.40sc03798	2	
10	SL2.40sc04872	4	
10	SL2.40sc05632	3	
10	SL2.40sc04534	5	
10	SL2.40sc04199	6	
11	SL2.40sc03748	1	
11	SL2.40sc06763	4	
11	SL2.40sc04054	2	
11	SL2.40sc03752	3	yes
11	SL2.40sc06137	5	
11	SL2.40sc03876	6	
12	SL2.40sc04607	1	
12	SL2.40sc06147	2	
12	SL2.40sc04039	3	yes
12	SL2.40sc04878	4	
12	SL2.40sc04266	5	
12	SL2.40sc04757	6	
12	SL2.40sc04057	7	
12	SL2.40sc04915	8	
12	SL2.40sc05611	9	
12	SL2.40sc05380	10	

Table 2. Gap sizes between scaffolds determined by FISH.

Chr.	Gap start	Gap end	Size (Mb)
1	SL2.40sc04133	SL2.40sc04191	2.28
1	SL2.40sc04191	SL2.40sc03666	2.13
1	SL2.40sc03666	SL2.40sc03594	0.57
1	SL2.40sc03594	SL2.40sc05010	2.12
1	SL2.40sc05010	SL2.40sc05941	0.51
1	SL2.40sc05941	SL2.40sc06917	0.25
1	SL2.40sc06917	SL2.40sc06903	0.17
1	SL2.40sc06903	SL2.40sc04323	0.21
2	SL2.40sc04732	SL2.40sc04208	0.34
2	SL2.40sc04208	SL2.40sc05776	0.10
2	SL2.40sc05776	SL2.40sc06593	0.10
2	SL2.40sc06593	SL2.40sc04142	3.05
2	SL2.40sc04142	SL2.40sc03766	0.49
2	SL2.40sc03766	SL2.40sc03665	1.34
3	SL2.40sc04439	SL2.40sc04696	0.09
3	SL2.40sc04696	SL2.40sc05330	0.10
3	SL2.40sc05330	SL2.40sc04126	0.32
3	SL2.40sc04126	SL2.40sc04616	2.58
3	SL2.40sc04616	SL2.40sc06725	0.16
3	SL2.40sc06725	SL2.40sc04704	0.74
3	SL2.40sc04704	SL2.40sc04822	1.09
3	SL2.40sc04822	SL2.40sc03806	-0.37
3	SL2.40sc03806	SL2.40sc03796	0.10
3	SL2.40sc03796	SL2.40sc06911	0.07
3	SL2.40sc06911	SL2.40sc03701	0.08
4	SL2.40sc03604	SL2.40sc05339	0.30
4	SL2.40sc05339	SL2.40sc03683	0.47
4	SL2.40sc03683	SL2.40sc06101	0.08
4	SL2.40sc06101	SL2.40sc04680	0.03
4	SL2.40sc04680	SL2.40sc04135	1.53
5	SL2.40sc03726	SL2.40sc06155	0.85
5	SL2.40sc06155	SL2.40sc05339	0.75
6	SL2.40sc04474	SL2.40sc06140	2.34
6	SL2.40sc06140	SL2.40sc05383	0.61
6	SL2.40sc05383	SL2.40sc04279	0.34
6	SL2.40sc04279	SL2.40sc05188	1
6	SL2.40sc05188	SL2.40sc05732	1
6	SL2.40sc05732	SL2.40sc05054	1

6	SL2.40sc05054	SL2.40sc03622	1
7	SL2.40sc03731	SL2.40sc05397	0.39
7	SL2.40sc05397	SL2.40sc03685	2.29
7	SL2.40sc03685	SL2.40sc04626	0.10
8	SL2.40sc04813	SL2.40sc03770	0.10
8	SL2.40sc03770	SL2.40sc04167	0.52
8	SL2.40sc04167	SL2.40sc03749	0.26
8	SL2.40sc03749	SL2.40sc04236	0.10
8	SL2.40sc04236	SL2.40sc03835	0.04
8	SL2.40sc03835	SL2.40sc04701	0.97
8	SL2.40sc04701	SL2.40sc04948	0.80
8	SL2.40sc04948	SL2.40sc03923	0.04
9	SL2.40sc03771	SL2.40sc04008	1.46
9	SL2.40sc04008	SL2.40sc04950	0.72
9	SL2.40sc04950	SL2.40sc04785	1.05
9	SL2.40sc04785	SL2.40sc04777	1.25
9	SL2.40sc04777	SL2.40sc05269	1
9	SL2.40sc05269	SL2.40sc03852	1
9	SL2.40sc03852	SL2.40sc04828	0.04
9	SL2.40sc04828	SL2.40sc06214	0.07
10	SL2.40sc05925	SL2.40sc03798	0.10
10	SL2.40sc03798	SL2.40sc04872	0.39
10	SL2.40sc04872	SL2.40sc05632	0.10
10	SL2.40sc05632	SL2.40sc04199	0.10
11	SL2.40sc03748	SL2.40sc06763	0.35
11	SL2.40sc06763	SL2.40sc04054	0.53
11	SL2.40sc04054	SL2.40sc03752	1.31
11	SL2.40sc03752	SL2.40sc06137	0.07
11	SL2.40sc06137	SL2.40sc03876	0.65
12	SL2.40sc04607	SL2.40sc06147	0.17
12	SL2.40sc06147	SL2.40sc04039	0.01
12	SL2.40sc04039	SL2.40sc04878	0.08
12	SL2.40sc04878	SL2.40sc04266	0.55
12	SL2.40sc04266	SL2.40sc04757	0.47
12	SL2.40sc04057	SL2.40sc04915	0.01
12	SL2.40sc04915	SL2.40sc05611	0.07
12	SL2.40sc05611	SL2.40sc05380	0.01

Figure 1. Chromosome 1: Dotplot of original vs FISH-modified chromosome sequence.

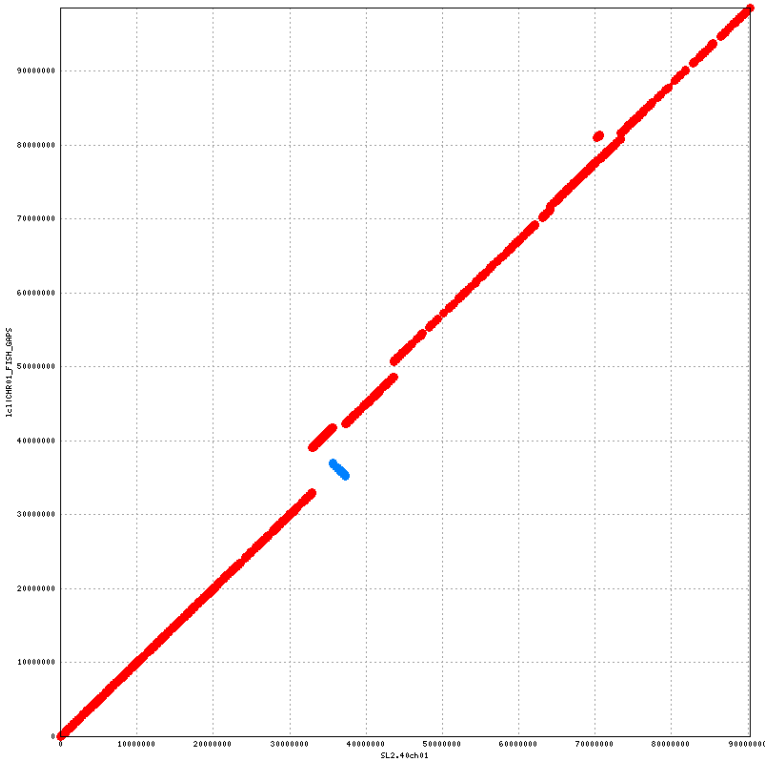

Figure 2. Chromosome 2: Dotplot of original vs FISH-modified chromosome sequence.

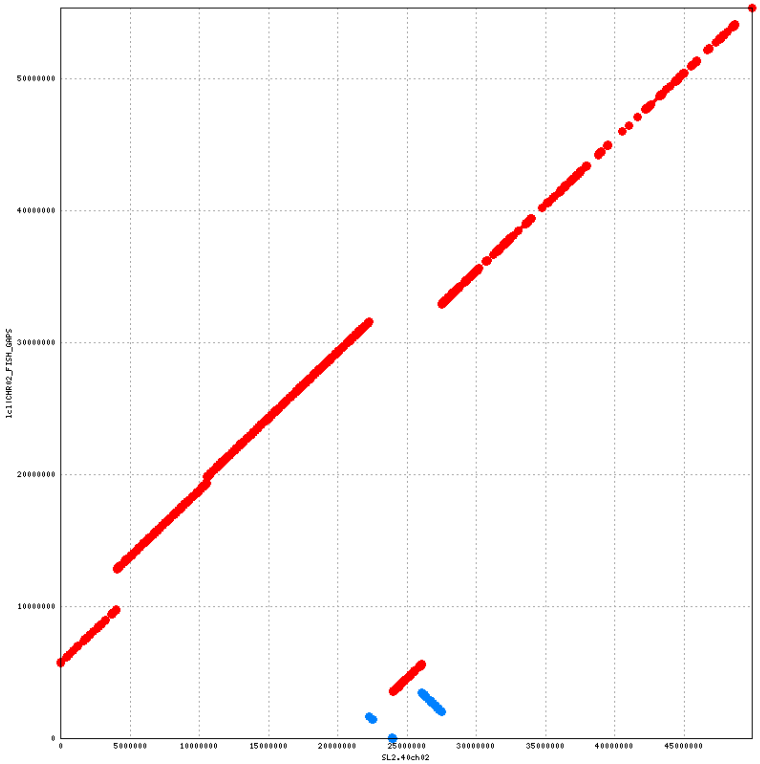

Figure 3. Chromosome 3: Dotplot of original vs FISH-modified chromosome sequence.

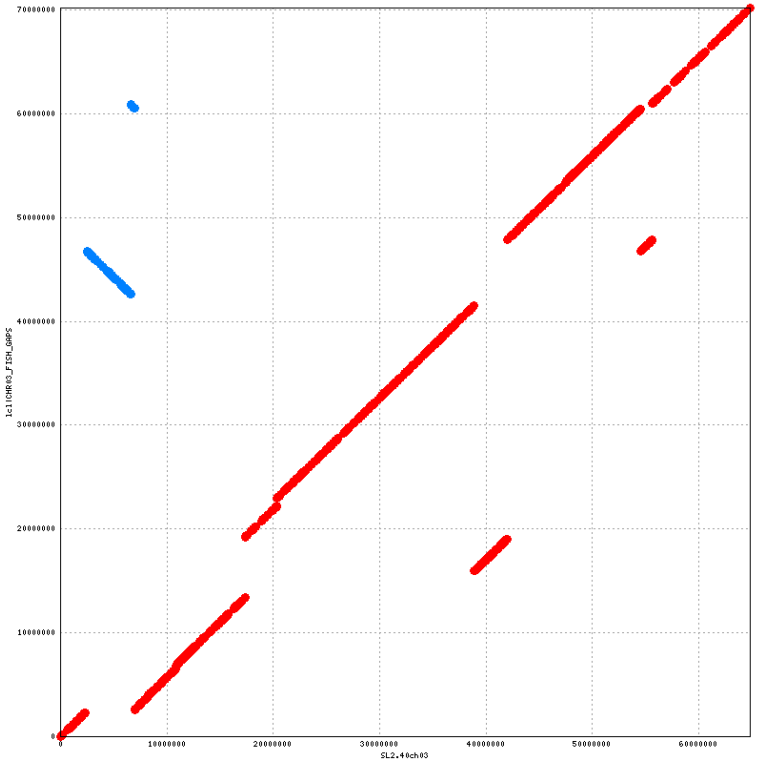

Figure 4. Chromosome 4: Dotplot of original vs FISH-modified chromosome sequence.

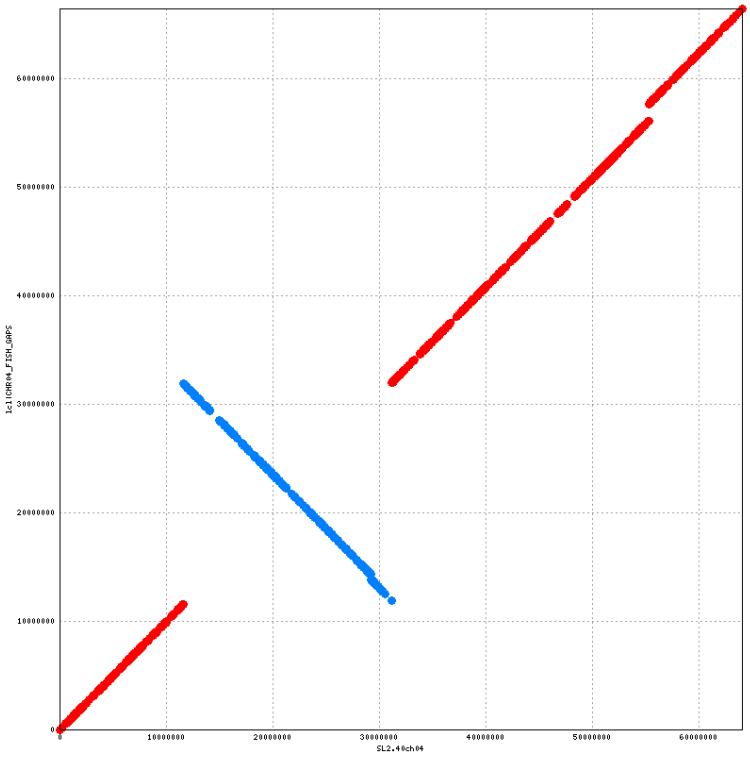

Figure 5. Chromosome 5: Dotplot of original vs FISH-modified chromosome sequence.

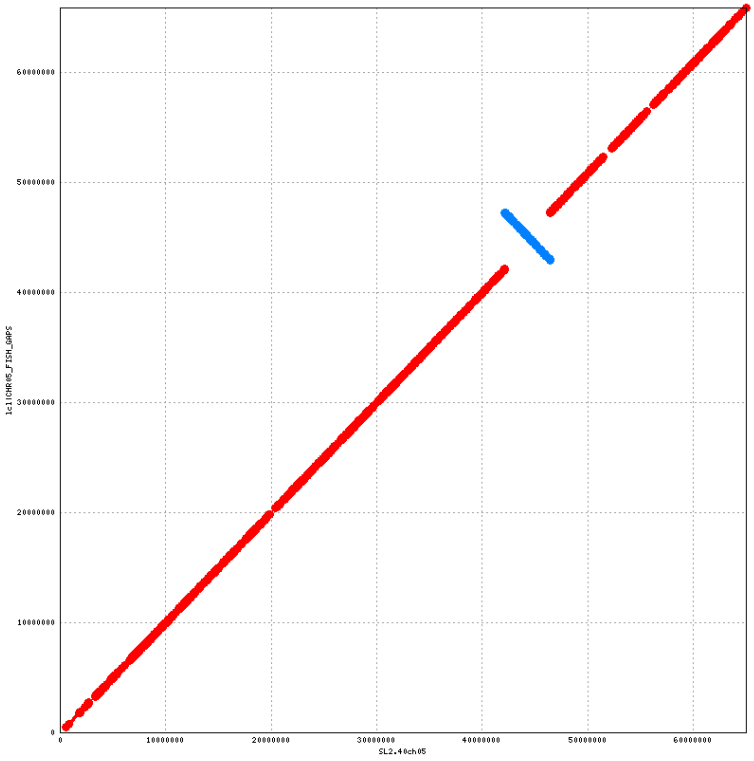

Figure 6. Chromosome 6: Dotplot of original vs FISH-modified chromosome sequence.

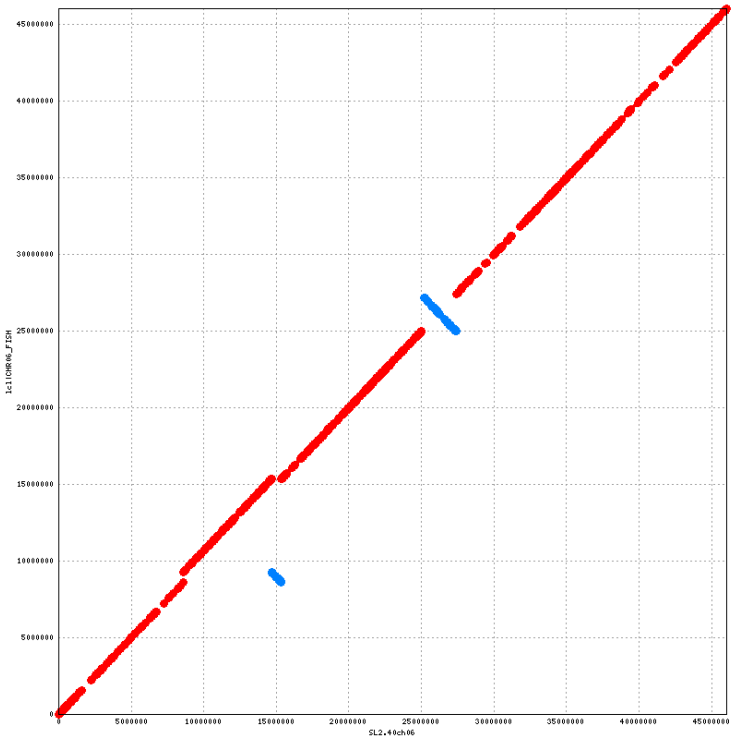

Figure 7. Chromosome 7: Dotplot of original vs FISH-modified chromosome sequence.

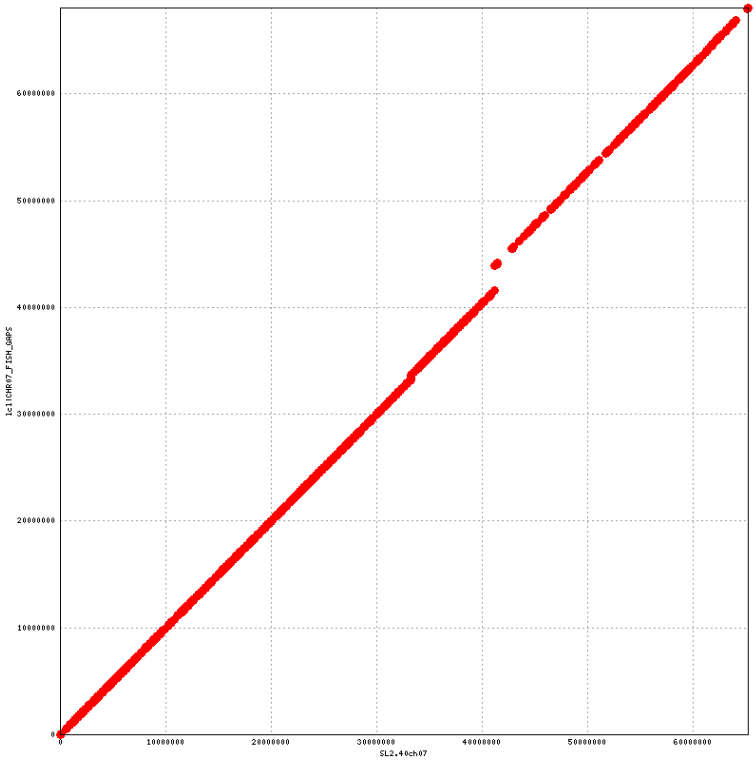

Figure 8. Chromosome 8: Dotplot of original vs FISH-modified chromosome sequence.

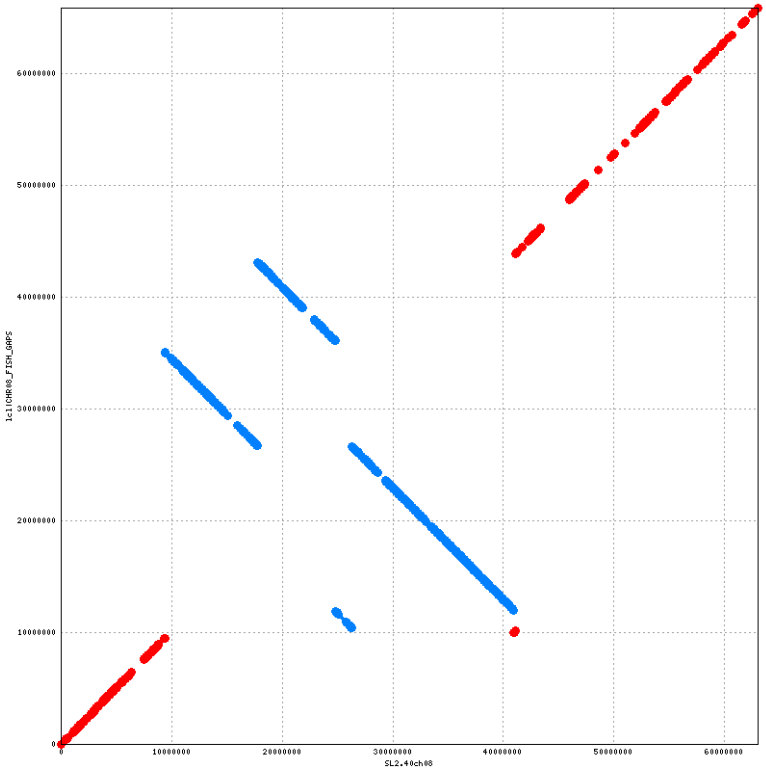

Figure 9. Chromosome 9: Dotplot of original vs FISH-modified chromosome sequence.

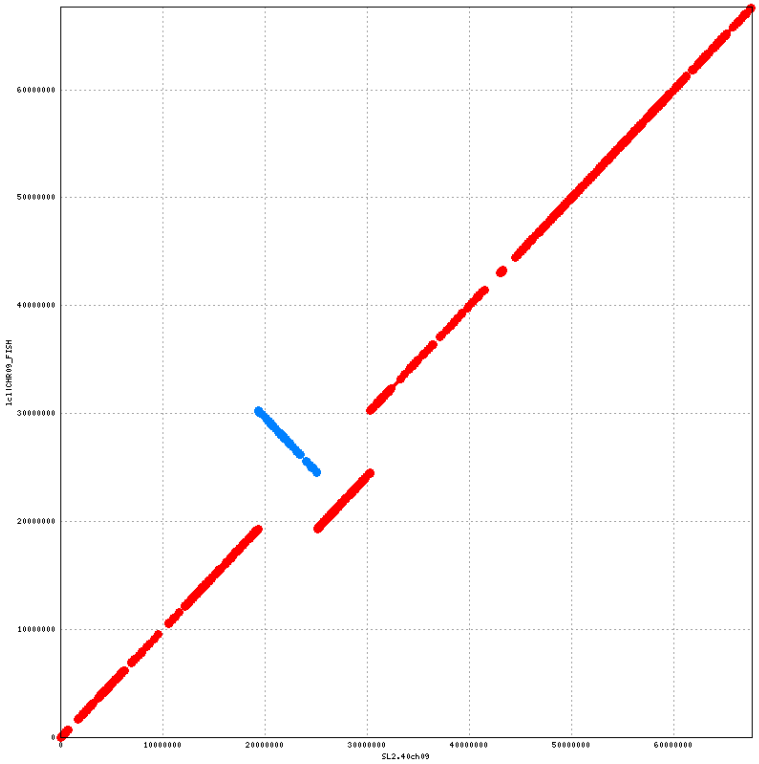

Figure 10. Chromosome 10: Dotplot of original vs FISH-modified chromosome sequence.

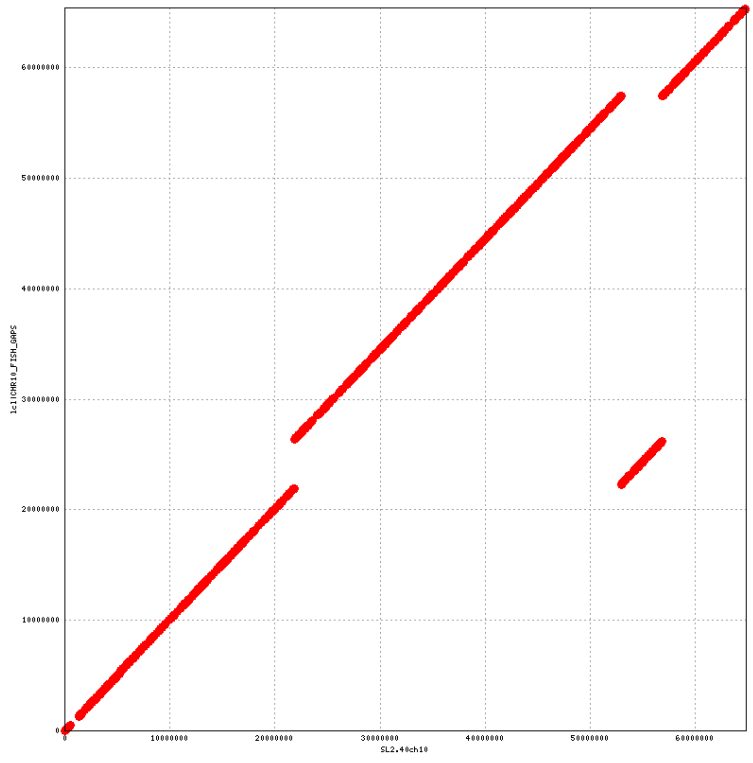

Figure 11. Chromosome 11: Dotplot of original vs FISH-modified chromosome sequence.

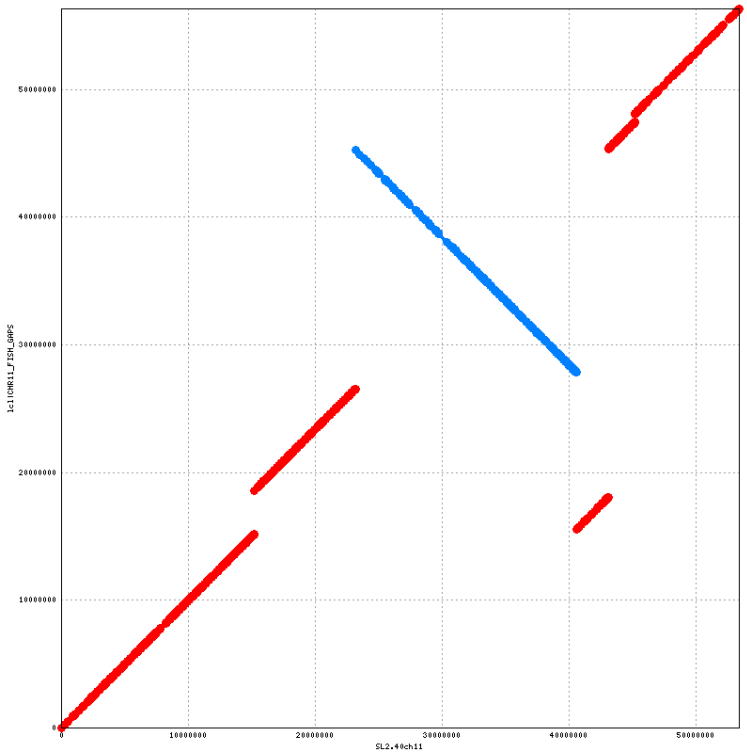

Figure 12. Chromosome 12: Dotplot of original vs FISH-modified chromosome sequence.