

Supplementary Tables

Material number	Resolved Chromosome number	Chromosome Volume (nm ³)	p arm volume (nm ³)	q arm volume (nm ³)	p arm volume %	q arm volume %	Whole chromosome volume %	Chromosome Length (nm)	P arm length (nm)	q arm length (nm)	p arm length %	q arm length %	Whole chromosome length %	Calculated DNA content (Mbp)
chromosome_1_-_4_final	1a	803642675	345890600	457752075	43.0	56.96	5.3	4732.68	2459.39	2571.02	47.17	52.83	3.94	138.559
chromosome_1_-_42_final	1b	784022525	364984400	419038125	46.6	53.448	5.2	5030.41	2232.66	2500.02	48.9	51.1	4.19	135.1762
chromosome_2_-_34_final	2a	677657475	200439525	501378625	41.8	58.203	4.7	4769	1817.95	2923.96	38.73	61.27	3.97	116.8374
chromosome_2_-_22_fianl	2b	701818150	283245875	394411600	28.6	71.44	4.5	4741.91	1847.14	2921.86	38.33	61.67	3.95	121.0031
chromosome_3_-_29_final	3a	508193950	251704200	327906975	44.5	55.531	3.8	3439.11	1776.67	2140.31	44.26	55.74	2.86	87.6196
chromosome_3_-_17_final	3b	579611175	157372600	401913600	43.4	56.574	3.7	3916.98	1522.22	1916.89	45.35	54.65	3.26	99.9329
chromosome4_-_20_final	4a	499947800	225991700	282202250	23.3	76.718	3.4	3661.56	1307.38	2445.61	28.25	71.75	3.05	86.1978
chromosome_4_-_16_final	4b	559286200	116398975	383548825	28.1	71.862	3.3	3752.99	1034.58	2626.98	34.83	65.17	3.12	96.4286
chromosome_5_30_final	5a	455217125	130147600	357509625	25.5	74.512	3.2	3122.33	978.26	2505.18	26.39	73.6	2.6	78.4857
chromosome_5_-_18_final	5b	487657225	116029925	339187200	26.7	73.312	3.0	3483.44	824	2298.33	28.08	71.91	2.9	84.0788
chromosome_6_-_15_final	6a	446786450	172031750	274754700	38.5	61.496	3.0	3469.08	1482.34	1986.74	42.73	57.27	2.88	77.0321
chromosome_6_-_23_final	6b	415807425	149413825	273230100	28.0	71.966	2.8	2869.49	1160.15	1709.34	40.43	59.57	2.39	71.6909
chromosome_7_-_12_final	7a	371382275	116571400	299236025	40.2	59.808	2.8	2980.63	690.13	1476.13	36.17	63.83	2.48	64.0314
chromosome_7_-_7_final	7b	373772025	137440875	236331150	36.8	63.229	2.5	2779.43	995.73	1783.7	35.82	64.18	2.31	64.4434
chromosome_8_-_46_final	8a	329942800	149268625	222113650	19.4	80.648	2.5	2369.78	1078.28	1902.35	32.18	67.82	1.97	56.8866
chromosome_8_-_10_final	8b	368566000	81523750	287042250	22.1	77.881	2.4	2580.2	840.25	1739.95	32.56	67.44	2.14	63.5458
chromosome_9_-_8_final	9a	269799750	107572025	238645275	33.8	66.232	2.3	2618.01	743	2360.99	32.73	67.27	2.18	46.5171
chromosome_9_-_24_final	9b	346217300	87104875	250252200	31.1	68.93	2.2	3103.99	1498.37	2201.15	23.93	76.07	2.58	59.6926
chromosome_10_-_1_final	10a	324328400	63851700	266091100	20.2	79.8	2.2	1999.6	762.74	1607.04	23.9	76.1	1.66	55.918
chromosome_10_-_13_final	10b	313586625	88393525	240548000	35.6	64.396	2.2	2341.92	1181.39	1450.83	38.39	61.61	1.95	54.0666
chromosome_11_-_25_final	11a	328941525	65500325	258828075	26.9	73.128	2.1	2632.22	477.95	1521.65	44.88	55.12	2.19	56.714
chromosome_11_-_36_final	11b	337357075	117128000	197302600	25.8	74.181	2.1	3699.52	1871.05	1310.87	40.5	59.5	3.08	58.165
chromosome_12_-_27_final.	12a	255715350	111649725	201936900	23.4	76.634	2.1	2768.35	899.07	1442.85	33.27	66.73	2.3	44.0888
chromosome_12_-_14_	12b	287741025	55935275	235704975	26.1	73.906	1.9	2627.77	515.58	1196.24	26.25	73.75	2.188	49.6105
chromosome_13_-_2_final	13a	213495425	75083525	212657500	11.8	88.151	1.9	2016.5	690.05	1937.72	13.34	86.66	1.67	36.8095
chromosome_13_-_38_final	13b	238463775	91106950	178692800	9.6	90.415	1.8	2037.57	857.13	1760.88	16.49	83.51	1.697	41.1144
chromosome_14_-_3_final	14a	187441100	102520275	164950225	16.8	83.218	1.8	1910.41	878.57	1443.88	24	76	1.59	32.3174
chromosome_14_-_26_final	14b	241776150	59752825	195962525	14.1	85.874	1.7	1807.73	921.24	1847.11	11.63	88.37	1.5	41.6855
chromosome_15_-_31_final	15a	231563750	34155275	207620875	16.6	83.367	1.6	2120.93	210.26	1597.47	26.07	73.93	1.76	39.9247
chromosome_15_-_37_final	15b	188212475	22856900	215606875	19.7	80.309	1.6	1810.24	336.16	1701.41	27.9	72.1	1.5	32.4504
chromosome_16_-_44_final..	16a	267470500	75119825	161008650	38.3	61.671	1.6	2322.45	740.94	1294.86	37.82	62.18	1.93	46.1156
chromosome_16_-_41_final	16b	422643925	38517325	193046425	35.4	64.648	1.5	2166.26	553.08	1567.85	31.85	68.15	1.8	72.8696
chromosome_17_-_21_final	17a	181872075	25298075	188197350	34.9	65.105	1.4	1645.65	269.09	1747.41	36.06	63.94	1.37	31.3572
chromosome_17_-_39_final	17b	236128475	41896250	170489000	31.8	68.187	1.4	2035.8	599.28	1322.39	36.39	63.61	1.695	40.711
chromosome_18_-_33_final	18a	212385250	85556075	105139925	19.7	80.274	1.3	1921.67	742.05	796.86	31.18	68.82	1.6	36.6181
chromosome_18_-_45_final	18b	291640250	37062300	151150175	19.2	80.821	1.2	1711.82	505.2	1305.04	30.11	69.89	1.42	50.2828
chromosome_19_-_28_final	19a	112569325	31456975	155984125	47.9	52.09	1.2	1520.94	458.58	1451.83	48.69	51.3	1.26	19.4085
chromosome_19_-_6_final	19b	126871525	63464500	118407575	45.1	54.93	1.2	1733.76	593.43	1052.22	49.08	50.92	1.44	21.8744
chromosome_20_-_43_final	20a	114006200	57184600	69686925	37.9	62.102	0.8	1449.02	882.91	850.85	46.8	53.2	1.2	19.6562
chromosome_20_-_5_final	20b	190696000	21187100	104468375	44.9	55.135	0.8	1538.91	866.93	1891.44	48.21	51.79	1.28	32.8786
chromosome_21_-_19_final	21a	75440475	43206075	70800125	18.0	81.985	0.8	1475.33	678.15	770.87	24.13	75.87	1.22	13.0069
chromosome_21_-_11_final	21b	86747925	53932725	58636600	23.7	76.257	0.7	1310.35	740.67	780.27	36.11	63.89	1.09	14.9565
chromosome_22_-_35_final	22a	105871975	31475125	74396850	29.7	70.271	0.7	1057.13	402.51	654.62	38.07	61.93	0.88	18.2537
chromosome_22_-_9_final	22b	92761625	26145075	66616550	28.2	71.815	0.6	1023.41	294.14	729.27	28.74	71.26	0.85	15.9933
chromosome_X_-_40_edited_new	(X) 23	314430600	20597225	66150700	37.3	62.75	0.6	3181.92	473.19	837.16	41.2	58.8	2.65	54.2121
chromosome_Y_-_32_final	(Y) 24	125655475	13591325	61849150	16.9	83.139	0.5	2758.37	356	1119.33	31.43	68.57	2.3	21.6647
Total		15085142600					100.00	120046.57					99.83	

Supplementary Table S1. Measurements of chromosomes after narrow segmentation. Summary table showing raw data for volume and length measurements for all 46 narrow segmented prophase chromosomes obtained from Avizo software. Calculations for p and q arm %, whole chromosome % and DNA content are given in Supplementary calculations (S1, S2 and S4).

Material number	Resolved Chromosome number	Chromosome volume (nm ³)	Calculated DNA content (Mbp)	CenterX (nm)	CenterY (nm)	CenterZ (nm)	Radius/MEMB (nm)
chromosome 1 4 combined	1a	1340912925	231.19	10618.946	20902.945	6659.7163	3326
chromosome 1 42 combined	1b	1599589750	275.79	11644.166	20413.619	3772.0825	3345
chromosome 2 34 combined	2a	1344812150	231.86	8554.6309	19515.209	5801.5547	2062
chromosome 2 22 combined	2b	1325101250	228.46	7463.1465	18429.328	5816.7554	2481
chromosome 3 29 combined	3a	1082759425	186.68	11467.317	16246.604	6685.4697	2808
chromosome 3 17 combined	3b	1181114275	203.64	9664.0703	20248.027	4075.1323	2527
chromosome 4 20 combined	4a	1248547575	215.266	7519.7549	18491.967	2953.1899	3281
chromosome 4 16 combined	4b	1221113850	210.536	7321.1499	19342.553	3555.5393	3301
chromosome 5 30 combined	5a	873943675	150.67	12443.127	16150.644	6099.0591	3317
chromosome 5 18 combined	5b	970550075	167.33	9795.4863	18826.332	2738.593	2620
chromosome 6 15 combined	6a	974942375	168.09	9164.1514	17051.939	2408.9419	3049
chromosome 6 23 combined	6b	932507675	160.77	8391.7148	17831.779	4130.8047	1820
chromosome 7 12 combined	7a	904453825	155.94	12082.962	18069.578	4741.6875	2300
chromosome 7 7 combined	7b	920943100	158.78	9958.002	18296.07	8247.1055	3037
chromosome 8 46 combined	8a	828205675	142.794	11395.227	19114.521	7020.4619	2623
chromosome 8 10 combined	8b	950742375	163.92	11293.394	20623.805	5300.4062	2998
chromosome 9 8 combined	9a	843742075	145.47	8832.0059	16114.48	7730.083	3294
chromosome 9 24 combined	9b	861644025	148.55	8710.6016	20613.592	5841.3682	2906
chromosome 10 1 combined	10a	606618375	140.1	10229.476	19518.533	8080.7876	3255
chromosome 10 13 combined	10b	781436150	134.73	12664.235	19195.689	5547.1899	3086
chromosome 11-25 combined	11a	774663175	133.56	10188.726	17243.354	7023.5005	1984
chromosome 11 36 combined	11b	798149275	137.61	12262.213	18628.455	7966.0947	3713
chromosome 12 27 combined	12a	692355950	119.37	8412.2676	18135.445	6597.7705	1981
chromosome 12 14 combined	12b	774971725	133.61	11506.471	17753.301	7505.7173	2838
chromosome 13 2 combined	13a	633652800	109.25	10273.442	17865.865	5117.3169	473
chromosome 13 38 combined	13b	605121000	104.33	9724.5742	18105.484	1737.3898	3492
chromosome 14 3 combined	14a	595259500	102.63	11124.825	17393.752	4060.9155	1843
chromosome 14-26 combined	14b	629841300	108.59	10619.313	19079.908	5962.1445	1520
chromosome 15 31 combined	15a	527647725	90.97	9963.1543	21162.957	5254.2305	3160
chromosome 15 37 combined	15b	549954075	94.819	11028.442	18494.551	2870.9792	2685
chromosome 16 44 combined	16a	664737700	114.6	12378.194	19470.723	4559.1138	3010
chromosome 16-41 combined	16b	852520625	146.98	11729.229	19118.195	3371.3601	2875
chromosome 17 21 combined	17a	552482975	95.255	9488.1924	19402.152	5563.043	1478
chromosome 17-39 combined	17b	595465200	102.66	8904.0029	19655.193	3719.1455	2421
chromosome 18 33 combined	18a	441713525	76.15	12222.978	20520.375	6738.0664	3783
chromosome 18 45 combined	18b	519204950	89.51	10353.921	20735.186	4009.9011	3033
chromosome 19 28 combined	19a	319603350	55.1	11001.119	15699.03	4639.0366	2650
chromosome 19 6 combined	19b	321245925	55.38	10594.163	19183.908	4354.3091	1651
chromosome 20 43 combined	20a	270513650	46.64	10382.965	19169.367	2806.9492	2740
chromosome 20 5 combined	20b	391834300	67.55	9341.8633	20428.834	7704.5405	3501
chromosome 21 19 combined	21a	247720275	42.71	8425.8857	18840.818	5090.5288	1644
chromosome 21 11 combined	21b	260431325	44.9	11248.175	18673.49	4636.7568	1670
chromosome 22 35 combined	22a	286379775	49.37	10381.077	18209.836	6159.3364	1100
chromosome 22 9 combined	22b	256807375	44.277	9317.1367	19341.57	4513.46	1601
chromosome X combined	(X) 23	728537975	125.6	9267.6523	17432.012	6748.3257	1723
chromosome Y combined	(Y) 24	304665900	52.52	10963.175	20246.205	7961.2949	3711
Membrane_final		2537239925		9835.2021	18005.523	5226.3589	891

Supplementary Table S2: Medium segmentation of chromosomes. Summary table showing raw data for volume and length measurements for all 46 wide segmented prophase chromosomes obtained from Avizo. Calculation for DNA content and distance from center of the nucleus are given in Supplementary calculations S1, S2, S4 and S6.

Material number	Resolved Chromosome number	Chromosome volume (nm ³)	Calculated DNA content (Mbp)
chromosome_1_- 42_vws	1b	2724369450	469.7188707
chromosome_8_- 10_vws	8b	1288175075	222.0991509
chromosome_16_- 44_vws	16a	872688300	150.4635
chromosome_18_- 45_vws	18b	825241175	142.2829612

Supplementary Table S3: Wide segmentation of chromosomes. Summary table showing raw data for volume and DNA content measurements for 4 wide segmented prophase chromosomes obtained from Avizo. Calculation for DNA content of chromosomes is given in Supplementary calculations S4.