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Supplementary information

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Genome analyses and breeding of polyploid crops

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Supplementary Table 1
The crop production data from the FAO (https://www.fao.org)

Rank	Crops/Years	Ploidy level	2,018	2,019	2,020	2,021	2,022	Avg. 5yrs (t)
1	Sugarcane	8X	1,930,727,095.12	1,956,290,122.58	1,877,806,323.23	1,861,933,222.71	1,922,059,850.80	1,909,763,322.89
2	Maize (corn)	2X	1,124,325,183.92	1,137,729,775.03	1,155,754,012.51	1,207,996,141.74	1,163,497,383.13	1,157,860,499.27
3	Rice	2X	765,678,570.03	753,797,270.84	772,544,696.78	789,045,342.64	776,461,456.61	771,505,467.38
4	Wheat	6X	732,357,019.43	764,053,398.06	757,023,106.83	772,779,429.72	808,441,568.18	766,930,904.44
5	Oil palm fruit	2X	412,854,929.17	416,112,185.36	416,154,752.48	415,581,456.96	424,587,459.57	417,058,156.71
6	Potatoes	4X	364,017,608.49	366,801,517	369,381,444.16	373,787,150.10	374,777,763.43	369,753,096.64
7	Soybean	2X	344,809,297.35	335,939,827.50	355,866,426.66	372,853,698.71	348,856,427.48	351,665,135.54
8	Cassava, fresh	2X	308,628,345.68	304,600,861.39	308,346,891.70	326,015,871.50	330,408,753.77	315,600,144.81
9	Other vegetables, fresh n.e.c.	Unknow	287,351,871.49	300,908,504.95	294,191,856.66	295,671,784.96	297,995,824.96	295,223,968.60
10	Sugar beet	4X	273,423,199.77	280,789,895.43	250,452,266.54	269,192,080.38	260,998,613.64	266,971,211.15
11	Tomatoes	2X	182,250,426.54	181,828,505.88	185,234,813.18	189,281,485.32	186,107,972.48	184,940,640.68
12	Barley	2X	141,013,838.34	158,827,743.01	156,836,485.42	145,133,126.63	154,877,139.86	151,337,666.65
13	Bananas	3X	117,204,598.05	117,339,974.18	126,737,998.24	132,082,173.51	135,112,326.37	125,695,414.07
14	Onions and shallots, dry (excluding dehydrated)	2X	97,409,036.97	100,080,528.18	105,110,959.04	106,748,886.16	110,616,269.81	103,993,136.03
15	Watermelons	2X,3X	101,014,639.93	100,798,758.58	100,977,005.55	102,171,351.21	99,957,595.15	100,983,870.08
16	Apples	2X	85,839,727.89	87,462,289.39	90,603,540.04	93,924,721.19	95,835,964.97	90,733,248.70

17	Cucumbers and gherkins	2X	84,974,109.18	88,193,857.21	90,745,183.85	92,613,393.91	94,718,396.55	90,248,988.14
18	Sweet potatoes	6X	91,527,920.23	90,773,022.97	88,517,053.31	87,489,756.18	86,410,354.75	88,943,621.49
19	Yams	2X	78,768,736.36	77,653,504.56	81,485,054.92	86,396,256.27	88,257,159.31	82,512,142.28
20	Grapes	2X	80,096,666.54	77,054,568.52	76,828,208.87	76,750,673.62	74,942,572.95	77,134,538.10
21	Oranges	2X	73,476,061.68	76,317,766.17	76,678,733.66	76,316,327.95	76,410,037.46	75,839,785.38
22	Rape or colza seed	4X	75,564,165.64	71,827,807.07	72,389,632.62	71,958,173.55	87,221,220.62	75,792,199.90
23	Seed cotton, unginned	4X	72,285,258.55	83,681,270.14	71,459,353.21	74,297,843.82	69,668,142.85	74,278,373.71
24	Cabbages	2X	71,251,624.69	71,424,419.36	71,900,972.49	71,967,904.98	72,603,754.67	71,829,735.24
25	Coconuts, in shell	2X	65,307,505.78	63,743,322.72	61,557,764.77	62,791,068.10	62,409,431.22	63,161,818.52
26	Sorghum	2X	60,033,733.56	56,721,830.66	59,045,651.48	62,120,089.92	57,581,942.77	59,100,649.72
27	Eggplants (aubergines)	2X	54,744,193.35	56,104,158.09	57,397,896.38	58,705,397.61	59,312,599.76	57,252,849.04
28	Mangoes, guavas and mangosteens	2X	54,583,093.13	56,461,410.94	56,365,594.93	57,061,367.40	59,151,822.83	56,724,657.85
29	Sunflower seed	2X	51,913,595.43	56,027,075.72	50,114,578.85	57,993,555.42	54,285,948.66	54,066,950.82
30	Groundnuts, excluding shelled	4X	51,835,036.68	49,241,520.83	54,414,487.70	54,490,274.72	54,238,560.13	52,843,976.01
31	Mushrooms and truffles	NA	40,518,126.66	41,706,788.47	42,931,422.46	44,173,858.50	48,335,996.08	43,533,238.43
32	Plantains and cooking bananas	3X	38,021,419.13	44,171,712.14	43,987,146.31	43,450,769.63	44,150,813.38	42,756,372.12
33	Carrots and turnips	2X	39,432,278.08	41,758,567.66	40,611,498.85	41,922,498.31	42,233,349.85	41,191,638.53
34	Tangerines, mandarins, clementines	2X	34,484,495.96	38,972,615.66	39,227,438.50	42,431,495.76	44,179,830.73	39,859,175.32
35	Other fruits, n.e.c.	Unknow	38,124,032.2	38,985,441.0	39,758,502.9	37,701,958.4	38,200,105.9	38,554,008.1

			4	5	7	2	9	3
36	Chillies and peppers, green (Capsicum spp. and Pimenta spp.)	2X	36,038,649.46	35,548,267.167	36,062,340.68	36,337,841.19	36,972,494.42	36,191,918.58
37	Spinach	2X	28,963,680.94	30,080,188.566	31,203,063.866	32,258,475.666	33,116,288.161	31,124,339.411
38	Millet	2X	31,466,956.33	28,304,209.95	32,347,975.10	29,566,321.36	30,859,664.24	30,509,025.40
39	Tea leaves	2X	27,015,824.69	27,654,159.57	28,519,814.95	30,265,018.41	29,760,667.52	28,643,097.03
40	Green garlic	2X	26,800,915.91	28,855,623.37	28,894,704.83	29,028,026.95	29,149,437.66	28,545,741.74
41	Pineapples	2X	28,290,033.34	27,657,867.644	27,448,680.12	28,714,479.17	29,361,138.34	28,294,439.72
42	Cantaloupes and other melons	2X	27,000,791.21	26,898,435.411	27,912,958.03	28,726,728.72	28,558,068.57	27,819,396.39
43	Other tropical fruits, n.e.c.	Unknow	26,800,785.05	26,961,551.055	27,658,889.44	28,109,337.47	28,359,402.21	27,577,993.04
44	Beans, dry	2X	27,503,925.50	25,565,121.844	27,136,040.15	28,538,100.36	28,346,198.66	27,417,877.34
45	Lettuce and chicory	2X	27,135,866.19	27,574,301.577	27,836,078.84	27,236,380.95	27,149,446.41	27,386,414.79
46	Cauliflowers and broccoli	2X	25,547,332.04	25,793,093.655	25,695,741.72	25,969,912.27	26,058,228.25	25,812,861.59
47	Pears	2X	23,719,003.05	24,278,767.055	24,975,885.95	25,616,665.48	26,324,873.50	24,983,039.01
48	Peaches and nectarines	2X	23,991,824.57	24,668,451.688	24,285,497.80	25,012,445.36	26,354,497.05	24,862,543.29
49	Oats	6X	22,612,728.77	23,143,327.40	25,321,359.64	22,659,155.12	26,385,330.04	24,024,380.19
50	Other beans, green	Unknow	23,432,675.16	23,082,373.366	23,424,500.82	23,511,042.65	23,340,915.70	23,358,301.54
51	Olives	2X	24,554,816.58	21,582,849.99	23,846,447.37	23,499,054.92	21,449,867.50	22,986,607.27
52	Pumpkins, squash and gourds	Unknow	21,824,031.56	22,259,179.24	23,048,646.51	23,309,351.52	22,806,320.54	22,649,505.87
53	Lemons and limes	Unknow	19,452,694.13	19,770,009.38	20,515,518.01	21,546,659.85	21,529,604.13	20,562,897.10

54	Peas, green	Unknow	19,865,022.17	19,823,789.09	20,344,430.13	20,775,396.01	20,945,188.58	20,350,765.20
55	Taro	Unknow	16,874,187.92	16,816,380.01	17,627,342.56	17,289,807.64	17,718,128.90	17,265,169.41
56	Chick peas, dry	Unknow	16,939,880.48	14,220,390.68	15,086,283.79	15,937,557.99	18,095,248.88	16,055,872.20
57	Natural rubber in primary forms	Unknow	14,233,303.64	14,522,719.14	14,184,940.61	14,629,301.58	15,125,392.71	14,539,131.54
58	Other citrus fruit, n.e.c.	Unknow	14,228,879.52	14,484,394.65	13,893,279.34	14,031,286.37	14,422,194.03	14,212,006.78
59	Papayas	Unknow	13,789,845.55	14,234,312.78	14,219,152.39	14,086,181.04	13,822,327.59	14,030,363.87
60	Triticale	Unknow	12,294,684.61	14,029,782.42	15,355,584.18	14,248,695.09	14,157,880.72	14,017,325.40
61	Peas, dry	Unknow	13,438,662.56	14,039,084.60	14,682,647.46	12,435,373.67	14,166,029.75	13,752,359.61
62	Rye	Unknow	10,702,481.90	12,794,285.89	15,036,812.41	13,119,560.51	13,143,054.91	12,959,239.12
63	Plums and sloes	Unknow	12,534,505.41	12,231,648.39	12,225,433.65	12,209,265.40	12,391,467.17	12,318,464.00
64	Coffee, green	Unknow	10,559,453.35	10,353,315.55	11,244,393.41	10,497,406.89	10,782,333.89	10,687,380.62
65	Okra	Unknow	9,582,586.82	9,904,398.33	10,445,458.18	10,569,835.12	11,232,656.48	10,346,986.99
66	Green corn (maize)	Unknow	10,430,820.50	9,974,106.25	10,300,759.58	9,694,252.88	9,868,461.38	10,053,680.12
67	Pomelos and grapefruits	Unknow	9,040,560.76	9,491,035.44	9,560,290.12	9,701,955.92	9,761,754.88	9,511,119.42
68	Dates	Unknow	8,767,836.10	9,216,541.34	9,470,322.18	9,867,985.31	9,747,570.04	9,414,050.99
69	Strawberries	Unknow	8,562,052.66	9,054,130.32	8,939,022.15	9,361,656.93	9,569,864.90	9,097,345.39
70	Cow peas, dry	Unknow	8,629,315.34	8,770,031.08	9,601,667.05	8,435,108.72	9,774,865.72	9,042,197.58
71	Asparagus	Unknow	8,523,259.03	8,804,444.90	8,900,477.15	8,779,923.09	8,824,150.02	8,766,450.84
72	Edible roots and tubers with high starch or inulin content, n.e.c., fresh	Unknow	7,720,978.83	7,926,338.29	8,323,521.98	8,559,310.94	8,877,780.12	8,281,586.03
73	Cereals n.e.c.	Unknow	7,652,730.04	7,898,379.03	8,372,507.14	8,369,437.77	8,713,290.37	8,201,268.87
74	Avocados	Unknow	6,842,057.50	7,219,430.04	8,209,608.92	8,570,283.60	8,978,275.20	7,963,931.05

7		Unk	6,141,	6,811,	6,679,	6,667,	6,741,	6,608,
5	Sesame seed	now	677.57	362.18	204.50	343.67	479.41	213.47
7		Unk	6,578,	5,787,	6,381,	5,603,	6,655,	6,201,
6	Lentils, dry	now	475.50	993.71	466.04	004.03	827.78	353.41
7		Unk	6,042,	6,498,	5,816,	5,882,	5,780,	6,004,
7	Unmanufactured tobacco	now	914.80	844.06	135.89	620.75	939.51	291.00
7	Broad beans and horse	Unk	5,559,	5,363,	5,700,	6,014,	6,144,	5,756,
8	beans, dry	now	795.63	648.70	650.10	445.20	394.66	586.86
7		Unk	5,506,	5,513,	5,602,	5,792,	5,874,	5,657,
9	Cocoa beans	now	005.86	558.05	251.30	867.89	581.94	853.01
8		Unk	5,379,	4,363,	5,077,	5,503,	5,326,	5,130,
0	Pigeon peas, dry	now	709.71	866.85	334.14	626.99	932.03	293.94
8		Unk	5,103,	4,928,	5,087,	5,119,	4,970,	5,041,
1	Onions and shallots, green	now	335.99	721.24	395.60	398.63	614.74	893.24
8		Unk	4,751,	4,417,	4,878,	4,913,	4,904,	4,773,
2	Other pulses n.e.c.	now	704.76	480.06	434.50	944.08	918.25	296.33
8	Chillies and peppers, dry (Capsicum spp., Pimenta	Unk	4,598,	4,168,	4,339,	4,910,	4,909,	4,585,
3	spp.), raw	now	637.71	156.58	411.79	800.80	320.76	265.53
8		Unk	4,091,	4,106,	4,317,	4,855,	4,874,	4,448,
4	Ginger, raw	now	573.06	280.56	014.44	031.84	216.17	823.21
8		Unk	4,239,	4,304,	4,435,	4,439,	4,539,	4,391,
5	Kiwi fruit	now	652.95	831.72	780.02	662.64	471.22	879.71
8		Unk	4,247,	4,246,	4,224,	4,344,	4,436,	4,299,
6	Persimmons	now	431.65	550.95	405.08	026.92	474.68	777.86
8		Unk	3,894,	4,052,	3,693,	3,622,	3,863,	3,825,
7	Apricots	now	644.75	374.91	873.05	552.80	179.61	325.02
8		Unk	3,317,	3,583,	4,173,	4,027,	3,630,	3,746,
8	Almonds, in shell	now	592.33	991.80	322.36	775.20	427.66	621.87
8		Unk	3,705,	3,484,	3,653,	3,826,	3,852,	3,704,
9	Cashew nuts, in shell	now	182.16	831.08	593.78	874.29	868.11	669.88
9		Unk	3,570,	3,510,	3,650,	3,496,	3,503,	3,546,
0	Jute, raw or retted	now	281.21	892.82	737.67	434.21	448.24	358.83
9		Unk	2,991,	3,113,	3,459,	3,522,	3,874,	3,392,
1	Walnuts, in shell	now	670.67	725.37	378.74	694.59	024.70	298.81
9		Unk	3,007,	3,065,	3,379,	3,334,	3,973,	3,352,
2	Linseed	now	647.76	280.31	359.71	601.33	931.78	164.18
9		Unk	3,412,	3,420,	3,053,	3,310,	2,223,	3,084,
3	Mixed grain	now	937.57	281.73	437.60	447.95	144.27	049.82
9	Other stimulant, spice and	Unk	2,782,	2,938,	3,194,	3,209,	3,172,	3,059,
4	aromatic crops, n.e.c.	now	898.23	734.52	223.72	495.28	094.78	489.31
9		Unk	2,560,	2,633,	2,618,	2,757,	2,765,	2,666,
5	Cherries	now	162.03	040.86	305.54	363.16	827.38	939.79
9	Anise, badian, coriander, cumin, caraway, fennel and	Unk	2,003,	2,194,	2,572,	2,705,	2,751,	2,445,
6	juniper berries, raw	now	498.69	971.02	953	561.65	010.40	598.95
9		Unk	2,349,	2,420,	2,429,	2,451,	2,527,	2,435,
7	Other oil seeds, n.e.c.	now	491.70	863.94	649.07	384.58	518.38	781.53
9	Leeks and other alliaceous	Unk	2,118,	2,148,	2,141,	2,239,	2,109,	2,151,
8	vegetables	now	107.26	368.20	416.31	817	066.16	354.99
9		Unk	2,079,	2,151,	2,158,	2,134,	2,131,	2,131,
9	Chestnuts, in shell	now	285.54	184.68	715.33	871.92	240.64	059.62
1								
0		Unk	1,558,	1,725,	2,230,	2,474,	2,542,	2,106,
0	Areca nuts	now	788.75	499.38	180.84	711.69	072.10	250.55
1	Buckwheat	Unk	1,945,	1,724,	1,807,	1,871,	2,235,	1,916,

101		now	554.06	300.50	986.29	393.66	193.31	885.56
110	Castor oil seeds	Unk now	1,767,450.56	1,415,036.15	2,052,585.36	1,862,081.69	1,829,521.75	1,785,335.10
103	Broad beans and horse beans, green	Unk now	1,736,726.41	1,652,615.82	1,804,657.32	1,683,515.41	1,642,153.15	1,703,933.62
104	Coir, raw	Unk now	1,381,764.17	1,533,083.15	1,720,405.64	1,823,537.17	1,939,429.80	1,679,643.99
105	Artichokes	Unk now	1,558,221.07	1,503,806.69	1,440,087.26	1,660,298.11	1,584,513.73	1,549,385.37
106	Sour cherries	Unk now	1,581,621.71	1,408,562.51	1,482,455.15	1,519,934.67	1,593,024.70	1,517,119.75
107	Maté leaves	Unk now	1,435,443	1,485,313	1,473,739	1,512,096.17	1,653,166.80	1,511,951.59
108	String beans	Unk now	1,466,755.50	1,358,600.64	1,343,345.82	1,314,568.69	1,375,583.93	1,371,770.92
109	Lupins	Unk now	1,192,034.38	1,340,943.60	1,070,650.49	1,417,259.40	1,644,690.67	1,333,115.71
110	Cashewapple	Unk now	1,324,284.84	1,324,433.54	1,333,534.21	1,337,470.20	1,329,862.29	1,329,917.02
111	Figs	Unk now	1,239,711.48	1,323,700.39	1,399,829.22	1,321,021.82	1,242,449.04	1,305,342.39
112	Hazelnuts, in shell	Unk now	874,423.30	1,121,862.21	1,070,990.17	1,077,393.41	1,195,732.16	1,068,080.25
113	Blueberries	Unk now	819,803.74	1,031,696.95	1,032,358.87	1,153,233.78	1,228,595.98	1,053,137.86
114	Pistachios, in shell	Unk now	985,293.91	891,092.80	1,129,955.91	1,214,743.34	1,026,802.86	1,049,577.76
115	Tallowtree seeds	Unk now	1,012,602.15	1,023,474.64	1,027,113.04	1,032,891.99	1,038,670.93	1,026,950.55
116	Other nuts (excluding wild edible nuts and groundnuts), in shell, n.e.c.	Unk now	975,969.63	991,112.16	1,029,681.05	1,042,138.18	1,051,017.39	1,017,983.68
117	Other berries and fruits of the genus vaccinium n.e.c.	Unk now	1,004,542.36	1,025,669.30	988,377.22	1,005,166.53	1,021,643.25	1,009,079.73
118	Melonseed	Unk now	1,015,920.22	963,542.11	948,454.11	968,767.83	968,692.23	973,075.30

11		Unk	864,617.97	1,091,186.57	971,242.90	897,882.04	875,994.92	940,184.88
19	Flax, raw or retted	now						
120	Raspberries	Unk now	899,742.45	877,942.63	934,767.39	925,501.73	947,852.03	917,161.25
121	Other sugar crops n.e.c.	Unk now	940,873.38	869,632.77	857,711.23	851,835.90	872,416	878,493.86
122	Karite nuts (sheanuts)	Unk now	780,751.37	874,935.09	807,904.89	822,898.46	815,825.10	820,462.98
123	Pepper (Piper spp.), raw	Unk now	788,343.04	786,495.54	811,170.15	788,032.04	812,673.57	797,342.87
124	Mustard seed	Unk now	658,600.49	656,285.47	684,665.02	687,108.62	852,807.53	707,893.43
125	Currants	Unk now	679,025.98	643,939.16	684,862.22	728,738.32	764,498.98	700,212.93
112	Safflower seed	Unk now	609,021.89	586,674.83	660,055.15	628,556.42	995,507.60	695,963.18

6								
1								
2		Unk	663,93	658,45	698,33	699,85	702,01	684,51
7	Quinces	now	4.65	8.48	3.69	5.23	5.15	9.44
1								
2		Unk	650,69	712,08	729,67	637,62	684,26	682,86
8	Vetches	now	3.94	1.18	0.90	0.69	3.78	6.10
1								
2		Unk	645,68	633,00	659,08	664,02	658,70	652,10
9	Fonio	now	6.53	4.23	2.03	4.58	7.96	1.07
1								
3		Unk	580,24	572,51	605,54	599,00	615,69	594,60
0	Other stone fruits	now	8.65	6.63	1.99	8.68	4.71	2.13
1								
3		Unk	448,23	470,22	738,30	572,94	554,14	556,77
1	Other fibre crops, raw, n.e.c.	now	3.44	4.47	8.07	5.30	6.12	1.48
1								
3		Unk	597,63	530,18	533,51	491,73	582,92	547,19
2	Cranberries	now	0.44	2.17	4.39	7.31	3.64	7.59
1								
3		Unk	415,22	433,29	453,76	454,11	453,68	442,01
3	Tung nuts	now	0.89	9.54	4.49	3.44	5.31	6.73
1								
3		Unk	463,90	405,67	407,74	381,38	396,40	411,02
4	Yautia	now	7.39	0.11	4.80	2.65	6.96	2.38
1								
3		Unk	307,10	310,69	311,23	311,55	315,02	311,12
5	Kola nuts	now	6.59	0.34	1.92	0.61	4.47	0.79
1								
3		Unk	295,81	284,66	282,32	284,56	283,28	286,13
6	Kapok fruit	now	6.43	5.02	8.08	5.54	7.08	2.43
1								
3		Unk	227,02	265,09	303,17	223,06	245,56	252,78
7	Canary seed	now	0.28	2.40	6.11	7.86	8.03	4.94
1								
3		Unk	238,81	229,35	261,80	215,00	246,51	238,29
8	Bambara beans, dry	now	1.27	7.19	9.65	3.05	1.30	8.49
1								
3	Kenaf, and other textile bast	Unk	232,46	229,65	229,91	226,28	224,92	228,65
9	fibres, raw or retted	now	7.87	7.44	1.88	6.30	6.49	0.00
1								
4		Unk	162,86	232,02	219,99	274,88	247,06	227,36
0	True hemp, raw or retted	now	4.05	3.21	5.10	2.93	4.39	5.94
1								
4	Cinnamon and cinnamon-tree	Unk	222,12	223,00	211,26	222,29	222,52	220,24
1	flowers, raw	now	7	6.59	6.82	1.38	3.87	3.13
1								
4		Unk	207,63	201,09	208,13	220,32	213,30	210,09
2	Sisal, raw	now	3.87	5.09	0.93	3.12	4.53	7.51
1								
4		Unk	179,96	187,34	195,66	185,12	183,45	186,30
3	Cloves (whole stems), raw	now	5.16	4.87	0.81	3.23	2.31	9.28
1								
4		Unk	169,91	174,51	173,46	181,00	158,54	171,48
4	Hop cones	now	3.18	2.41	7.81	8.06	5.32	9.36

145	Quinoa	Unknow	159,736.78	161,053.42	175,381.91	157,864.17	158,985.17	162,604.29
146	Nutmeg, mace, cardamoms, raw	Unknow	142,199.36	134,228.94	133,629.33	147,858.61	138,887.87	139,360.82
147	Other pome fruits	Unknow	135,887.12	129,148.05	127,448.84	130,583.64	129,481.01	130,509.73
148	Abaca, manila hemp, raw	Unknow	107,994	107,672.76	107,682.62	107,523.24	107,494.92	107,673.51
149	Gooseberries	Unknow	77,427.37	80,626.08	83,942.94	90,825.10	95,425.32	85,649.36
150	Brazil nuts, in shell	Unknow	74,876.61	71,151	70,961	72,375.22	79,277.79	73,728.32
151	Peppermint, spearmint	Unknow	106,363.82	74,222.16	48,434.92	38,007.55	51,081.46	63,621.98
152	Locust beans (carobs)	Unknow	46,419.63	47,608.21	50,054.26	51,684.96	56,423.36	50,438.08
153	Agave fibres, raw, n.e.c.	Unknow	40,476.62	40,628.38	40,481.25	40,655.94	40,639.24	40,576.29
154	Ramie, raw or retted	Unknow	56,339.42	60,352.64	62,021.67	8,165.69	7,625.16	38,900.92
155	Chicory roots	Unknow	33,302.23	33,593.71	30,830.54	32,234.65	32,662.22	32,524.67
156	Hempseed	Unknow	4,457.20	47,818.56	31,960.54	33,388.55	42,266.75	31,978.32
157	Poppy seed	Unknow	29,648.01	30,014.11	23,185.73	23,659.28	14,857.07	24,272.84
158	Vanilla, raw	Unknow	7,471.98	6,998.13	7,012.07	7,616.32	7,704.03	7,360.51
159	Pyrethrum, dried flowers	Unknow	5,909.64	6,964.48	5,715.32	6,043.78	5,049.45	5,936.53
160	Jojoba seeds	Unknow	143.33	147.6	149.41	148	146.58	146.984

Supplementary Table 2
The summary of polyploid genome assembly.

Name	Ploid	Type	Reference
Medicago sativa	2n=4x	auto	Allele-aware chromosome-level genome assembly and efficient transgene-free genome editing for the autotetraploid cultivated alfalfa
Medicago sativa	2n=4x	auto	The Chromosome-Level Genome Sequence of the Autotetraploid Alfalfa and Resequencing of Core Germplasms Provide Genomic Resources for Alfalfa Research
Medicago sativa	2n=4x	auto	Genome Assembly of Alfalfa Cultivar Zhongmu-4 and Identification of SNPs Associated with Agronomic Traits
Solanum tuberosum	2n=4x	auto	Chromosome-scale and haplotype-resolved genome assembly of a tetraploid potato cultivar
Solanum tuberosum	2n=4x	auto	Genome architecture and tetrasomic inheritance of autotetraploid potato
Solanum tuberosum	2n=4x	auto	The autotetraploid potato genome provides insights into highly heterozygous species
Solanum tuberosum	2n=4x	auto	Haplotype-resolved assembly of a tetraploid potato genome using long reads and low-depth offspring data
Solanum tuberosum	2n=4x	auto	Phased, chromosome-scale genome assemblies of tetraploid potato reveal a complex genome, transcriptome, and predicted proteome landscape underpinning genetic diversity
Rheum officinale	2n=	auto	The haplotype-resolved genome assembly of autotetraploid rhubarb Rheum officinale provides insights into its genome evolution and massive accumulation of

	4x n = 3x 2n = 6x	seg allo aut o	anthraquinones
Chrysanthemum morifolium			Analyses of a chromosome-scale genome assembly reveal the origin and evolution of cultivated chrysanthemum
Ipomoea batatas			Haplotype-resolved sweet potato genome traces back its hexaploidization history
Cyclocarya paliurus	2n = 4x 2n = 4x	aut o	Genomic insights into biased allele loss and increased gene numbers after genome duplication in autotetraploid Cyclocarya paliurus
Cyclocarya paliurus			Whole-genome Duplication Reshaped Adaptive Evolution in A Relict Plant Species, Cyclocarya paliurus
Helianthus tuberosus	2n = 6x	aut o	Haplotype-resolved chromosome-level genome of hexaploid Jerusalem artichoke provides insights into its origin, evolution, and inulin metabolism
Saccharum spontaneum	*n = 4x 2n = 4x*	aut o	Allele-defined genome of the autopolyploid sugarcane Saccharum spontaneum L.
Saccharum spontaneum			Genomic insights into the recent chromosome reduction of autopolyploid sugarcane Saccharum spontaneum
Saccharum spontaneum	2n = 12x 2n = 12x	all o + aut o	The complex polyploid genome architecture of sugarcane
Saccharum spontaneum			A chromosomal-scale genome assembly of modern cultivated hybrid sugarcane provides insights into origination and evolution
Syzygium samarangense	2n = 4x	aut o	The haplotype-resolved autotetraploid genome assembly provides insights into the genomic evolution and fruit divergence in wax apple (Syzygium samarangense (Blume) Merr. and Perry)
Onobrychis viciifolia	*2n = 4*	aut o	A chromosome-level genome assembly for Onobrychis viciifolia reveals gene copy number gain underlying enhanced proanthocyanidin biosynthesis

Corydalis yanhusuo	*x 2n = 4x*	auto	Haplotype-resolved genome assembly of Corydalis yanhusuo, a traditional Chinese medicine with unusual telomere motif
Zanthoxylum armatum	2n = 4 × 2n	auto	The complex genome and adaptive evolution of polyploid Chinese pepper (Zanthoxylum armatum and Zanthoxylum bungeanum)
Zanthoxylum armatum	= 4 ×	auto	Chromosome-level genome assembly of Sichuan pepper provides insights into apomixis, drought tolerance, and alkaloid biosynthesis
Actinidia deliciosa	2n = 6x 2n	auto	Chromosome-level genome of putative autohexaploid Actinidia deliciosa provides insights into polyploidisation and evolution
Actinidia arguta	= 4x 2n	auto	Genome assembly of autotetraploid Actinidia arguta highlights adaptive evolution and dissects important economic traits
Musa acuminata	= 3x	auto	Origin and evolution of the triploid cultivated banana genome
Gossypium hirsutum	2n = 4x 2n	allo	Genomic diversifications of five Gossypium allopolyploid species and their impact on cotton improvement
Gossypium barbadense	= 4x 2n	allo	Genomic diversifications of five Gossypium allopolyploid species and their impact on cotton improvement
Gossypium mustelinum	= 4x 2n	allo	Genomic diversifications of five Gossypium allopolyploid species and their impact on cotton improvement
Gossypium darwinii	= 4x 2n	allo	Genomic diversifications of five Gossypium allopolyploid species and their impact on cotton improvement
Gossypium tomentosum	= 4x	allo	Genomic diversifications of five Gossypium allopolyploid species and their impact on cotton improvement

Gossypium ekmanianum	2n=4x	allo	Genomic diversifications of five Gossypium allopolyploid species and their impact on cotton improvement
Gossypium ekmanianum	2n=4x	allo	Evolutionary divergence of duplicated genomes in newly described allotetraploid cottons
Gossypium stephensii	2n=4x	allo	Evolutionary divergence of duplicated genomes in newly described allotetraploid cottons
Gossypium hirsutum	2n=4x	allo	Evolutionary divergence of duplicated genomes in newly described allotetraploid cottons
Gossypium hirsutum	2n=4x	allo	Genome sequence of Gossypium herbaceum and genome updates of Gossypium arboreum and Gossypium hirsutum provide insights into cotton A-genome evolution
Gossypium barbadense	2n=4x	allo	Structural variation (SV)-based pan-genome and GWAS reveal the impacts of SVs on the speciation and diversification of allotetraploid cottons
Gossypium barbadense	2n=4x	allo	Gossypium barbadense and Gossypium hirsutum genomes provide insights into the origin and evolution of allotetraploid cotton
Gossypium hirsutum	2n=4x	allo	Gossypium barbadense and Gossypium hirsutum genomes provide insights into the origin and evolution of allotetraploid cotton
Gossypium hirsutum	2n=4x	allo	Genome resources for three modern cotton lines guide future breeding efforts
Triticum aestivum	2n=6x	allo	Multiple wheat genomes reveal global variation in modern breeding
Triticum aestivum	2n=6x	allo	Long-read genome sequencing of bread wheat facilitates disease resistance gene cloning
Triticum aestivum	2	all	A chromosome-based draft sequence of the hexaploid

	n = 6 x	o	bread wheat (Triticum aestivum) genome
Triticum turgidum	2n = 4 x	allo	Durum wheat genome highlights past domestication signatures and future improvement targets
Triticum turgidum	2n = 4 x	allo	Wild emmer genome architecture and diversity elucidate wheat evolution and domestication
Avena sativa	2n = 6 x	allo	Reference genome assemblies reveal the origin and evolution of allohexaploid oat
Avena insularis	2n = 4 x	allo	Reference genome assemblies reveal the origin and evolution of allohexaploid oat
Avena sativa	2n = 6 x	allo	The mosaic oat genome gives insights into a uniquely healthy cereal crop
Avena insularis	2n = 4 x	allo	The mosaic oat genome gives insights into a uniquely healthy cereal crop
Arachis hypogaea	*2n = 4 x*	allo	A genomic variation map provides insights into peanut diversity in China and associations with 28 agronomic traits
Arachis hypogaea	*2n = 4 x*	allo	The genome sequence of segmental allotetraploid peanut Arachis hypogaea
Arachis hypogaea	*2n = 4 x*	allo	The genome of cultivated peanut provides insight into legume karyotypes, polyploid evolution and crop domestication
Arachis hypogaea	*2n = 4 x*	allo	Sequencing of Cultivated Peanut, Arachis hypogaea, Yields Insights into Genome Evolution and Oil Improvement
Brassica napus	*2n*	allo	Eight high-quality genomes reveal pan-genome architecture and ecotype differentiation of Brassica napus

Brassica napus	*2n = 4x = 4x = 2n = 4x*	allo	Early allopolyploid evolution in the post-Neolithic Brassica napus oilseed genome
Brassica napus	*2n = 4x = 4x*	allo	The high-quality genome of Brassica napus cultivar ‘ZS11’ reveals the introgression history in semi-winter morphotype
Brassica juncea	*2n = 4x = 2n = 4x*	allo	A chromosome-scale assembly of allotetraploid Brassica juncea (AABB) elucidates comparative architecture of the A and B genomes
Brassica juncea	*4x*	allo	Genome structural evolution in Brassica crops
Brassica carinata	*2n = 4x = 2n = 4x*	allo	The genome sequence of allopolyploid Brassica juncea and analysis of differential homoeolog gene expression influencing selection
Brassica carinata	*4x = 2n = 4x*	allo	Genomic insights into the origin, domestication and diversification of Brassica juncea
Brassica carinata	*4x*	allo	Genome structural evolution in Brassica crops
Chenopodium quinoa	*2n = 4x = 2n = 4x*	allo	The genome of Chenopodium quinoa
Chenopodium quinoa	*2n = 4x = 2n = 4x*	allo	A high-quality genome assembly of quinoa provides insights into the molecular basis of salt bladder-based salinity tolerance and the exceptional nutritional value
Chenopodium quinoa	*2n = 4x*	allo	A chromosome-scale assembly of the quinoa genome provides insights into the structure and dynamics of its subgenomes
Artemisia argyi	*2n =*	allo	A chromosome-scale genome assembly of Artemisia argyi reveals unbiased subgenome evolution and key contributions of gene duplication to volatile terpenoid

	4x2n=4x		diversity
Artemisia argyi		allo	Genome sequencing reveals chromosome fusion and extensive expansion of genes related to secondary metabolism in Artemisia argyi
Panicum miliaceum	2n=4x	allo	Pangenome analysis reveals genomic variations associated with domestication traits in broomcorn millet
Panicum virgatum	2n=4x	allo	Genomic mechanisms of climate adaptation in polyploid bioenergy switchgrass
Sesamum radiatum	2n=4x	allo	Genomic evolution and insights into agronomic trait innovations of Sesamum species
Papaver setigerum	2n=4x	allo	Three chromosome-scale Papaver genomes reveal punctuated patchwork evolution of the morphinan and noscapine biosynthesis pathway
Araidopsis suecia	2n=4x	allo	Gradual evolution of allopolyploidy in Arabidopsis suecica
Araidopsis suecia	2n=4x	allo	Concerted genomic and epigenomic changes accompany stabilization of Arabidopsis allopolyploids
Dendrocalamus latiflorus	2n=6x	allo	Allele-aware chromosome-scale assembly of the allopolyploid genome of hexaploid Ma bamboo (Dendrocalamus latiflorus Munro)
Rorippa aquatica	2n=4x	allo	*Chromosome-level genome assembly of Rorippa aquatica revealed its allotetraploid origin and mechanisms of heterophylly upon submergence*
Oryza alta	2n=4x	allo	A route to de novo domestication of wild allotetraploid rice
Musa acuminata	2n=3	allo	Origin and evolution of the triploid cultivated banana genome

Musa acuminata	x 2n = 3x	allo	Telomere-to-telomere haplotype-resolved reference genome reveals subgenome divergence and disease resistance in triploid Cavendish banana
Musa acuminate x balbisiana	2n = 3x 2n = 4x	allo	Two haplotype-resolved genome assemblies for AAB allotriploid bananas provide insights into banana subgenome asymmetric evolution and Fusarium wilt control
Eragrostis tef		allo	Exceptional subgenome stability and functional divergence in the allotetraploid Ethiopian cereal teff
Brachypodium hybridum	2n = 4x 2n = 4x	allo	Gradual polyploid genome evolution revealed by pan-genomic analysis of Brachypodium hybridum and its diploid progenitors
Brachypodium hybridum		allo	Subgenomic Stability of Progenitor Genomes During Repeated Allotetraploid Origins of the Same Grass Brachypodium hybridum
Coffea arabica	2n = 4x 2n = 4x	allo	A chromosome-scale assembly reveals chromosomal aberrations and exchanges generating genetic diversity in Coffea arabica germplasm
Poa annua		allo	Chromosome-Scale Genome Assembly and Annotation of Allotetraploid Annual Bluegrass (Poa annua L.)
Nicotiana benthamiana	2n = 4x 2n = 4x	allo	A multi-omic Nicotiana benthamiana resource for fundamental research and biotechnology
Nicotiana benthamiana		allo	High-quality assembled and annotated genomes of Nicotiana tabacum and Nicotiana benthamiana reveal chromosome evolution and changes in defense arsenals
Nicotiana tabacum	*2n = 4x 2n = 4x*	allo	High-quality assembled and annotated genomes of Nicotiana tabacum and Nicotiana benthamiana reveal chromosome evolution and changes in defense arsenals
Capsella bursa-pastoris		allo	Origin and diversity of Capsella bursa-pastoris from the genomic point of view

Fragaria × *ananassa*	2n = 8x	allo	Origin and evolution of the octoploid strawberry genome
Fragaria × *ananassa*	2n = 8x	allo	Haplotype-resolved genomes of wild octoploid progenitors illuminate genomic diversifications from wild relatives to cultivated strawberry
Leptochloa chinensis	2n = 4x	allo	Genomic insights into the origin, adaptive evolution, and herbicide resistance of Leptochloa chinensis, a devastating tetraploid weedy grass in rice fields
Echinochloa crus-galli	*2n = 6x*	allo	Genomic insights into the evolution of Echinochloa species as weed and orphan crop
Echinochloa colona	*2n = 6x*	allo	Genomic insights into the evolution of Echinochloa species as weed and orphan crop
Echinochloa oryzicola	*2n = 4x*	allo	Genomic insights into the evolution of Echinochloa species as weed and orphan crop
Perilla frutescens	2n = 4x	allo	Incipient diploidization of the medicinal plant Perilla within 10,000 years
Pogostemon cablin	4x *2n =*	allo	Chromosome-level and haplotype-resolved genome provides insight into the tetraploid hybrid origin of patchouli
Cardamine occulta	*8x* 2n =	allo	Common evolutionary trajectory of short life-cycle in Brassicaceae ruderal weeds
Armoracia rusticana	4x 2n =	allo	The allotetraploid horseradish genome provides insights into subgenome diversification and formation of critical traits
Sesbania cannabina	4x 2n =	allo	Telomere-to-telomere genome of the allotetraploid legume Sesbania cannabina reveals transposon-driven subgenome divergence and mechanisms of alkaline stress tolerance
Orinus kokonorica	*2*	all	A genome assembly for Orinus kokonorica provides

	n = *4x* *2n* = *6x* 2n = 10x 2n = 6x 2n = 4x 2n = 4x 2n = 4x 2n = 4x n = 3x n = 3x 2n = 4× 2n =	o all o all o all o all o all o all o all o	insights into the origin, adaptive evolution and further diversification of two closely related grass genera Chromosomal-level genome and metabolome analyses of highly heterozygous allohexaploid Dendrocalamus brandisii elucidate shoot quality and developmental characteristics Subgenome dominance shapes novel gene evolution in the decaploid pitcher plant Nepenthes gracilis Phylogenomic discovery of deleterious mutations facilitates hybrid potato breeding Genome biology of the paleotetraploid perennial biomass crop Miscanthus Chromosome-scale assembly and analysis of biomass crop Miscanthus lutarioriparius genome Extraordinary preservation of gene collinearity over three hundred million years revealed in homosporous lycophytes A High-Quality Haplotype-Resolved Genome of Common Bermudagrass (Cynodon dactylon L.) Provides Insights Into Polyploid Genome Stability and Prostrate Growth PtoNF-YC9-SRMT-PtoRD26 module regulates the high saline tolerance of a triploid poplar *Chromosome-level genome assembly of a triploid poplar Populus alba 'Berolinensis'* The complex genome and adaptive evolution of polyploid Chinese pepper (Zanthoxylum armatum and Zanthoxylum bungeanum) Zanthoxylum-specific whole genome duplication and recent activity of transposable elements in the highly repetitive paleotetraploid Z. bungeanum genome
Dendrocalamus brandisii			
Nepenthes gracilis			
Tubocapsicum anomalum			
Miscanthus sinensis			
Miscanthus lutarioriparius			
Huperzia asiatica			
Cynodon dactylon			
Populus × tomentosa			
Populus alba			
Zanthoxylum bungeanum			
Zanthoxylum bungeanum			

	4×		
Ampelocalamus luodianensis	2n=4x	allo	Genome assemblies of 11 bamboo species highlight diversification induced by dynamic subgenome dominance
Hsuehochloa calcarea	2n=4x	allo	Genome assemblies of 11 bamboo species highlight diversification induced by dynamic subgenome dominance
Phyllostachys edulis	2n=4x	allo	Genome assemblies of 11 bamboo species highlight diversification induced by dynamic subgenome dominance
Otatea glauca	2n=4x	allo	Genome assemblies of 11 bamboo species highlight diversification induced by dynamic subgenome dominance
Guadua angustifolia	2n=4x	allo	Genome assemblies of 11 bamboo species highlight diversification induced by dynamic subgenome dominance
Rhipidocladum racemiflorum	2n=4x	allo	Genome assemblies of 11 bamboo species highlight diversification induced by dynamic subgenome dominance
Melocanna baccifera	2n=6x	allo	Genome assemblies of 11 bamboo species highlight diversification induced by dynamic subgenome dominance
Bonia amplexicaulis	2n=6x	allo	Genome assemblies of 11 bamboo species highlight diversification induced by dynamic subgenome dominance
Dendrocalamus sinicus	2n=6x	allo	Genome assemblies of 11 bamboo species highlight diversification induced by dynamic subgenome dominance
Houttuynia cordata	2n=10x	allo	A Genome Assembly of decaploid *Houttuynia cordata* Provides Insights into the evolution of *Houttuynia* and the biosynthesis of alkaloids
Bambusa odashimae	3n=	allo	Haplotype-resolved nonaploid genome provides insights into *in vitro* flowering in bamboo

Eleusine coracana	9x2n=6x	allo	Genome analyses reveal population structure and a purple stigma color gene candidate in finger millet
Phyllanthus emblica	2n=8x	allo	Haplotype-resolved genomes of octoploid species in Phyllanthaceae family reveal a critical role for polyploidization and hybridization in speciation
Sauropus spatulifolius	2n=8x	allo	Haplotype-resolved genomes of octoploid species in Phyllanthaceae family reveal a critical role for polyploidization and hybridization in speciation
Note: the same color represents either the same species or different species from the same article			