

**Supplemental Table 3.** Data processing summary, including percent unannotated. Read numbers refer to the number of individual reads for each given category.

Family	Species	Genome Size (Mbp/1C)	Raw read #	Filtered reads #	Total # reads sampled	Total # reads clustered	Percent unannotated
Bataceae	<i>Batis maritima</i>	356.97	16,618,110	15,093,764	500,000	177,780	0.171599998
Brassicaceae	<i>Aethionema arabicum</i>	933.99	17,515,712	13,704,622	500,000	298,181	0.787799994
Brassicaceae	<i>Meniocus linifolius</i>	899.76	19,025,676	17,900,990	500,000	205,355	0.866199996
Brassicaceae	<i>Barbarea bracteosa</i>	268.95	17,958,660	16,274,282	500,000	270,845	1.117800003
Brassicaceae	<i>Cakile maritima</i>	1383.87	20,109,922	17,345,778	500,000	290,826	0.769600012
Brassicaceae	<i>Calepina irregularis</i>	254.28	18,945,186	14,996,774	500,000	230,865	0.667199996
Brassicaceae	<i>Capsella bursa-pastoris</i>	420.54	19,924,400	17,596,938	500,000	244,673	1.018199992
Brassicaceae	<i>Cardamine hirsuta</i>	489	14,327,238	13,353,298	500,000	236,564	0.893800004
Brassicaceae	<i>Caulanthus amplexicaulis</i>	484.11	17,276,330	13,566,798	500,000	227,219	0.618400004
Brassicaceae	<i>Chorispora tenella</i>	366.75	21,426,658	17,199,758	500,000	255,923	0.669999999
Brassicaceae	<i>Cochlearia officinalis</i>	-	19,571,568	17,680,152	500,000	309,075	0.633400004
Brassicaceae	<i>Crambe hispanica</i>	660.15	17,962,804	16,030,190	500,000	237,458	0.847600007
Brassicaceae	<i>Descurainia pinnata</i>	371.64	21,064,170	18,911,684	500,000	246,938	0.555600003
Brassicaceae	<i>Descurainia sophioides</i>	195.6	14,299,738	11,722,246	500,000	248,632	0.685599997
Brassicaceae	<i>Diptychocarpus strictus</i>	557.46	14,976,410	13,219,700	500,000	255,043	0.805800004
Brassicaceae	<i>Eruca vesicaria</i>	709.05	19,393,468	16,238,972	500,000	267,256	0.8802
Brassicaceae	<i>Erysimum cheiranthoides</i>	-	19,255,900	14,718,730	500,000	258,177	1.210200004
Brassicaceae	<i>Euclidium syriacum</i>	298.29	16,998,370	15,169,108	500,000	223,832	0.641799998
Brassicaceae	<i>Farsetia aegyptia</i>	2004.9	17,029,968	16,121,632	500,000	239,500	0.934600003
Brassicaceae	<i>Goldbachia laevigata</i>	547.68	19,699,580	18,035,220	500,000	231,487	0.6218
Brassicaceae	<i>Guillenia lasiophylla</i>	621.03	11,213,854	9,994,886	500,000	189,388	1.013799997
Brassicaceae	<i>Hesperis matronalis</i>	3261.63	15,614,640	15,174,086	500,000	333,859	0.537600005
Brassicaceae	<i>Hirschfeldia incana</i>	552.57	23,055,074	21,141,192	500,000	232,731	1.167399996
Brassicaceae	<i>Iberis amara</i>	831.3	13,691,982	13,178,566	500,000	270,980	1.225400004
Brassicaceae	<i>Isatis lusitanica</i>	381.42	23,390,698	17,191,612	500,000	282,703	0.580399999
Brassicaceae	<i>Isatis tinctoria</i>	616.14	18,892,040	15,557,688	500,000	246,272	0.846399996
Brassicaceae	<i>Lepidium rudemale</i>	371.64	18,919,410	14,656,664	500,000	195,884	0.829600002
Brassicaceae	<i>Lepidium sativum</i>	591.69	18,902,354	16,242,402	500,000	245,618	0.521800004
Brassicaceae	<i>Lobularia maritima</i>	312.96	19,156,394	14,101,930	500,000	257,902	0.571799998
Brassicaceae	<i>Lunaria annua</i>	498.78	14,633,200	12,998,044	500,000	313,439	0.6024
Brassicaceae	<i>Malcomia maritima</i>	312.96	15,816,038	13,287,250	250,000	122,050	1.107999997
Brassicaceae	<i>Matthiola longipetala</i>	1599.03	20,089,766	19,078,766	500,000	344,981	0.498000005
Brassicaceae	<i>Myagrurn perfoliatum</i>	352.08	13,275,434	10,829,146	400,000	220,796	0.700749995
Brassicaceae	<i>Nasturtium officinale</i>	430.32	16,369,294	13,096,042	500,000	270,006	0.548799996
Brassicaceae	<i>Olimoarabidopsis pumila</i>	410.76	14,092,992	11,158,530	500,000	221,195	1.072000003
Brassicaceae	<i>Physaria acutifolia</i>	2322.75	18,571,300	17,404,712	500,000	361,507	1.074200005
Brassicaceae	<i>Sisymbrium leucocladum</i>	498.78	21,306,942	17,347,804	500,000	284,673	0.703999996
Brassicaceae	<i>Psychine stylosa</i>	518.34	18,672,344	15,813,984	500,000	246,922	0.815000003
Brassicaceae	<i>Rorippa islandica</i>	567.24	14,323,126	12,382,424	500,000	244,939	1.065999997
Brassicaceae	<i>Schizopetalum walkeri</i>	1775.07	19,473,154	18,463,848	500,000	317,020	0.339599997
Brassicaceae	<i>Sinapis alba</i>	557.46	19,804,700	16,543,166	500,000	249,449	0.833399989

Brassicaceae	<i>Sisymbrium brassiciforme</i>	-	18,157,024	15,596,368	500,000	247,748	0.779399995
Brassicaceae	<i>Brassicaceae sp</i>	1036.68	14,359,594	12,039,944	500,000	258,811	0.911999998
Brassicaceae	<i>Streptanthus arizonicus</i>	1090.47	20,032,530	17,795,582	500,000	291,308	0.391000003
Brassicaceae	<i>Streptanthus heterophyllus</i>	748.17	20,440,916	18,181,630	500,000	189,327	0.588599995
Brassicaceae	<i>Teesdalia nudicaulis</i>	557.46	17,158,882	15,882,064	500,000	277,737	0.503399998
Brassicaceae	<i>Thlaspi arvense</i>	205.38	13,742,780	12,034,208	500,000	326,494	0.530000001
Brassicaceae	<i>Turritis glabra</i>	919.32	21,721,584	19,358,608	500,000	230,979	1.205600012
Capparaceae	<i>Boscia sp</i>	410.76	21,741,004	19,951,552	500,000	195,140	1.424399998
Capparaceae	<i>Cadaba natalensis</i>	259.17	18,732,834	15,702,982	500,000	217,968	1.441000001
Capparaceae	<i>Capparis fascicularis</i>	1139.37	20,757,542	19,626,330	500,000	204,412	0.881599999
Capparaceae	<i>Capparaceae sp</i>	611.25	18,850,070	16,916,978	500,000	210,754	0.937799997
Cariaceae	<i>Carica papaya</i>	-	26,670,784	22,740,686	500,000	211,407	2.305599995
Cleomaceae	<i>Cleome africana</i>	484.11	14,535,678	12,523,252	500,000	317,696	1.167200004
Cleomaceae	<i>Coalisisina angustifolia</i>	342.3	17,685,930	16,598,982	300,000	143,503	1.172000003
Cleomaceae	<i>Cleome arabica</i>	464.55	15,921,148	12,608,460	500,000	319,725	1.200000004
Cleomaceae	<i>Polanisia sp</i>	709.05	16,484,740	14,702,180	500,000	358,263	0.9018
Cleomaceae	<i>Coalisisina paradoxa</i>	484.11	20,093,758	17,333,978	500,000	285,751	1.307799997
Cleomaceae	<i>Cleomaceae sp</i>	322.74	20,481,152	17,552,776	500,000	294,564	1.399400005
Cleomaceae	<i>Cleome violacea</i>	474.33	15,366,960	13,381,026	400,000	234,951	1.143750005
Cleomaceae	<i>Melidiscus giganteus</i>	420.54	18,036,600	15,768,938	500,000	295,440	1.648799998
Cleomaceae	<i>Arivela viscosa</i>	268.95	18,197,094	14,690,618	400,000	186,177	2.092499998
Cleomaceae	<i>Cleomella serrulata</i>	-	-	-	-	-	-
Cleomaceae	<i>Gynandropsis gynandra</i>	1124.7	18,472,870	16,563,780	500,000	320,397	0.499200002
Cleomaceae	<i>Polanisia dodecandra</i>	733.5	17,592,446	16,046,308	500,000	361,926	0.840400003
Cleomaceae	<i>Polanisia graveolens</i>	723.72	20,436,352	18,930,976	500,000	362,412	0.833199998
Cleomaceae	<i>Polanisia trachysperma</i>	699.27	18,164,388	14,896,462	500,000	361,223	0.827400004
Cleomaceae	<i>Tarenaya hassleriana</i>	435.21	24,418,660	22,321,972	500,000	277,209	1.194800003
Moringaceae	<i>Moringa oleifera</i>	386.31	20,478,894	17,095,412	500,000	216,954	0.590999995
Resadaceae	<i>Ochradenus baccatus</i>	870.42	18,680,706	17,328,066	500,000	250,676	0.341200004
Resadaceae	<i>Reseda odorata</i>	498.78	20,059,938	17,972,876	500,000	296,311	0.307800004