

Supplementary Table 1: Number of reads per species/accession and assembly size. E-size is an alternative assembly statistic implemented by the Genome Assembly Gold-standard Evaluations (GAGE) study to evaluate the completeness of the assembled gene space by considering the expected contig size for a randomly selected base.

Subsection	Species	Accession	# Raw reads	Raw coverage (X)	# Trimmed reads	Trimmed coverage (X)	Assembly E-size
<i>Austroamericana</i>	<i>G. raimondii</i>	D5-8	209,266,292	47.6	125,455,638	28.5	2,718
<i>Austroamericana</i>	<i>G. raimondii</i>	D5-6	150,875,945	34.3	91,746,782	20.9	1,587
<i>Caducibracteata</i>	<i>G. armourianum</i>	D2-1-6	155,005,858	36.2	130,884,124	30.6	3,891
<i>Caducibracteata</i>	<i>G. harknessii</i>	JFW	183,115,691	42.8	150,576,667	35.2	5,724
<i>Caducibracteata</i>	<i>G. turneri</i>	D10-3	136,351,407	45.0	126,215,258	41.6	29,772
<i>Caducibracteata</i>	<i>G. turneri</i>	D10-7	197,515,336	65.1	187,920,299	62.0	45,201
<i>Caducibracteata</i>	<i>G. turneri</i>	D10-8	124,131,681	40.9	114,788,764	37.8	33,468
<i>Erioxylum</i>	<i>G. aridum</i>	DRD-185	169,506,661	36.9	139,275,121	30.3	4,778
<i>Erioxylum</i>	<i>G. aridum</i>	D4-12	158,194,517	34.4	134,374,429	29.2	5,255
<i>Erioxylum</i>	<i>G. lobatum</i>	D7-157	173,890,886	41.4	143,417,911	34.1	4,940
<i>Erioxylum</i>	<i>G. lobatum</i>	D7-4	169,232,618	36.2	143,485,641	30.7	3,267
<i>Erioxylum</i>	<i>G. laxum</i>	D9-4	189,688,054	40.6	166,155,995	35.6	5,530
<i>Erioxylum</i>	<i>G. schwendimanii</i>	D11-1	303,290,420	65.3	260,234,325	56.0	10,495
<i>Houzingenia</i>	<i>G. thurberi</i>	D1-2	145,820,029	34.7	67,245,582	16.0	---
<i>Houzingenia</i>	<i>G. thurberi</i>	D1-35	181,003,659	43.0	157,481,159	37.5	9,074
<i>Houzingenia</i>	<i>G. trilobum</i>	D8-8	155,793,983	36.6	130,561,611	30.7	9,368
<i>Houzingenia</i>	<i>G. trilobum</i>	D8-9	94,579,207	22.2	81,335,215	19.1	1,765
<i>Integrifolia</i>	<i>G. davidsonii</i>	D3D-27	166,777,486	36.7	143,853,161	31.6	10,350
<i>Integrifolia</i>	<i>G. klotzschianum</i>	D3K-56	166,667,596	37.9	135,720,623	30.8	5,467
<i>Integrifolia</i>	<i>G. klotzschianum</i>	D3K-57	161,773,353	36.8	139,262,455	31.7	7,051
<i>Selera</i>	<i>G. gossypoides</i>	D6-5	165,907,958	39.5	142,939,108	34.0	7,621
<i>Selera</i>	<i>G. gossypoides</i>	D6-7	167,999,537	40.0	98,890,166	23.5	1,918

Supplementary Table 2: The number and length of indels per accession, and the number of SNPs, relative to G. longicaule (Lonloale)

Number of indels/Nb	Total insertions and deletions													Total deletions																		
	Ch01	Ch02	Ch03	Ch04	Ch05	Ch06	Ch07	Ch08	Ch09	Ch10	Ch11	Ch12	allChr	Ch01	Ch02	Ch03	Ch04	Ch05	Ch06	Ch07	Ch08	Ch09	Ch10	Ch11	Ch12	Ch13	Total (Nb)					
G. ramondii	D5-8	158	131	148	127	98	163	161	169	161	124	134	153	120	141	G. ramondii	D5-8	-25,262	-21,353	-15,876	-19,203	-13,673	-22,713	-28,094	-27,439	-34,761	-19,842	-22,230	-12,792	-15,108	-278,446	-278
G. armarianum	D2-1-6	143	132	137	123	99	136	140	153	138	123	121	134	111	139	G. armarianum	D2-1-6	-25,064	-22,620	-17,152	-22,034	-18,827	-22,109	-28,855	-27,910	-36,322	-22,841	-24,180	-14,832	-18,272	-301,118	-301
G. harknessii	D2-2	193	176	189	152	130	158	172	152	177	152	182	205	140	172	G. harknessii	D2-2	34,795	-32,626	-26,307	-28,815	-24,828	-33,797	-36,805	-37,497	-47,518	-29,889	-36,067	-23,815	-24,784	-417,623	-418
G. turneri	D10-7	194	174	188	153	123	200	177	200	177	200	177	154	182	199	G. turneri	D10-7	-35,689	-30,350	-26,288	-29,073	-23,284	-32,693	-37,047	-38,776	-46,012	-29,919	-36,102	-22,293	-26,207	-413,733	-414
G. aridum	D4-185	206	178	207	185	151	203	214	212	201	184	174	190	161	189	G. aridum	D4-185	-34,268	-31,313	-26,848	-32,342	-26,149	-32,887	-40,120	-37,537	-49,283	-34,701	-32,278	-10,593	-27,567	-425,086	-425
G. labatum	D7-157	212	190	194	187	152	207	208	222	199	188	183	204	171	193	G. labatum	D7-157	34,146	-31,467	-24,837	-32,379	-27,228	-32,182	-38,445	-38,117	-47,955	-33,549	-33,581	-20,229	-26,912	-421,607	-424
G. laum	D9-4	169	153	168	148	125	171	172	180	159	151	144	159	139	156	G. laum	D9-4	-28,670	-26,495	-22,894	-25,962	-22,048	-26,100	-33,127	-31,520	-39,339	-28,402	-26,851	-16,811	-22,102	-350,321	-350
G. schwendimanni	D11-1	231	193	186	190	141	216	219	233	182	194	188	223	161	193	G. schwendimanni	D11-1	-38,007	-35,769	-25,017	-31,995	-24,974	-34,593	-40,003	-39,831	-44,377	-35,501	-32,738	-22,594	-27,033	-432,432	-432
G. thurberi	D1-35	199	163	181	161	126	205	198	207	193	159	174	191	155	177	G. thurberi	D1-35	-47,318	-37,600	-33,483	-37,344	-28,298	-46,549	-52,835	-52,337	-62,561	-39,946	-43,769	-25,249	-36,203	-543,093	-543
G. triliobum	D8-8	205	168	191	164	133	210	205	213	199	164	188	221	162	193	G. triliobum	D8-8	-49,077	-39,087	-33,147	-37,554	-29,361	-46,794	-57,838	-51,790	-63,341	-39,333	-45,808	-25,528	-35,951	-550,299	-555
G. davidsonii	D3D-27	220	180	209	179	146	229	221	231	209	180	191	221	177	198	G. davidsonii	D3D-27	-45,804	-37,810	-33,841	-37,886	-30,325	-44,786	-49,283	-52,588	-59,587	-38,295	-43,470	-27,001	-33,992	-532,668	-533
G. klotschianum	D3K-57	220	181	208	179	146	229	220	232	209	180	192	220	177	198	G. klotschianum	D3K-57	-45,474	-38,652	-33,468	-37,939	-30,280	-44,807	-49,267	-52,288	-59,261	-38,375	-43,622	-26,719	-33,849	-532,161	-532
G. assypoides	D6-5	249	214	234	202	171	250	248	260	233	205	221	246	199	224	G. assypoides	D6-5	-41,866	-37,695	-30,976	-37,056	-26,559	-38,667	-47,663	-58,267	-35,790	-37,207	-26,248	-35,676	-506,600	-507	
Number of insertions														Number of deletions																		
Accession														Accession																		
Ch01	Ch02	Ch03	Ch04	Ch05	Ch06	Ch07	Ch08	Ch09	Ch10	Ch11	Ch12	Ch13	allChr	Ch01	Ch02	Ch03	Ch04	Ch05	Ch06	Ch07	Ch08	Ch09	Ch10	Ch11	Ch12	Ch13	allChr					
G. ramondii	D5-8	2,941	2,720	2,338	2,590	2,087	2,849	3,367	3,267	3,967	2,589	2,786	1,895	2,433	35,829	G. ramondii	D5-8	5,881	5,524	4,424	5,326	4,209	5,452	6,457	6,391	7,412	5,132	5,623	3,543	4,587	69,961	
G. armarianum	D2-1-6	2,694	2,792	2,154	2,536	2,110	2,398	2,929	3,027	3,384	2,579	2,539	1,611	2,195	23,248	G. armarianum	D2-1-6	5,270	5,480	4,100	5,108	4,258	4,571	5,636	5,715	6,402	5,090	5,072	3,126	4,286	64,114	
G. harknessii	D2-2	3,577	3,640	2,909	3,051	2,607	3,379	3,539	3,767	4,393	3,104	3,702	2,358	2,653	42,739	G. harknessii	D2-2	7,188	7,422	5,749	6,300	5,650	6,743	6,967	7,201	8,130	6,344	7,895	4,765	5,515	85,759	
G. turneri	D10-7	3,598	3,635	2,918	3,062	2,585	3,481	3,647	3,886	4,390	3,117	3,714	2,335	2,753	43,121	G. turneri	D10-7	7,218	7,276	5,702	6,464	5,332	6,756	7,121	7,533	8,114	6,459	7,678	4,740	5,764	86,117	
G. aridum	D4-185	3,867	3,537	3,143	3,607	3,041	3,422	4,409	4,073	4,369	3,099	3,528	2,205	3,087	46,637	G. aridum	D4-185	7,630	7,652	6,152	7,838	6,661	6,930	8,664	8,049	9,220	7,758	7,386	4,540	6,301	94,981	
G. labatum	D7-157	3,965	3,722	2,889	3,614	2,950	3,539	4,214	4,309	4,558	3,732	3,668	2,361	3,216	47,159	G. labatum	D7-157	7,871	8,227	5,988	7,999	7,344	7,043	8,386	8,393	9,231	7,968	7,794	4,874	6,762	97,240	
G. laum	D9-4	3,129	3,032	2,490	2,889	2,483	2,915	3,562	3,472	3,902	3,018	2,910	1,839	2,625	38,862	G. laum	D9-4	6,293	6,587	5,205	6,302	5,508	5,794	6,932	6,822	7,340	6,364	6,093	3,840	5,495	78,539	
G. schwendimanni	D11-1	4,311	3,893	2,827	3,775	2,847	3,632	4,569	4,467	4,509	3,913	3,866	2,612	3,111	48,326	G. schwendimanni	D11-1	8,594	8,217	5,698	8,012	6,189	7,401	8,762	8,820	9,347	8,166	7,902	5,295	6,283	97,886	
G. thurberi	D1-35	3,550	3,338	2,694	3,211	2,621	3,292	4,036	3,842	4,486	3,291	3,478	2,279	2,901	43,029	G. thurberi	D1-35	7,557	6,885	5,603	6,780	5,467	7,158	8,048	7,998	9,142	6,995	7,402	4,497	6,164	89,296	
G. triliobum	D8-8	3,718	3,471	2,865	3,294	2,824	3,468	4,130	4,015	4,641	3,396	3,568	2,385	3,046	44,821	G. triliobum	D8-8	7,736	7,045	5,874	6,903	5,703	7,280	8,375	8,145	9,456	6,801	7,584	4,726	6,735	91,984	
G. davidsonii	D3D-27	3,948	3,551	3,152	3,527	2,933	3,824	4,428	4,206	4,520	3,557	3,741	2,532	3,278	47,597	G. davidsonii	D3D-27	8,355	7,741	6,417	7,608	6,405	7,854	9,038	8,977	9,836	7,622	8,207	5,286	7,073	100,419	
G. klotschianum	D3K-57	3,951	3,558	3,143	3,521	2,934	3,828	4,431	4,227	4,537	3,561	3,764	2,547	3,283	47,666	G. klotschianum	D3K-57	8,326	7,782	6,395	7,627	6,413	7,870	9,012	9,014	9,811	7,622	8,300	5,250	7,067	100,483	
G. assypoides	D6-5	4,910	4,639	3,820	4,265	3,765	4,445	5,292	5,182	5,804	4,460	4,827	2,969	3,969	58,347	G. assypoides	D6-5	8,993	8,792	6,880	8,277	7,203	8,300	9,820	9,649	10,641	8,268	9,039	5,755	7,651	109,268	
Insertion lengths														Deletion lengths																		
Accession														Accession																		
Ch01	Ch02	Ch03	Ch04	Ch05	Ch06	Ch07	Ch08	Ch09	Ch10	Ch11	Ch12	Ch13	allChr	Ch01	Ch02	Ch03	Ch04	Ch05	Ch06	Ch07	Ch08	Ch09	Ch10	Ch11	Ch12	Ch13	allChr					
G. ramondii	D5-8	6,970	6,545	5,645	6,557	4,998	7,188	7,862	8,053	10,358	5,892	6,553	4,598	5,758	86,986	G. ramondii	D5-8	32,232	27,907	21,521	25,760	18,671	29,301	35,956	35,492	45,119	25,834	28,783	17,390	20,866	365,432	
G. armarianum	D2-1-6	9,192	9,940	7,862	9,182	6,955	8,499	9,660	10,008	11,880	8,171	8,415	5,197	7,317	112,528	G. armarianum	D2-1-6	34,256	32,560	25,014	31,216	25,682	30,358	38,515	38,918	48,203	31,112	32,395	20,029	25,589	431,046	
G. harknessii	D2-2	12,555	12,211	10,515	10,789	9,348	12,013	12,815	13,100	14,921	9,944	13,336	8,266	9,638	148,361	G. harknessii	D2-2	47,350	44,837	38,822	39,604	34,176	48,810	48,700	50,507	62,439	39,833	49,403	32,081	34,422	560,984	
G. turneri	D10-7	13,345	13,793	10,909	10,912	9,042	12,834	12,688	14,040	15,865	10,275	14,172	8,545	10,184	156,048	G. turneri	D10-7	49,034	44,103	37,197	39,985	32,366	45,527	49,735	52,816	61,877	40,194	50,274	30,838	36,391	570,337	
G. aridum	D4-185	11,002	12,367	10,791	13,517	9,960	11,734	14,657	14,398	16,911	11,734	12,188	7,240	9,901	159,032	G. aridum	D4-185	47,347	43,608	37,639	40,499	36,114	46,611	54,977	53,932	64,194	47,435	46,466	26,833	27,648	518,138	
G. labatum	D7-157	12,909	13,350	12,045	12,815	9,891	12,629	15,505	15,051	17,429	12,045	12,815	7,240	9,901	159,032	G. labatum	D7-157	47,347	43,608	37,639	40,499	36,114	46,611	54,977	53,932	64,194	47,435	46,466	26,833	27,648	518,138	
G. laum	D9-4	9,772	10,505	8,166	9,963	8,013	11,018	11,479	12,075	14,391	8,167	9,901	5,945	8,996	127,034	G. laum	D9-4	38,442	37,055	30,100	35,925	30,014	36,618	44,606	45,134	52,680	37,899	24,241	22,306	31,908	477,355	
G. schwendimanni	D11-1	10,168	10,450	7,934	10,664	9,622	11,163	16,792	14,704	19,202	11,938	14,477	9,014	10,970	170,915	G. schwendimanni	D11-1	41,505	40,819	34,811	40,659	36,426	47,109	56,799	57,235	69,469	49,459	47,215	11,808	38,003	608,523	
G. thurberi	D1-35	11,836	11,211	10,168	11,211	8,214	12,102	10,769	11,741	14,391	8,214	10,769	5,197	7,317	112,528	G. thurberi	D1-35	47,347	43,608	37,639	40,499	36,114	46,611	54,977	53,932	64,194	47,435	46,466	26,833	27,648	518,138	
G. triliobum	D8-8	12,310	11,510	9,849	13,410	9,404	12,286	13,506	13,757	16,027	11,742	14,882	8,222	10,144	155,550</																	

Supplementary Table 3: Accessions used in the present study

Subsection	Species	Accession	Sequenced
<i>Caducibracteata</i>	<i>G. armourianum</i>	D2-1-6	BGI
<i>Erioxylum</i>	<i>G. aridum</i>	D4-12	BGI
<i>Erioxylum</i>	<i>G. lobatum</i>	D7-4	BGI
<i>Erioxylum</i>	<i>G. laxum</i>	D9-4	BGI
<i>Erioxylum</i>	<i>G. schwendimanii</i>	D11-1	BGI
<i>Houzingenia</i>	<i>G. thurberi</i>	D1-35	BGI
<i>Houzingenia</i>	<i>G. trilobum</i>	D8-8	BGI
<i>Integrifolia</i>	<i>G. davidsonii</i>	D3D-27	BGI
<i>Integrifolia</i>	<i>G. klotzschianum</i>	D3K-57	BGI
<i>Selera</i>	<i>G. gossypoides</i>	D6-5	BGI
<i>Caducibracteata</i>	<i>G. turneri</i>	D10-3	Novogene
<i>Caducibracteata</i>	<i>G. turneri</i>	D10-7	Novogene
<i>Caducibracteata</i>	<i>G. turneri</i>	D10-8	Novogene
<i>Austroamericana</i>	<i>G. raimondii</i>	D5-8	NXT
<i>Austroamericana</i>	<i>G. raimondii</i>	D5-6	NXT
<i>Houzingenia</i>	<i>G. thurberi</i>	D1-2	NXT
<i>Houzingenia</i>	<i>G. trilobum</i>	D8-9	NXT
<i>Selera</i>	<i>G. gossypoides</i>	D6-7	NXT
<i>Integrifolia</i>	<i>G. klotzschianum</i>	D3K-56	USDA
<i>Caducibracteata</i>	<i>G. harknessii</i>	JFW	USDA
<i>Erioxylum</i>	<i>G. aridum</i>	DRD-185	USDA
<i>Erioxylum</i>	<i>G. lobatum</i>	D7-157	USDA

**BGI:** Samples submitted to BGI Genomics (Hong Kong) for Illumina library preparation and 2x100bp sequencing.

**NXT:** Samples prepared in-house at the USDA-ARS GBRU core facility using Nextera and sequenced as 2x100 bp.

**USDA:** Samples prepared at the USDA-ARS GBRU core facility using Accel-NGS 2S PCR-Free (Product number 20024 with adapter set 26396, Swift Biosciences, Ann Arbor, MI, USA) and

**Novogene:** Samples submitted to Novogene (Beijing) for Illumina library preparation and 2x150bp sequencing.