Code	PI no.	Botanical	Origin	Genotype	Number
		variety		name	in
					structure
G-001	PI152146	fastigiata	Uruguay	Turkestan B	23
G-002	PI158854	fastigiata	China	N/A	60
				Taiwan	
				Kotsubu No.	
G-003	PI200441	fastigiata	Japan	13	9
G-004	PI259617	fastigiata	Cuba	No. 15233	37
				Japanese	
G-005	PI259836	fastigiata	Malawi	Bunch	52
G-006	PI262038	fastigiata	Brazil	R.C.M. 544	24
G-007	PI290566	fastigiata	India	SI 35	3
G-008	PI290620	fastigiata	Argentina	SI 89	2
G-009	PI295730	fastigiata	India	A.H.45	76
G-010	PI313129	fastigiata	Taiwan	101	20
G-011	PI337406	fastigiata	Paraguay	Fav 153	15
G-012	PI339960	fastigiata	Argentina	N/A	119
G-013	PI343398	fastigiata	Israel	Fav 153	6
G-014	PI356004	fastigiata	Argentina	Mf.67 XM 27	33
				Valencia	
G-015	PI429420	fastigiata	Zimbabwe	Bassanga	89
G-016	PI471954	fastigiata	Zimbabwe	31/7/28	87
	DI 450050	<i>c</i>	TT 1	ICG 2716	
G-017	PI478850	fastigiata	Uganda	(EC76446)	77
G-018	PI482189	fastigiata	Zimbabwe	Kasawaira	79
G-019	PI502040	fastigiata	Peru	SPZ 469-1	114
G-020	PI475863	fastigiata	Bolivia	US 216	106
G-021	PI475918	fastigiata	Bolivia	US 331	65
G-022	PI476025	fastigiata	Peru	US 413	71
G-023	PI493329	fastigiata	Argentina	RCM 21	82
G-024	PI493356	fastigiata	Argentina	RCM 48	84
G-025	PI49354/	fastigiata	Argentina	RCM 239	34
G-026	PI493581	fastigiata	Argentina	RCM 273	98
G-02/	P1493631	fastigiata	Argentina	RCM 323	100
G-028	PI493693	fastigiata	Argentina	RCM 385	/8
G-029	P1493/1/	Jastigiata	Argentina	RCM 409	101
G-030	PI493/29	fastigiata	Argentina	RCM 421	102
G-031	P1493880	fastigiata	Argentina	RCM 572	103
G-032	PI493938	fastigiata	Argentina	RCM 630	80
G-033	P1159/86	nypogaea	Senegal	IN/A	16
G-034	PI162655	hypogaea	Uruguay		22
G-035	P1162857	hypogaea	Sudan	American	74
0.000	DI10((22	1	Cote	41-48	02
G-036	P1196622	hypogaea	Divoire	17 16	93
G-03/	P1196635	nypogaea	Madagascar	4/-10 Notel	10
C 020	DI240560		Couth A fri-	Inatal	70
G-038	P1240560	nypogaea	South Africa	Common	12

1 Table S1 One hundred and twenty genotypes mainly coming from the peanut mini core accession used

2 for GWAS analysis related with elemental accumulation.

G-039	PI259658	hypogaea	Cuba	No. 15599	35
G-040	PI259851	hypogaea	Malawi	American	11
G-041	PI268586	hypogaea	Zambia	SB41	63
G-042	PI268696	hypogaea	South Africa	BC205	17
G-043	PI268755	hypogaea	Zambia	SB117	31
G-044	PI268806	hypogaea	Zambia	SB152	30
G-045	PI268868	hvpogaea	Sudan	BC42	19
G-046	PI268996	hvpogaea	Zambia	AR12	28
G-047	PI270786	hvnogaea	Zambia	MS. 28	32
G-048	PI270905	hvnogaea	Zambia	F1-23	27
G-049	PI270907	hvnogaea	Zambia	F1-30	26
G-051	PI290536	hvnogaea	India	SI 5	5
G-052	PI290594	hvnogaea	India	SI 63	4
G-053	PI292950	hvnogaea	South Africa	No 3	73
0 000	112/2/00	nyp ogueu		Tanganyika	, 0
G-054	PI295250	hvnogaea	Israel	Mwitunde	46
0.001	112/0200	nypogueu	101401	Large	10
				Chimbuwita	
G-055	PI295309	hvnogaea	Israel	NRN3	48
G-056	PI296550	hvnogaea	Israel	178	42
G-057	PI296558	hvnogaea	Israel	266-4-PL-64	44
G-058	PI298854	hvnogaea	South Africa	Jumbo Runner	18
G-050	PI319768	hypogaea	Israel	1066-20	40
G-060	PI323268	hypogaea	Pakistan	No 45	99
G-061	PI325943	hypogaea	Venezuela	Mani	54
G-067	PI331297	hypogaea	Argentina	132	120
G-062	PI331314	hypogaea	Argentina	132	120
G-064	PI337203	hypogaea	Brazil	/17 /12	25
0-004	11557275	пурозиси	DIazii	White Spanish	20
G-065	PI337300	hypogaea	Morocco		97
G-065	PI343384	hvnogaea	Israel	1318-6	7
U -000	11545504	пурозиси	151401	Almacenado	/
$G_{-}067$	PI355268	hypogaea	Mexico	sin cascara	95
G-068	PI355200	hypogaea	Mexico	No 24	12
G-060	PI370331	hypogaea	Israel	Virginia adom	50
G_{-070}	PI372271	hypogaea	Unknown	5009 7	13
G-070	PI372305	hypogaea	Nigeria	56597	69
G_{-072}	PI309581	hypogaea	Nigeria	M866 73	14
$G_{-0.72}$	PI//2768	hypogaea	Zimbahwe	P31/6/2	83
U -075	11442700	пурозиси	Zimodowe	Mao-Ming	05
$G_{-}074$	PI/61/3/	hypogaea	China	Hwa-Sung	01
$G_{-0.75}$	PI/71052	hypogaea	Zimbabwe	31/7/10	91 81
G-075	PI/76636	hypogaea	Nigeria	M 107-74	68
U- 070	114/0050	nypogueu	Mozambiqu	Mative	00
$G_{-}077$	PI/81705	hypoggag	e		86
G-078	PI482120	hypogueu	c Zimbabwe	Kaboko	80 85
G-070	PI/0/705	hypogaea	Zambia	7FA 3/15	03 117
0-077	1 1474/73	nypogueu	Burking	ZFA 3413 7FΔ 2/15	11/
G-080	PI/06/01	hypoggag	Faso	LIA JHIJ	110
0-000	11770701	пуродиеи	Rurking	Kongoussi III	110
$G_{-}081$	PI/06//9	hunogaga	Faco	ixongoussi III	111
0-001	1 1470440	nypogueu	1.020		111

G-082	PI504614	hypogaea	Colombia	Tatui-76	112
G-083	PI338338	peruviana	Venezuela	Virginia No. 4	56
G-084	PI502111	peruviana	Peru	SPZ 494-2	115
G-085	PI502120	peruviana	Peru	SPZ 497-1	116
		*		LE 39	
				Aceitero	
G-086	PI155107	vulgaris	Uruguay	Federacion	21
G-087	PI157542	vulgaris	China	N/A	58
G-088	PI270998	vulgaris	Zambia	BMP42	29
		C		Spanish 44D	
G-089	PI271019	vulgaris	Zambia	1302	62
G-090	PI288146	vulgaris	India	G 287	38
G-091	PI290560	vulgaris	India	SI 29	1
		0		Japones de	
G-092	PI403813	vulgaris	Argentina	Tancacha	64
G-093	PI407667	vulgaris	Thailand	Chiba Shoryer	75
G-094	PI478819	vulgaris	India	Chiba Shoryer	67
G-095	PI476432	hypogaea	Nigeria	Chiba Shoryer	70
G-096	PI497517	fastigiata	Brazil	US 861	109
G-097	PI497639	fastigiata	Ecuador	US 713	113
G-098	PI497318	hypogaea	Bolivia	US 619	107
G-099	PI497395	hypogaea	Bolivia	US 820-2	108
G-100	PI494018	vulgaris	Argentina	RCM 710	104
G-101	PI494034	vulgaris	Argentina	RCM 726	105
G-102	PI288210	vulgaris	India	526	39
G-103	PI371521	hypogaea	Israel	NC25	8
G-104	PI461427	hypogaea	China	Se-li-Hwong	66
G-105	Grif12545	aequatoriana	Ecuador	N/A	41
G-107	Grif14051	aequatoriana	Guatemala	N/A	43
G-108	PI259748	hypogaea	Peru	N/A	88
G-109	PI390428	hypogaea	Ecuador	N/A	90
G-110	PI468250	hypogaea	Bolivia	N/A	92
G-111	PI497648	fastigiata	Ecuador	N/A	94
G-112	PI501272	hypogeae	Peru	N/A	96
G-113	PI576613	hirsuta	Mexico	N/A	45
G-114	PI576614	hirsuta	Mexico	N/A	47
G-116	PI576634	hirsuta	Mexico	N/A	49
G-117	PI576636	hirsuta	Mexico	N/A	36
G-118	PI576637	hirsuta	Mexico	N/A	51
G-119	PI648241	hirsuta	Ecuador	N/A	53
G-120	PI648242	aequatoriana	Ecuador	N/A	55
G-121	PI648245	aequatoriana	Ecuador	N/A	57
G-122	PI648249	aequatoriana	Ecuador	N/A	59
G-123	PI648250	aeauatoriana	Ecuador	N/A	61

A sub-genome	В	Ca	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	Р	S	Zn	Total
Linkage Group														
A01	34	2		1				3	3				1	44
A02	3	1		5				3	3	1	1	1		18
A03	20	1		2	2			3	14	8				50
A04	34			4					3	4	1	2		48
A05	65		4		11			1	2		3		2	88
A06	14	1		2	5	1		2						25
A07	1				6			1			3			11
A08	5		1		1			1						8
A09	3		1		9		1		2	2				18
A10	7		1	3	4	1		2	1	7				26
B01	27	2							1		2	1	1	34
B02	6	3		1	1				6					17
B03	21	5		3		2	1		19	13		2		66
B04	6			1		1			2	1				11
B05	15	5	4		3			2	1	1			5	36
B06	28	2		11	4	7	1	3	4					60
B07	12			1	1	3			10		14			41
B08	12				3	2		8	5	2	1	3		36
B09	19	1	43	1	13		1	2	1	1	1	3	1	87
B10	13	2			5	3	1	6	3	7	2	34		76
Total	345	25	54	35	68	20	5	37	80	47	28	46	10	800

4 Table S2. The distribution of the QTLs associated with elemental accumulation on peanut linkage groups.

A sub-genome	В	Cu	Na	S	Zn	Total
Linkage Group						
A01	1					1
A02						
A03						
A04	1		1			2
A05	6		1			7
A06	1					1
A07	1					1
A08	1					1
A09						
A10	2					2
B01			1			1
B02			1			1
B03	1					1
B04	1		1			2
B05	3				1	4
B06	1		1			2
B07	1					1
B08	1					1
B09	1	2				3
B10	2			3		5
Total	24	2	6	3	1	36

6 Table S3. The distribution of the significant QTLs associated with elemental accumulation on peanut

7 linkage groups.

8

	A sub-genome	В	Cu	Na	S	Zn	Total
	Linkage Group						
	A01	1					1
	A02						
	A03						
	A04	1		3			4
	A05	20		10			30
	A06	2					2
	A07	2					2
	A08	10					10
	A09						
	A10	3					3
	B01			6			6
	B02						
	B03						
	B04			8			8
	B05	14				4	18
	B06	2		8			10
	B07						
	B08						
	B09		7				7
	B10	6			3		9
	Total	61	7	35	3	4	110
1							
2							
3							
4							
5							
6							
7							
8							
9							
-							
0							
0							

10 Table S4. The distribution of the significant genes associated with elements on peanut linkage groups.



Fig S1. Frequency and accumulative frequency of marker density. Distribution of marker density wasdisplayed as a histogram and an accumulative distribution.



47 Fig S2. Markers heterozygosity and LD decade. A) The frequency of heterozygous were calculated for all

48 of the markers. High level of heterozygosis indicated low quality. B) Linkage disequilibrium (LD) decade

49 over distance. Each dot represented a pair of distance between two markers on the window and their

50 squared correlation coefficient. The red line was the moving average of the 5 adjacent markers.





Fig S3. Q-Q plots for 13 peanut elements resulted from different software: A TASSEL; B GAPIT. X-axis shows expected $-\log_{10} (P \text{ value})$; y-axis shows observed $-\log_{10} (P \text{ value})$.



horizontal line indicates the genome-wide significant threshold: $-\log_{10} (P \text{ value}) = 4.31$. The blue horizontal line indicates the threshold for the significance of "suggestive association": $-\log_{10} (P \text{ value}) = 3.01$.







Fig S6. Average elemental concentrations in 120 accessions mainly coming from the U.S. peanut mini core collection in 2008 and 2009. B, Cu, Fe, Mn, Mo, Na, Ni, and Zn, $\mu g/g$; Ca, K, Mg, P, and S, mg/g.

