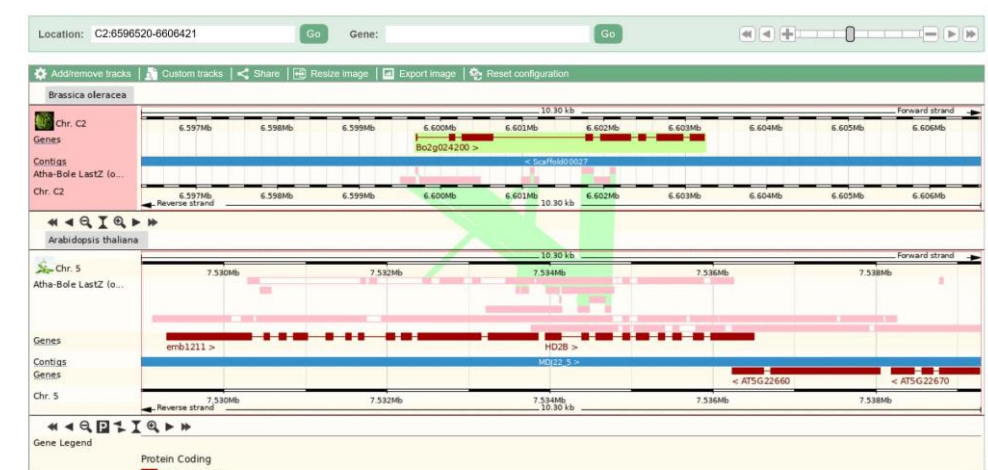
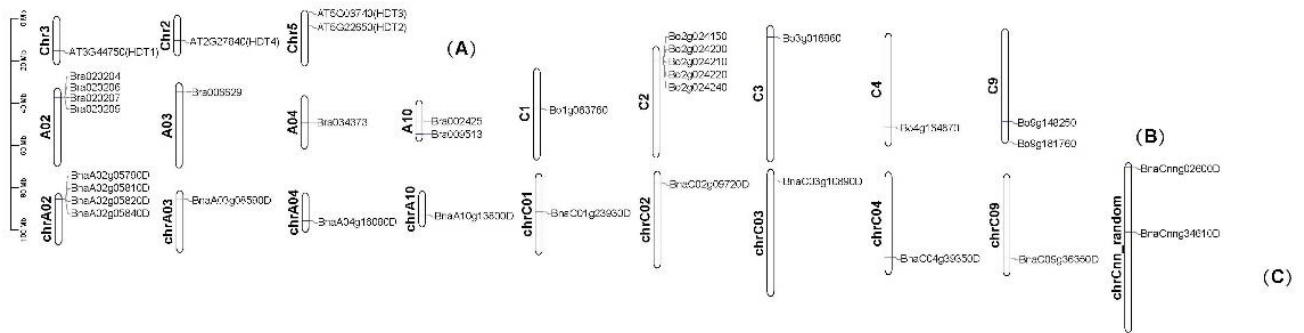


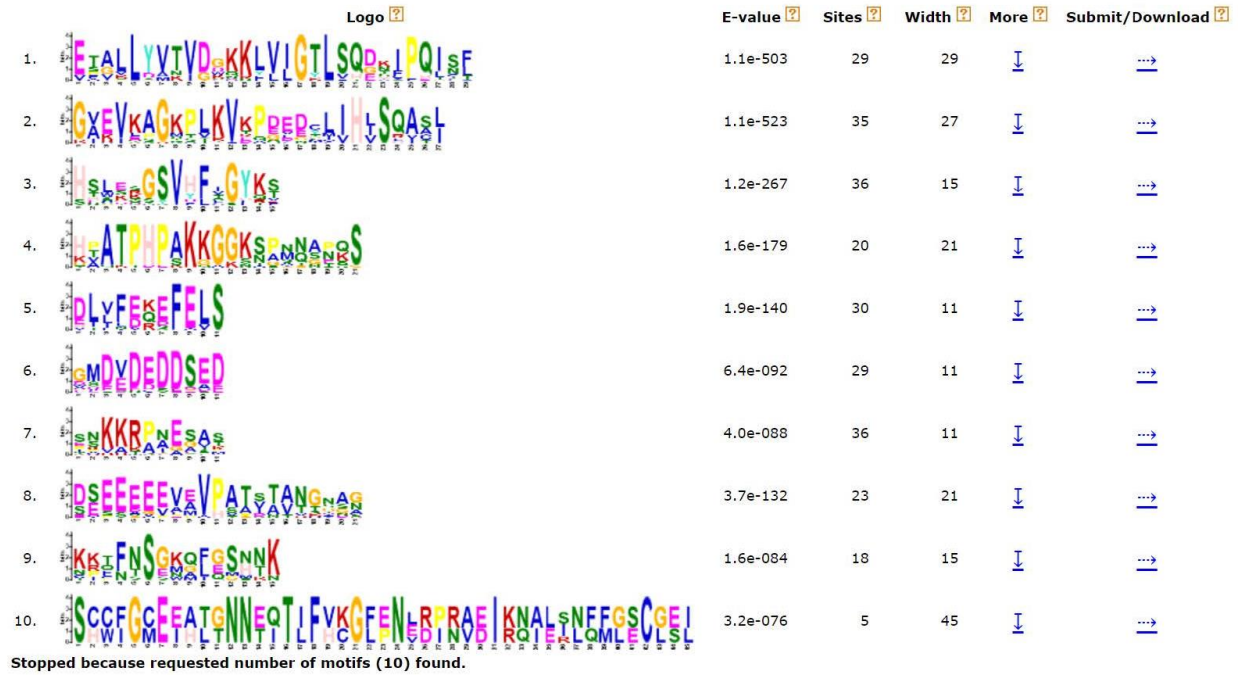
**Figure S1.** Sequence alignment of HDT proteins.



**Figure S2.** Comparison of gene structure between *ATHDT2* and *Bo2g024200*.



**Figure S3.** Chromosomal localizations of HDT genes in *Arabidopsis* (A), *B. rapa*, (Bra) and *B. oleracea* (Bo) (B), and *B. napus* (C). (A) Chr2, Chr3, Chr5: *Arabidopsis* chromosomes, (B) A02, A03, A04, A10: *B. rapa*, chromosomes; C2, C3, C4, C9: *B. oleracea* chromosomes, (C) ChrA02, chrA03, chrA04, chrA10: *B. napus* An-subgenome chromosomes; ChrC02, chrC03, chrC04, chrC09: *B. napus* Cn-subgenome chromosomes; random means genes were randomly distributed to a specific chromosome. ChrCnn were unanchored scaffolds that could not be mapped to a specific chromosome from the *B. napus* C-subgenomes.



**Figure S4.** 10 motifs were detected in HDT proteins using MEME.

**Table S1.** RNA-seq data of expression levels of *AtHDT* , *BraHDT*, *BoHDT* and *BnaHDT* genes in different tissues and organs.

gene_id	root	stem	leaf	bud	sepal	stamen	newpistil	blosomypistil	wiltingpistil	ovule	pericarp	silique
BnaA02g05840D	94.18644	92.0765223	39.00577597	110.228006	23.61232111	340.0437106	7.962097	36.81925	3.398101	130.345	170.4775	329.03
BnaC02g09720D	61.91186	63.9230658	27.44350117	83.2342217	13.94473728	228.8799195	6.064687	10.24578	1.260797	73.90664	95.16839	182.4752
BnaA03g08590D	8.434458	43.0048952	10.36822358	23.2457629	1.464976139	60.94503219	0.661402	0.644645	0	16.24339	17.81137	44.6983
BnaC03g10890D	8.125341	18.3789342	3.609988776	9.34433637	0.627846917	26.69425264	0.955359	1.002781	0.171875	10.85459	12.7343	13.6304
BnaA10g13800D	11.6763	7.91607987	9.241904515	29.2885017	7.716286536	50.18456797	1.161241	4.75364	1.176884	24.08565	22.70864	43.07622
BnaC09g36350D	11.58095	5.07421341	5.415465653	12.3152015	3.688500406	28.31526172	0.932552	1.060412	0.908764	9.850269	13.81821	15.3581
BnaA02g05810D	0.065881	0.2701417	0.563621126	0	0.20815105	0.857767919	0	0.10686	0	1.033651	0.248342	0.560968
BnaA02g05790D	0.069646	0.57115674	0.066203116	0.5807824	0	0.129540461	0	0	0	24.76825	0.7876	2.890987
BnaCnng34610D	0.299092	1.07310891	1.208308413	0.15588485	0	0.278154364	0	0	0	28.54695	0.845583	2.546724
BnaA02g05820D	2.586523	2.81216644	3.352730172	8.53782807	4.828970499	11.00677391	7.761022	3.686843	7.702872	7.446794	11.52277	10.51138
BnaA04g16080D	0.551494	1.1306836	0.996042362	0.40240862	0	4.10309153	0	0.089453	0	1.057557	0.623666	1.056574
BnaC04g39350D	1.523502	2.42939934	1.716377092	0.94108259	0.08913876	7.451575139	0	0.274571	0	2.852643	1.276204	2.522407
BnaC01g23930D	7.840459	7.99924174	6.711139088	15.8420351	1.81973517	38.082131	1.422284	1.988965	0.361566	11.66009	14.28726	23.01806
BnaCnng02600D	31.23818	21.6983567	12.72138315	31.8505053	6.687654181	60.57921567	5.624699	9.192358	2.923319	17.02163	24.70903	40.37062
gene	Root	Leaf	Stem	Sepals	Stamens	Carpels	Flower	Siliques Stage 3	Siliques Stage 4	Siliques Stage 5	Siliques Stage 6	
AT3G44750	475.5	130.72	36.77	110.33	76.1	411.3	404.58	106.8	140.05	98.07	106.67	
AT5G22650	671.3	324.28	173.33	303.27	236.38	856.32	772.63	368.2	383.08	344.88	384.83	
AT5G03740	224.73	115.72	80.03	108.03	155.27	444.3	450.25	225.18	262.1	216.55	260.08	
AT2G27840	363.78	146.38	63.2	101.08	58.52	197.95	289	111.02	103.9	94.03	69.4	
tracking_id	Root	Stem	Leaf	Bud	Flower	Silique	Callus					
Bo1g063760	2.10526	0.603312	8.05516	2.86231	1.3393	2.52561	5.96444					
Bo2g024150	0	0.449708	0	0	0.147898	29.2354	0.164663					
Bo2g024200	0.068238	0.273772	1.82764	1.91411	1.55314	1.41574	0.150364					
Bo2g024210	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					
Bo2g024220	6.38207	2.57612	12.5072	8.88869	10.8752	10.2268	7.88907					
Bo2g024240	204.962	62.2215	414.987	203.265	33.7984	116.659	273.256					
Bo3g016960	29.5496	11.9083	29.0509	22.2023	2.08873	21.1134	19.6697					
Bo4g164870	5.72536	1.689	4.12038	6.18558	0.888751	6.37722	11.2555					
Bo9g148250	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					
Bo9g181760	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A					
Bra002425	32.2377	40.7451	44.4231	36.9564	21.1477	34.4548	15.5953					
Bra006629	40.7167	32.784	84.4606	81.825	31.7366	54.1575	14.612					
Bra009513	67.1451	68.7888	46.2489	51.2764	86.3331	85.3799	63.0488					
Bra020204	0.293098	0.371959	0.1719345	0.147938	0	32.6815	0					
Bra020206	0	0	0	0	0	0.334215	0					
Bra020207	0.061075	0	0.0768449	0.0924615	0.183224	1.1041	0.097938					
Bra020209	268.5685	476.247	436.6785	467.123	147.943	219.433	168.179					
Bra034373	19.3331	16.5746	28.6557	30.5637	8.90675	21.0393	5.71304					

**Table S2:** RNA-seq data of expression levels of *BnaHDT* genes under different abiotic stresses and plant hormones treatments.

gene _id	Le	Le	Le	C	C	Co	H	H	H	A	A	A	M	M	M			E	S	S	S	R	R	Ro	N	N		P	P		
	af	af	af	ol	ol	ld	ot	ot	ot	B	B	B	ej	ej	ej	E	E	T_	A	A	A	oo	oo	ot	a	a	Na	E	E	PE	
	_3	_6	_1	d_	d_	_1	_3	_6	_1	A	A	A_	A	A	A_	T_	T_	12	_3	_6	_1	t_	t_	_1	Cl	Cl	Cl	G	G	G	
	h	h	2h	3h	6h	2h	h	h	2h	h	h	h	h	h	h	h	h	h	h	h	h	2h	3h	6h	2h	h	h	2h	h	h	2h
Bna	50	41	21	10	42	11	40	42	77	38	75	35.	48.	33.	23.	74	78	31	42	71	88	92	11	10	67	87	10	10	90	82	
A02	.8	.1	.6	.8	.8	6.9	.1	.5	.3	.4	.6	09	77	39	45	.5	.4	.0	.2	.1	.3	.2	1.	8.6	.1	.0	1.9	9.	.6	.0	
g058	70	00	68	10	86	07	08	40	03	59	70	03	82	21	70	47	27	21	66	69	21	02	49	52	40	13	87	92	76	30	
40D	44	06	75	15	17	2	27	06	6	93	1	4	2	8	7	82	34	67	86	16	44	99	07	8	72	88	8	65	15	05	
Bna	46	41	21	10	16	35.	45	59	11	37	60		44.	33.	22.	67	67	28	40	62	80	86	10	10	70	93	10	11	96	83	
C02	.7	.9	.9	.1	.6	21	.5	.0	0.	.9	.8	35.	44	76	98	.9	.6	.0	.8	.5	.6	.5	6.	0.2	.5	.0	0.3	0.	.5	.3	
g097	36	07	19	66	40	56	99	80	56	65	82	00	66	13	08	26	62	34	75	88	42	74	72	79	98	48	37	55	25	53	
20D	08	91	18	53	47	8	39	86	96	21	62	65	6	7	2	25	69	6	63	69	27	55	16	4	53	77	8	33	24	91	
Bna	10	10	3.	1.	3.	3.9	3.	5.	4.	8.	27	3.7	10.		3.6	22	21	4.	8.	18	22	16	24		13	16	24.	22	16	15	
A03	.1	.1	96	71	02	56	46	61	47	65	.3	56	17	7.7	74	.0	.0	52	98	.2	.3	.3	.5	24.	.5	.6	72	.6	.8	.4	
g085	64	93	23	29	57	87	24	63	42	56	89	03	29	27	06	50	62	58	25	78	11	05	24	39	74	88	66	25	91	78	
90D	08	13	3	27	81	5	71	08	85	15	71	9	9	65	1	23	46	41	6	25	34	74	71	78	46	85	6	63	52	84	
Bna	2.	2.	1.	0.	0.		0.	1.	0.	1.	7.	2.2	3.1	2.2	1.1	4.	6.	0.	1.	3.	5.	5.	7.	6.0	3.	5.	7.6	7.	7.	5.	
C03	04	92	08	36	42	0.9	99	90	98	93	43	08	32	60	03	62	20	99	97	80	68	80	12	67	93	06	37	45	17	02	
g108	35	35	78	91	43	97	82	06	28	18	19	83	32	55	26	68	98	91	35	49	29	03	24	05	04	08	02	45	67	31	
90D	9	06	18	94	42	68	39	7	64	76	7	4	2	5	4	58	79	2	81	21	78	81	07	1	44	84	2	9	75	27	
Bna	8.	11	6.	2.	3.	6.4	6.	7.	15	8.	17	12.	8.9	9.2	7.5	12	19	9.	9.	12	12	16	18	19.	14	15	17.		13	16	
A10	14	.0	25	55	52	42	99	76	.8	71	.2	98	13	00	98	.7	.7	37	13	.1	.7	.5	.2	62	.5	.6	77	16	.7	.1	
g138	80	26	20	13	40	44	19	73	53	12	20	80	45	37	66	89	80	02	52	84	14	46	24	32	96	03	82	.4	87	17	
00D	11	81	69	56	51	8	81	72	35	63	8	2	8	8	1	74	68	03	2	77	05	33	05	9	82	89	6	95	83	85	
Bna	8.		5.	2.	4.	8.5	2.	3.	6.	6.	10	8.3		5.7	5.1	8.	11	7.	8.	11	11	9.	14	14.	12	13	16.	12	10	12	
C09	63	6.	31	51	61	93	95	01	07	15	.5	78	8.1	04	51	51	.6	13	21	.4	.7	99	.7	19	.9	.3	22	.0	.4	.3	
g363	20	81	28	50	63	64	86	47	69	44	44	40	68	76	81	62	00	04	51	35	36	37	22	52	15	04	76	44	88	08	
50D	78	44	43	65	69	3	92	31	22	47	39	3	34	6	9	79	37	14	46	72	78	76	28	7	12	16	5	26	05	58	
Bna	0.	0.	0.	0.	0.	0.3	0.	0.	0.	0.	0.	0.4				0.	0.	0.	0.	0.	0.		0.	0.0	0.	0.	0.0		0.	0.	
A02	32	61	18	12	20	72	09	43	36	07	61	08	0.4	0.2	0.1	62	92	34	47	27	53		03	43	09	14	58		05	03	
g058	28	77	65	05	26	86	60	37	33	68	18	39	11	79	41	39	73	69	52	88	41		19	29	17	06	93		30	06	
10D	93	63	53	3	78	8	81	2	57	89	12	3	03	52	46	16	12	95	43	49	74	0	97	8	5	27	1	0	07	04	
Bna																						0.	0.			0.	0.1	0.	0.		
A02																							02	03			05	40	14	10	
g057																										87	80	70	41		
90D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	91	89	0	0	6	5	21	12	0
Bna	0.	0.	0.	0.	0.	0.1	0.	0.		0.	0.	0.0	0.0			0.	0.	0.	0.	0.	0.	0.	0.	0.0		0.	0.5	0.	0.	0.	
Cnn	11	02	14	18	25	92	04	18		09	30	90	32			03	01	11	11	19	11	13	02	94		12	58	12	04	19	
g346	63	72	96	93	59	90	91	16		47	38	34	72			08	84	25	25	94	14	99	37	78		97	10	42	61	64	
10D	84	96	62	58	47	7	18	1	0	65	7	7	7	0	0	85	45	5	5	09	91	98	18	4	0	17	5	25	5	29	

Bna	0.	0.	1.	0.	0.	0.6	1.	1.	2.	0.	1.	1.2	0.8	0.9	1.4	1.	1.	1.	1.	1.	2.	1.	1.	2.1	2.	1.	1.6	1.	1.	2.
A02	99	77	19	76	34	80	44	62	37	91	17	24	69	78	13	11	23	70	73	91	07	67	93	07	37	91	02	92	54	44
g058	75	43	87	70	63	01	67	58	37	66	03	41	98	17	27	64	62	49	87	04	01	24	20	16	18	43	52	65	07	93
20D	31	68	37	2	6	2	05	17	4	06	95	3	8	9	1	38	92	49	48	46	12	19	93	8	62	03	4	25	23	65
Bna	0.	0.	0.	0.	0.	0.6	0.	0.	0.	0.	2.	0.4	0.7	0.6	0.3	1.	1.	0.	0.	1.	2.	1.	3.	2.9	1.	1.	3.0	3.	2.	2.
A04	98	96	30	20	15	79	21	28	36	61	79	89	18	00	41	98	87	35	75	75	29	29	10	15	44	84	44	62	59	90
g160	37	05	22	10	96	88	48	07	01	20	83	07	21	47	90	12	15	46	92	53	13	07	47	71	80	01	14	90	95	07
80D	3	79	36	47	85	4	01	84	54	06	84	6	4	1	6	73	81	74	23	57	58	83	95	3	9	37	5	04	81	46
Bna	3.	2.	1.	0.	1.	2.4	0.	0.	0.	1.	8.	1.8	2.5	1.4	1.1	6.	7.	0.	2.	4.	6.	9.	13		7.	9.	12.	13	8.	9.
C04	22	82	09	85	53	45	51	79	72	94	41	36	98	91	37	41	96	93	40	38	01	23	.2	15.	04	41	75	.0	93	08
g393	45	62	08	39	99	71	94	72	61	72	05	13	82	57	04	74	61	73	37	87	88	87	45	27	82	23	66	24	55	69
50D	7	45	04	9	82	4	89	18	14	95	45	9	2	5	3	8	64	56	59	14	5	12	3	64	38	83	6	02	06	16
Bna	2.	4.	3.	1.	1.	2.1	2.	3.	3.	3.	9.		2.6	2.2	2.2	6.	8.	3.	2.	3.	4.	7.	8.		5.	5.	8.0	7.	7.	7.
C01	76	63	03	19	67	04	38	39	52	21	98	3.9	15	63	67	59	57	47	97	50	06	35	08	7.3	02	01	20	76	99	41
g239	53	39	79	83	16	30	66	59	98	90	74	55	23	96	85	63	41	80	82	18	47	17	69	83	76	17	97	60	44	59
30D	52	29	07	34	22	1	46	29	43	28	74	99	8	4	3	68	98	63	66	09	09	98	44	65	82	34	1	82	53	5
Bna	11	10	11	6.	8.	11.	18	21	49	8.	15	9.9	10.	10.	9.8	12	12	12	13	13	14	35	43	39.	38	40	36.	39	36	41
Cnn	.2	.6	.8	18	10	37	.5	.5	.8	96	.3	05	68	67	91	.5	.8	.5	.2	.7	.3	.9	.9	99	.7	.1	84	.0	.0	.0
g026	50	19	08	72	74	04	56	32	86	27	88	72	46	48	15	10	35	97	06	54	37	47	23	09	63	15	96	93	27	48
00D	9	47	06	94	73	2	44	78	96	08	73	7	8	8	7	26	63	44	1	27	87	52	07	9	36	08	5	03	11	6

**Table S3.** RNA-seq data of expression levels of *BnaHDT* genes under different low-temperature.

gene_id	HX17_MA	HX17_CA	HX17_FA	HX17_MB	HX17_CB	HX17_FB	HX58_MA	HX58_CA	HX58_FA	HX58_MB	HX58_CB	HX58_FB
BnaA02g05840D	11.67546	24.79769	8.925661	27.69888	48.62542	86.74409	4.498591	13.08269	12.25774	10.23339	95.06071	126.0484
BnaC02g09720D	25.63816	41.75628	16.0856	62.25208	120.0346	134.2699	8.203703	16.7466	14.86383	16.61071	157.5789	138.8114
BnaA03g08590D	2.734362	4.424089	2.022714	8.152468	10.34699	8.970388	0.287605	1.196378	1.419705	1.732016	16.97928	15.52134
BnaC03g10890D	0.108457	0.605434	0.010534	0.584349	3.094805	2.649393	0	0	0.061007	0.093199	2.580671	4.197495
BnaA10g13800D	7.191454	10.12443	4.257001	9.483133	29.20542	27.08059	0.303878	0.22119	1.0235	0.924607	9.994659	9.749105
BnaC09g36350D	6.354079	11.84805	3.47475	9.588258	17.1129	18.50291	3.906548	5.284188	5.548681	5.912688	33.18358	22.96896
BnaA02g05810D	0.017889	0.070231	0	0.085415	0.068321	0.015811	0	0	0	0.014942	0.111754	0.013485
BnaA02g05790D	0	0	0	0	0	0.088032	0.013094	0	0.014063	0.014602	0	0.014053
BnaCnng34610D	1.395851	0.595493	0.69993	3.799195	1.438766	4.145075	3.987993	2.225652	3.036752	5.419788	0.181318	0.47019
BnaA02g05820D	2.180877	2.086215	1.451145	2.996337	4.591788	3.165979	2.597661	3.321969	1.273094	3.344828	4.989705	3.617936
BnaA04g16080D	0.833191	1.262734	0.345504	1.249651	4.272226	4.023432	0.083747	0.439651	0.380718	0.666794	4.268026	6.821455
BnaC04g39350D	8.829801	13.73429	5.246243	7.507761	24.63128	22.77567	1.716244	4.482435	2.286339	3.387485	57.89643	39.61481
BnaC01g23930D	3.602764	7.35241	3.534618	7.857723	14.42529	12.33155	1.313597	2.866638	2.292368	2.624625	44.51624	43.20122
BnaCnng02600D	0	0	0	0	0	0	0	0	0	0	0	0

**Table S4.** RNA-seq data of expression levels of *BnaHDT* genes infected with *S. sclerotiorum*.

gene_id	Westar Control	Westar 24hpi	ZY821 Control	ZY821 24hpi
BnaA02g05840D	0.356186333	0.1335198	1.88366	0.175538667
BnaC02g09720D	5.86514	23.81336667	1.685676	4.020363333
BnaA03g08590D	1.912766	8.579573333	2.2625	42.1359
BnaC03g10890D	0.280070367	5.966473333	1.35687	32.27626667
BnaA10g13800D	5.559086667	17.3852	7.6069	45.82286667
BnaC09g36350D	6.08331	14.34291	4.874573333	31.01666667
BnaA02g05810D	0.806768	1.386803333	0.327372667	0
BnaA02g05790D	0	0.034526333	0	0
BnaCnng34610D	0.459594333	0.377515	0	0
BnaA02g05820D	4.041793333	5.455313333	0.5788571	0.132761667
BnaA04g16080D	0.386425667	3.363276667	0.516782333	15.30636667
BnaC04g39350D	#N/A	#N/A	#N/A	#N/A
BnaC01g23930D	1.105142333	4.825896667	1.69495	10.17909
BnaCnng02600D	8.529536667	13.13366667	8.825866667	28.03213333