Figure S1.

(A)

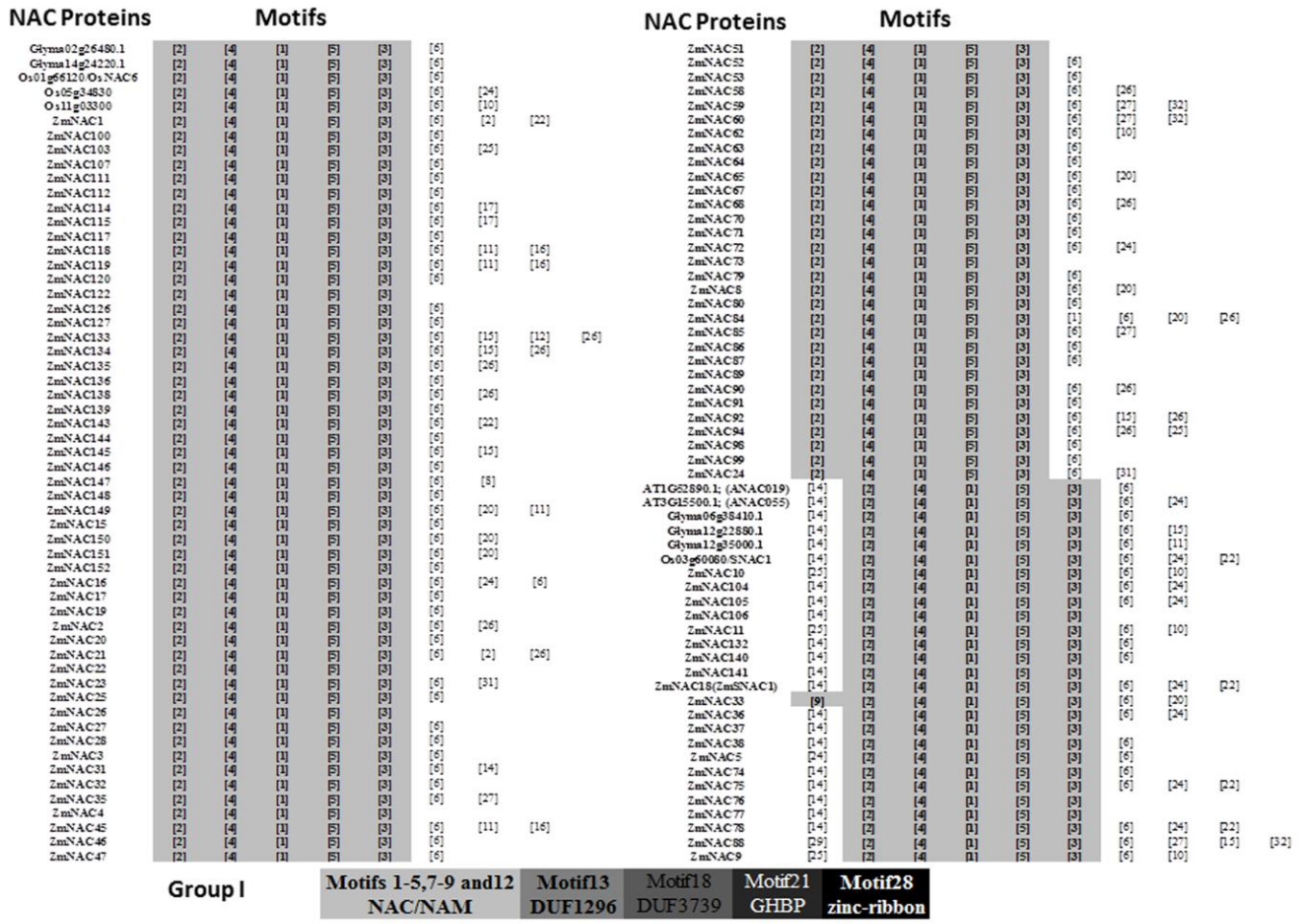

Fig. S1. Distribution of conserved motifs in the NAC family members of maize. All motifs were identified by MEME using the complete amino acid sequences of 152 maize and 11 well-known drought stress NAC proteins of Arabidopsis, rice, and soybean. (A) Group I. (B) Groups II–IX.

Figure S1.

(B)

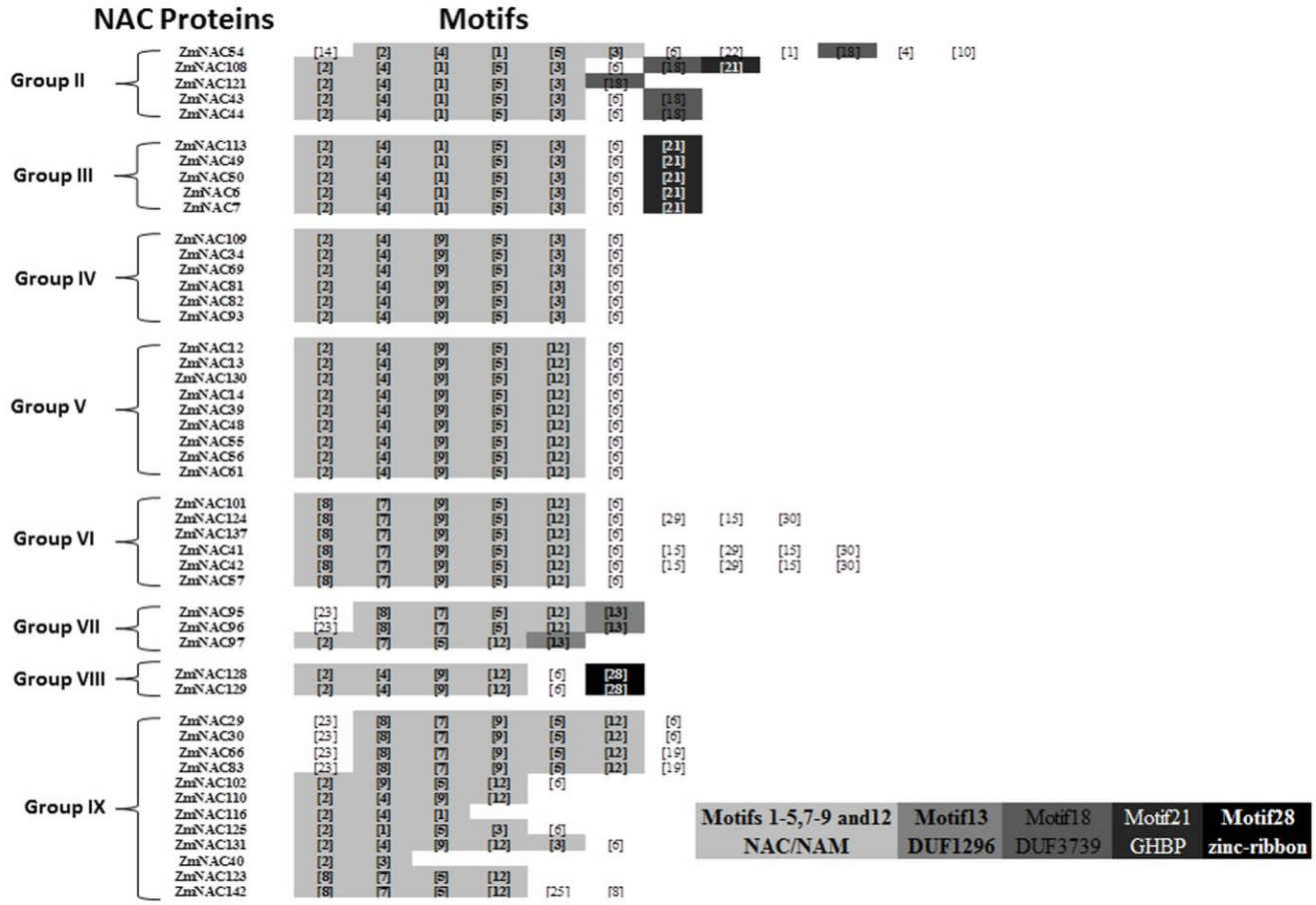

Fig. S1. Distribution of conserved motifs in the NAC family members of maize. All motifs were identified by MEME using the complete amino acid sequences of 152 maize and 11 well-known drought stress NAC proteins of Arabidopsis, rice, and soybean. (A) Group I. (B) Groups II–IX.

Table S1.

Gene name	Primer	Primer Sequence	Primer length	Primer T_M	Primer GC %
ZMNAC18F	Forward	GAAGAACGAGTGGGAGAAGATG	22	62.147	50
ZMNAC18R	Reverse	ACGAGTGCGAGTGTGATTG	19	62.212	52.632
ZMNAC145F	Forward	GGCGTCTTCTTCCATCAGTATG	22	62.503	50
ZMNAC145R	Reverse	CCGATGTGGCTGTTGAGTAG	20	62.186	55
ZMNAC51F	Forward	GAAGGCGCTCGTCTTCTAC	19	61.829	57.895
ZMNAC51R	Reverse	CTTACCCTGAGGCTGTTCTTC	21	61.954	52.381
ZMNAC72F	Forward	CACGCAAGAAGACCAACAAC	20	61.735	50
ZMNAC72R	Reverse	GTGTCGTACCGCTCGATAAC	20	62.029	55
ZMNAC75F	Forward	GAAGAACGAGTGGGAGAAGATG	22	62.147	50
ZMNAC75R	Reverse	GTGGGTGATCTGCGAGTG	18	61.95	61.111
ZMNAC99F	Forward	CAAGAAGGCTCTCGTCTTCTAC	22	61.839	50
ZMNAC99R	Reverse	CCTGAGGCTGTTGTTCTTCT	20	61.806	50
ZMNAC73F	Forward	CGAGGTGGATCTCTACAAGTTC	22	61.651	50
ZMNAC73R	Reverse	GGCGAGAAGAAGTACCACTC	20	61.58	55
ZMNAC52F	Forward	CTGGTGATGCACTACCTCTG	20	61.688	55
ZMNAC52R	Reverse	CCATGGGTCGAACTTGTAGAG	21	61.929	52.381
ZMNAC54F	Forward	AAGGGTGGGAATTTGGTCTC	20	61.989	50
ZMNAC54R	Reverse	GCTCCAGAGAATCAGAGAAGTG	22	61.947	50
ZMNAC132F	Forward	CAAGAAGGCTCTCGTCTTCTAC	22	61.839	50
ZMNAC132R	Reverse	ACACCCACTCATCCAACTTC	20	61.848	50
ZMNAC37F	Forward	GAGTGGATCATGCACGAGTA	20	61.293	50
ZMNAC37R	Reverse	GAGGAGATGAAACCAAGGAAGA	22	61.677	45.455
18s RNAF	Forward	TCAGCATGCCGCGGTGAATATG	22	64.2	54.5
18s RNAR	Reverse	TGCTTCGGGCGAAACCAATTCC	22	64.6	54.5

Table S1. Primers used for candidate ZmNAC genes for qRT-PCR verification.

Table S2.

ZmNAC name	GM ID	Chromosome No	Protein Length	Domain Start	Domain end	Domain length
ZMNAC1	GRMZM2G406204_T01	Chr:1	609	6	133	127
ZMNAC2	GRMZM2G025642_T01	Chr:1	362	8	137	129
ZMNAC3	GRMZM2G059428_T01	Chr:1	325	16	143	127
ZMNAC4	GRMZM2G059428_T03	Chr:1	172	16	143	127
ZMNAC5	GRMZM2G031001_T01	Chr:1	433	105	232	127
ZMNAC6	GRMZM2G011598_T01	Chr:1	373	9	137	128
ZMNAC7	GRMZM2G082709_T01	Chr:1	317	6	133	127
ZMNAC8	GRMZM2G475014_T01	Chr:1	371	91	224	133
ZMNAC9	GRMZM2G430522_T01	Chr:1	422	116	243	127
ZMNAC10	GRMZM2G430522_T02	Chr:1	387	81	208	127
ZMNAC11	GRMZM2G430522_T03	Chr:1	418	89	216	127
ZMNAC12	GRMZM2G054252_T03	Chr:1	230	23	168	145
ZMNAC13	GRMZM2G054252_T02	Chr:1	231	23	169	146
ZMNAC14	NM_001153991	Chr:1	231	23	169	146
ZMNAC15	PUT-1-171a-Zea_mays-13423	Chr:1	237	30	158	128
ZMNAC16	GRMZM2G152543_T01	Chr:1	392	16	143	127
ZMNAC17	GRMZM2G163251_T01	Chr:1	368	41	173	132
ZMNAC18	GRMZM2G347043_T01	Chr:1	312	17	142	125
ZMNAC19	NM_001157429	Chr:2	312	5	144	139
ZMNAC20	GRMZM2G156977_T01	Chr:2	317	11	148	137
ZMNAC21	GRMZM2G178998_T01	Chr:2	344	7	136	129
ZMNAC22	GRMZM2G178998_T02	Chr:2	170	7	136	129
ZMNAC23	NM_001137855	Chr:2	320	10	151	141
ZMNAC24	AC212859.3_FGT008	Chr:2	328	10	151	141
ZMNAC25	GRMZM2G176677_T01	Chr:2	408	6	134	128
ZMNAC26	GRMZM2G176677_T04	Chr:2	168	6	134	128
ZMNAC27	NM_001156824	Chr:2	295	10	137	127
ZMNAC28	GRMZM2G081930_T01	Chr:2	297	10	137	127
ZMNAC29	NM_001153290	Chr:2	438	57	205	148
ZMNAC30	GRMZM2G450445_T01	Chr:2	289	57	205	148
ZMNAC31	NM_001157307	Chr:2	364	11	136	125
ZMNAC32	GRMZM2G009892_T01	Chr:2	365	11	136	125
ZMNAC33	GRMZM2G099144_T01	Chr:2	362	46	175	129
ZMNAC34	GRMZM2G316840_T01	Chr:2	211	10	131	121
ZMNAC35	GRMZM2G018436_T01	Chr:2	322	20	155	135
ZMNAC36	GRMZM2G162739_T01	Chr:2	303	22	147	125
ZMNAC37	GRMZM2G162739_T02	Chr:2	186	22	147	125

ZMNAC38	GRMZM2G008374_T01	Chr:2	388	21	156	135
ZMNAC39	GRMZM2G179049_T01	Chr:2	285	11	146	135
ZMNAC40	GRMZM2G309582_T01	Chr:2	242	29	160	131
ZMNAC41	GRMZM2G166721_T01	Chr:3	436	43	185	142
ZMNAC42	NM_001158829	Chr:3	440	43	185	142
ZMNAC43	NM_001111762	Chr:3	391	24	155	131
ZMNAC44	GRMZM2G062650_T01	Chr:3	391	24	155	131
ZMNAC45	GRMZM2G064541_T01	Chr:3	517	9	136	127
ZMNAC46	GRMZM2G114850_T01	Chr:3	338	13	143	130
ZMNAC47	GRMZM2G139700_T01	Chr:3	368	13	141	128
ZMNAC48	NM_001157765	Chr:3	232	13	147	134
ZMNAC49	NM_001149662	Chr:3	443	35	160	125
ZMNAC50	GRMZM2G140174_T01	Chr:3	448	35	160	125
ZMNAC51	GRMZM2G014653_T03	Chr:3	202	10	134	124
ZMNAC52	GRMZM2G014653_T02	Chr:3	295	10	134	124
ZMNAC53	GRMZM2G334796_T01	Chr:3	292	5	141	136
ZMNAC54	GRMZM2G312201_T01	Chr:3	1467	21	148	127
ZMNAC55	NM_001150285	Chr:3	326	16	147	131
ZMNAC56	GRMZM2G122615_T01	Chr:3	329	16	147	131
ZMNAC57	GRMZM2G058518_T01	Chr:3	323	70	211	141
ZMNAC58	GRMZM2G069047_T01	Chr:4	379	11	139	128
ZMNAC59	NM_001165742	Chr:4	358	31	156	125
ZMNAC60	GRMZM2G123246_T01	Chr:4	368	41	166	125
ZMNAC61	GRMZM2G100583_T01	Chr:4	228	22	162	140
ZMNAC62	GRMZM2G125777_T01	Chr:4	665	26	154	128
ZMNAC63	GRMZM2G048826_T01	Chr:4	295	16	151	135
ZMNAC64	AC198937.4_FGT005	Chr:4	381	17	144	127
ZMNAC65	NM_001154298	Chr:4	344	13	138	125
ZMNAC66	GRMZM2G104078_T02	Chr:4	399	57	201	144
ZMNAC67	GRMZM2G062009_T01	Chr:4	294	10	139	129
ZMNAC68	GRMZM2G354151_T01	Chr:4	380	7	136	129
ZMNAC69	NM_001159059	Chr:4	657	24	160	136
ZMNAC70	GRMZM2G140901_T01	Chr:4	298	10	139	129
ZMNAC71	GRMZM2G439903_T01	Chr:4	309	16	149	133
ZMNAC72	GRMZM2G123667_T01	Chr:4	359	9	133	124
ZMNAC73	GRMZM2G123667_T05	Chr:4	174	9	133	124
ZMNAC74	NM_001147627	Chr:4	350	14	146	132
ZMNAC75	GRMZM2G336533_T01	Chr:5	436	153	283	130
ZMNAC76	GRMZM2G336533_T02	Chr:5	312	153	283	130
ZMNAC77	GRMZM2G018553_T02	Chr:5	178	19	149	130
ZMNAC78	GRMZM2G018553_T01	Chr:5	302	19	149	130
ZMNAC79	GRMZM2G112548_T01	Chr:5	336	28	155	127

ZMNAC80	GRMZM2G063522_T01	Chr:5	305	14	146	132
ZMNAC81	GRMZM2G389557_T01	Chr:5	268	11	146	135
ZMNAC82	GRMZM2G094067_T01	Chr:5	225	8	136	128
ZMNAC83	GRMZM2G038073_T01	Chr:5	399	57	201	144
ZMNAC84	GRMZM2G315140_T01	Chr:5	342	7	136	129
ZMNAC85	GRMZM2G100593_T01	Chr:5	386	16	143	127
ZMNAC86	NM_001154860	Chr:6	275	19	158	139
ZMNAC87	GRMZM2G052239_T01	Chr:6	277	19	158	139
ZMNAC88	GRMZM2G030325_T01	Chr:6	380	50	175	125
ZMNAC89	GRMZM2G092465_T02	Chr:6	185	11	139	128
ZMNAC90	GRMZM2G092465_T01	Chr:6	418	11	139	128
ZMNAC91	GRMZM2G393433_T01	Chr:6	357	15	143	128
ZMNAC92	GRMZM2G091490_T01	Chr:6	367	11	144	133
ZMNAC93	GRMZM2G074358_T01	Chr:6	326	7	142	135
ZMNAC94	GRMZM2G041746_T01	Chr:6	366	10	140	130
ZMNAC95	GRMZM2G027309_T01	Chr:6	413	58	196	138
ZMNAC96	GRMZM2G086768_T01	Chr:6	303	58	196	138
ZMNAC97	GRMZM2G379608_T01	Chr:6	264	11	149	138
ZMNAC98	GRMZM2G147867_T01	Chr:6	420	42	167	125
ZMNAC99	GRMZM2G180328_T01	Chr:6	339	22	146	124
ZMNAC100	GRMZM2G456568_T01	Chr:6	452	6	133	127
ZMNAC101	GRMZM2G031200_T01	Chr:6	319	62	202	140
ZMNAC102	GRMZM2G033014_T01	Chr:7	315	16	147	131
ZMNAC103	GRMZM2G479980_T01	Chr:7	358	38	169	131
ZMNAC104	PUT-7-171a-Zea_mays-10695	Chr:7	336	21	146	125
ZMNAC105	GRMZM2G079632_T01	Chr:7	300	24	149	125
ZMNAC106	GRMZM2G079632_T02	Chr:7	192	24	149	125
ZMNAC107	GRMZM2G159094_T01	Chr:7	419	15	142	127
ZMNAC108	NM_001136986	Chr:7	709	10	135	125
ZMNAC109	NM_001157548	Chr:7	251	11	140	129
ZMNAC110	GRMZM2G054277_T01	Chr:7	157	11	138	127
ZMNAC111	AC233865.1_FGT002	Chr:7	380	6	133	127
ZMNAC112	AC233865.1_FGT003	Chr:7	245	6	134	128
ZMNAC113	GRMZM2G179885_T02	Chr:7	410	27	155	128
ZMNAC114	NM_001158141	Chr:7	386	12	139	127
ZMNAC115	GRMZM2G430849_T01	Chr:7	463	89	216	127
ZMNAC116	PUT-7-171a-Zea_mays-12169	Chr:7	133	9	132	123
ZMNAC117	GRMZM2G181605_T01	Chr:7	318	9	141	132
ZMNAC118	NM_001153976	Chr:8	518	9	136	127
ZMNAC119	GRMZM2G167492_T01	Chr:8	518	9	136	127
ZMNAC120	GRMZM2G109627_T01	Chr:8	398	27	162	135

ZMNAC121	GRMZM2G154182_T01	Chr:8	359	23	153	130
ZMNAC122	GRMZM2G154182_T03	Chr:8	192	23	153	130
ZMNAC123	GRMZM2G342647_T01	Chr:8	566	379	508	129
ZMNAC124	GRMZM2G112681_T01	Chr:8	494	95	237	142
ZMNAC125	GRMZM2G172264_T01	Chr:8	283	6	142	136
ZMNAC126	GRMZM2G104400_T01	Chr:8	445	6	133	127
ZMNAC127	GRMZM2G134687_T01	Chr:8	425	52	177	125
ZMNAC128	NM_001154212	Chr:8	356	14	147	133
ZMNAC129	GRMZM2G163843_T01	Chr:8	356	14	147	133
ZMNAC130	GRMZM2G163841_T01	Chr:8	312	23	155	132
ZMNAC131	GRMZM2G134073_T01	Chr:8	259	22	160	138
ZMNAC132	GRMZM2G068973_T01	Chr:8	308	20	147	127
ZMNAC133	NM_001153847	Chr:9	433	11	142	131
ZMNAC134	GRMZM2G171395_T01	Chr:9	435	11	142	131
ZMNAC135	GRMZM2G041668_T01	Chr:9	349	20	154	134
ZMNAC136	GRMZM2G163914_T02	Chr:9	612	11	141	130
ZMNAC137	GRMZM2G115721_T01	Chr:9	310	50	210	160
ZMNAC138	GRMZM2G104074_T01	Chr:9	357	10	139	129
ZMNAC139	GRMZM2G042494_T01	Chr:9	241	10	138	128
ZMNAC140	GRMZM2G159500_T02	Chr:9	348	22	149	127
ZMNAC141	GRMZM2G159500_T01	Chr:9	234	22	149	127
ZMNAC142	AC233893.1_FGT005	Chr:9	538	167	296	129
ZMNAC143	GRMZM2G126817_T01	Chr:9	317	16	143	127
ZMNAC144	GRMZM2G174070_T01	Chr:9	687	6	133	127
ZMNAC145	GRMZM2G127379_T01	Chr:10	475	23	157	134
ZMNAC146	GRMZM2G083347_T01	Chr:10	259	12	148	136
ZMNAC147	GRMZM2G167018_T01	Chr:10	282	12	140	128
ZMNAC148	NM_001154759	Chr:10	284	12	142	130
ZMNAC149	GRMZM2G003715_T01	Chr:10	664	6	139	133
ZMNAC150	NM_001158179	Chr:10	335	10	139	129
ZMNAC151	GRMZM2G435824_T01	Chr:10	349	10	139	129
ZMNAC152	GRMZM2G043813_T01	Chr:10	293	10	138	128

Table S2. Detailed information on, and structures of representative ZmNAC proteins.

Table S3.

Motif Number	Domain	Size	Motif Sequence
28	zinc-ribbon	159	DDESCDDESSDATLDDDDSSNASLAAASGPKRESDEVESS DATVAAPSRHSAPNDEISGGSAVAPGRKEKREIGEVSTETS AAVRKRRKADGSSSPGTPVSTTDMHCPQCGTHLMLTLNM AESKSETGLAKDESATTAPDQGGTGESSQKNVRVRFHQF
1	NAM	35	WYFFCPRDRKYPNGSRTNRATGSGYWKATGKDKPI
2	NAM	19	GFRFHPTDEELVCHYLCRK
3	NAM	18	GRAPKGVKTNWIMHEYRL
4	NAM	21	IIAEVDLYKCEPWDLPEKCKI
5	NAM	15	NGRLVGMKKTLVFYR
7	NAM	57	PHPLIDEFIPTIDEEEGICYTHPEKLPGVKQDGSVKHFFHRP FKAYTTGTRKRRKII
8	NAM	41	CIDNIDVKQQWPGLPAGVKFDPTDQELIWHLEAKVGNENS K
9	NAM	21	CSRHTGSGYWHKTGKEKPVYM
12	NAM	15	GKRERTNWVMHEYHL
21	GHBP	124	HGHPASARSTPSRGVVTAPQQDNKQQASSSSTPTPPTTPSK MMQFLHGECTSSQPAAICRNSHHAAAAAHSNNKAAAAG AQRQSQFLPTKPYCSGYQQLSTASSAGSAVGAAVDHHHH QQQQQQ
18	DUF3739	159	QVAMAGPEMDQNQNNIPAIPIPMPLQLPLPVPMQMQFPILP DFAMDPVAPYYPNPNAGAGMMPPMALAGMGGAGGLQIN GALFGNPVPAPLPMNFYHHQMGMGAAAGQVDMGAAAG QMDMGAAGAGAGGFDVAAPESRPSSMVSQKDEQANAAE ISSMM
13	DUF1296	80	EYVVSKLFFQQQFKPGDKNAQELTTSDDLESMAAESNLPD FTTLPTDKHVGTVQEVVHNPEHNLYQLNRNCEISIEETVV
6	-	21	SQQKDDWVLCRIFKKKNIWQK
10	-	113	PLPNPSGCTPFHHGHPHHSMQPPPPLPPSNHAGKAVFTGA AAACCMQQEPADGSNSAVLPMPPFPPFTPIVAGKPAAPAP PPQVVNAGPQEPPPPTWLEAYLQHTGGILYEMG
11	-	118	DSSPPNGGKELEVWLEELLDPSPSFNLVADTRSADVSLTD QYAESSNLQNPGSVSRNIGPGHASPIQDGTDATDYLLTDD LPEDLYSMLYPGTDQFYDSMFLEQAGQEGIAFPTNQAY
14	-	15	QQQERDAEAELNLPP
15	-	56	TAVPATHFLISRPSNCVSTIVPPAMQHANVVLDHDQFHVP AIMMHHHDKFQNDHQQ
16	-	79	NAELQSDQENNTTNLANGNTDTGITIQSRRATTSPANISLA AGKIKMQVGINRMVTSSSVSINQTMRFTDNSGRRLDLK
17	-	200	MVPPLADYEHLDRDGPSPGGFFDDYFCGSTSLYAAAAPAI GGGAAAAGTTNTTTTPAVVMQQHQQPAALPRLPKIPSISE LLWDEYALAQILDPPADVAADHASFAVHPSLNQLLAVGD DGSDLMMFSPPPAAAAGGKRKAMVAMNMSPADECAATA HQHQSPAAKRLNGGSCFDDAPQPASGLPATMSSVLGGGL

			NHHM
19	-	159	NKSMEISETETACEEPEAPASVIGPKTPKTITPQPRHPKNSP CETQQNIFIVQDQLLLDGEGEPTMPIVSLEDDAMNPAWCA VAEEEQVVGEASRAQSNSDEPLLCREDPNSLNDEALLPWD YPILSQCRNEIFDGNLNGYGLPDHHNVDLGTPPDLQL
20	-	48	LAYMHPHPYYHHAASYYSQMQAPGPHATAYSHHVQVQD LLTNHRPTDD
22	-	59	GGSARTSDLFVDLSYDDIQGMYSGLDMLPPAGEDLYSSLF ASPRVRGNQPTGPAGLGPF
23	-	41	MGTSWIINCQGIAKKIRNATQSFNPRIQEWIANPRKECPNC
24	-	20	SISHSWGETRTPESEIVDND
25	-	41	IDLTTCLRSKPLCMHHHHQDQAMGDALWDLLGEEMAAA GGE
26	-	17	GITDWRILDKFVASQLN
27	-	55	HLSTTTARSSGSKAAATMEKKHHRTSASPRMAPVFDGGH SSGYMNKPYSGANTTM
29	-	41	FAPFRKTFDQEVGIGGDQVPSNQLGRSEPHHAGLGQQPHG P
30	-	41	SAGLEELIMGCTSSTSTKGDASIAHPQETEWPYPYWPPDN Q
31	-	111	FPTSYAGYYDHNLSTTARLHVDGDRHFLAGSSAAAAALL QQPPGLAGSSFPQLYSDDDLESKKQLLSIPPLESPTAMACC SDAGGYAQRSSYDEHEMMMMMIQQGGGGGEQ
32	-	41	CQGDPNQTLPTQAPLLPFPNLEKIWDWNPLLESPKVCTSFK

Table S3. Details of predicted sequence motifs of ZmNAC proteins.