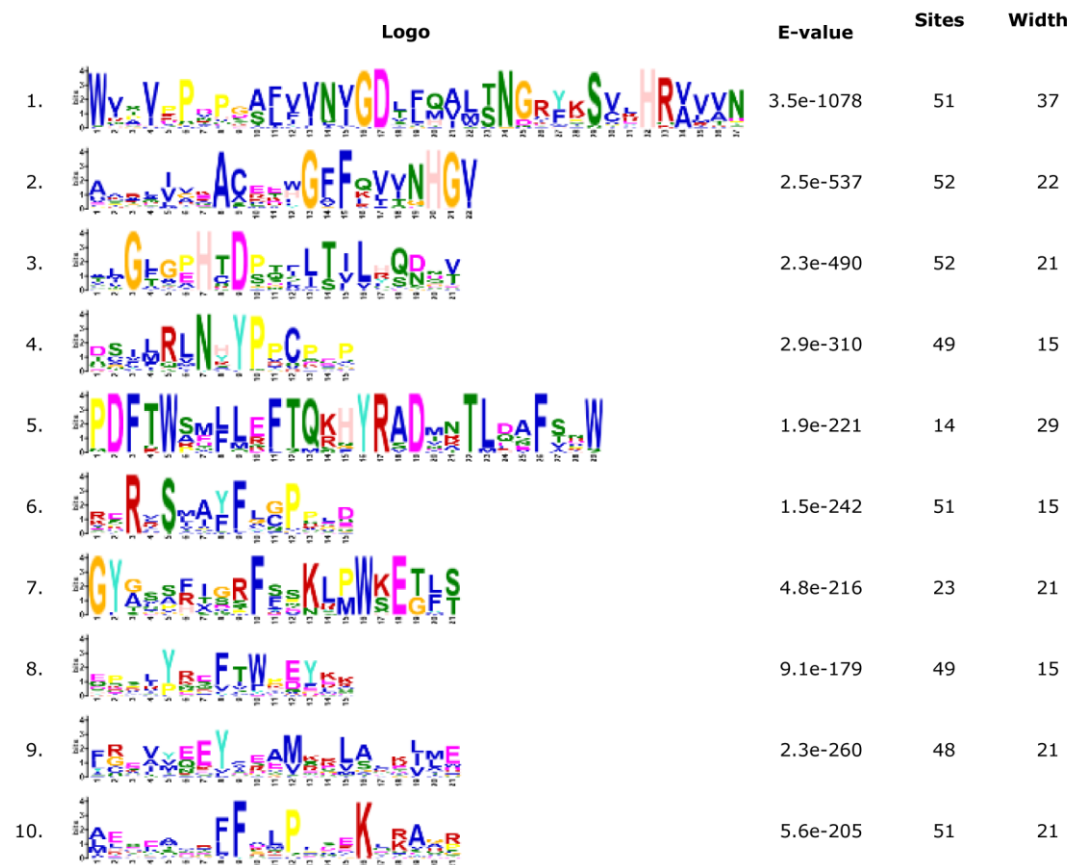


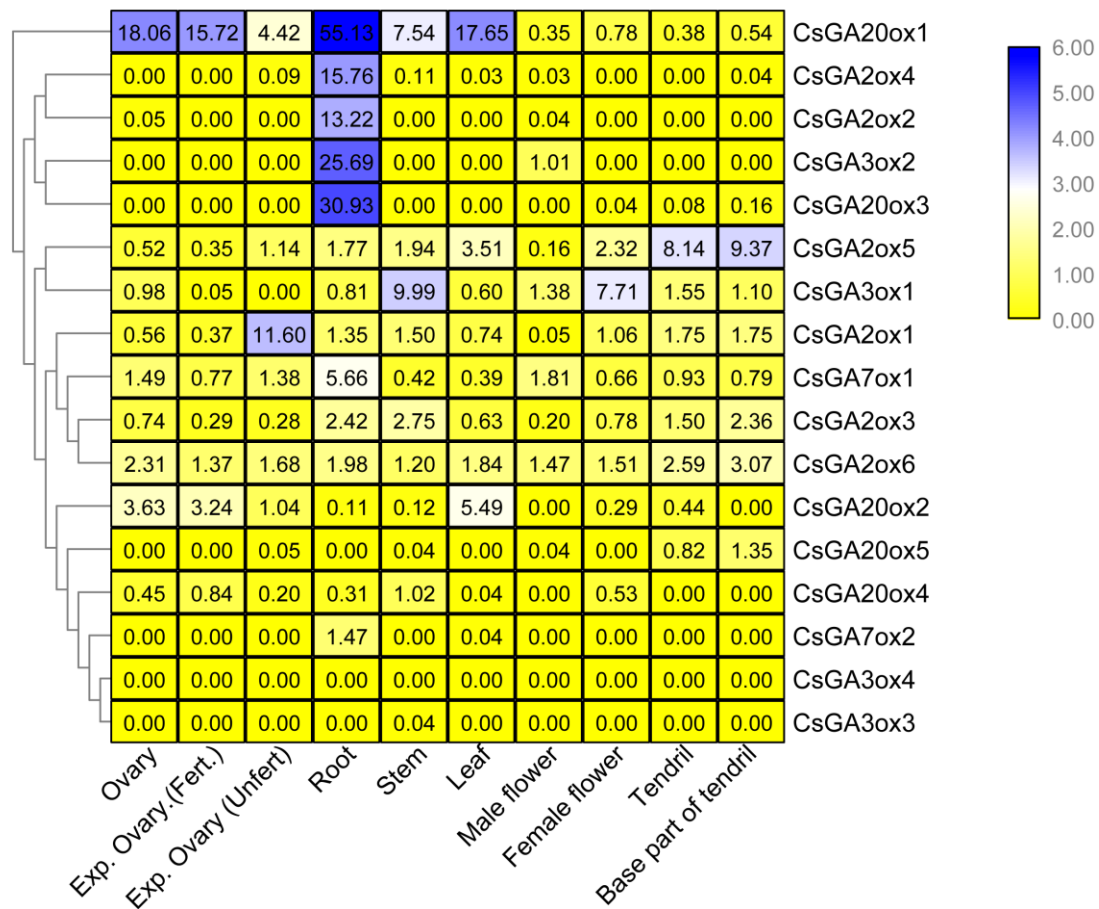
**Figure S1.** Phylogenetic analysis candidate *GAox* genes in cucumber. The neighborjoining tree includes 53 candidate *GAox* proteins from cucumber and 16 *AtGAox* proteins. The 17 *CsGAox* were labeled by red dots.

CsGA20ox5	.....MDSNISQLESQECAPN.....EALFFLHASKLTHLTFVQSKFIWFGDLV...	46
CsGA20ox2	.....MESTIVVGVAV.....IILFTVWFKRK.....LREFVWFGELAG...	38
CsGA20ox3	.....HTLCLMNN.....NIFSNFPI.....IPQIWFCHFP...	37
CsGA20ox4	.....MATECMNSGRDSTQ.....RVEFGCSSESM.....VERFVWCEFFK...	40
AtGA20ox1	.....MAVSFTTSPFEEDK.PRLGLG.NI...TSFLIFNFSMLNLQAN.....INQFIWFCEFFK...	53
AtGA20ox2	.....MAILCTTSPARKEHEPQDLKQD...TSFLIFNFSMLNLQSC.....INQFIWFCEFFK...	55
AtGA20ox3	.....MATECIATVQIFSE.....NNT.RE...DSS.IFDAILNQHSHH.....IPQCFVWCEFFK...	50
AtGA20ox4	.....MECITLFGQRHC.....NBS.RH...NFIETLIVNLFNQH.....IPQCFVWCEFFK...	49
CsGA20ox1	.....MHVVTSSMAFEAAN.....ND...GVFLVFDASVLRHQHF.....IPQCFVWCEFFK...	47
OsGA20ox1	.....MSMVVQCECF.....VVFDAVLSCQE.....ISQCFWAEAFSFGS...	38
OsGA20ox3	.....MAA.....VVFDAVLSCQE.....IACQFVWAEAFPAAD...	33
OsGA20ox2	.....MVAEHTFPQPHQPFMDSTAGSG...IAFAAAAACDLRMEF...KIEFFVWNGDAF...	55
OsGA20ox4	MHASPHQLAHDTLLSLTHTLCTATGTSTRTIAMVYSNAQASKLIVANGGGGADLAAASSAAVVLQWRCPA...KIAFFVWNGDAFVFPFS	98
AtGA20ox5	.....MCTYASGTCTCTTFFVFWK.....SREMSVSWSLISQCFP...VIEFFVWNGDAF...	56
CsGA7ox2	.....MVNR.EE.....I...TITLADLE...	16
OsGA20ox8	.....MAAT.NN.....VGAGALFVVDLAF...	19
CsGA7ox1	.....MAKDTG.....ITVLDLV...	14
OsGA20ox5	.....NGLSL.....MDCAFVQAEHR...KASVAEADGIF...	29
OsGA20ox7	.....NAIVELVWAGEQQMGSKRAAEDGGGVDSRETYCRGVHLCDSGITLGNIVLPAISDFGCA	68
OsGA20ox6	.....	0
CsGA20ox5	...EAYELSEHVELEGLFGRDFEATEASKLVRFAKRGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	142
CsGA20ox2	...EERSELRELLDGGFRNGEEATEAAAHVRAKRGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	133
CsGA20ox3	...LNLGVHVPET.....ILNMGVETVIAKRGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	115
CsGA20ox4	...EGLGLQVHIDQLKNSQSDIEETIRLVEAKKRGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	135
AtGA20ox1	...INVLELVFLICQNLSS.DFSSTLCASLISEACKKRGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	147
AtGA20ox2	...IDIFELNVFIDLS.....SQDSELEAFVIAACTRGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	145
AtGA20ox3	...ITVQVLQVLLLAGLSEGLSECLASEATLIVSVAATGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	145
AtGA20ox4	...RVNVLQVFLLAGLSEGLSECLASEATLIVSVAATGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	144
CsGA20ox1	...HGFENEVLIDLSGLSGLSKDVREAVRVHVGACKEKRGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	142
OsGA20ox1	...VAVELVALIVVGAGAE.....RSSVVGVEACERGGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	128
OsGA20ox3	...GVVEELIAPVVLAAFLA.....SGGIGRIVAEACERGGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	123
OsGA20ox2	...ASAEELHVEVVGVRDGAELGRRAAACVAAAGATGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	150
OsGA20ox4	...SEFTGELVGVVLAALALDAGCHRAVACVAAAGATGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	193
AtGA20ox5	...SEGLDILIELISQFIMNGEATOLAAAVRVAQAAAGATGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	150
CsGA7ox2	...FLKELDQGSYSDDDQKFKRAAIIETIGACSEHSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	104
OsGA20ox2	...FLATGD.....DEGVARASATAGVREACRDUHGRAVHGVFAELHARLELSAAFALED.EENRAVARVEGSEAFAGYA.RQAFH	107
CsGA7ox1	...FSAQNE.....TEAKRFATITTCSSGSGOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	92
OsGA20ox5	...VILIS.FLLAAG...DGGACVVALAEVGRSRDGSOVTHGVQONLATALHEMGFTINLEFNVKTRASCSHFARMNGESTAHNRFSK	117
OsGA20ox7	GAAAGGSGSVFVFLSLR...VSGRAVLTLDLAEHGVFAELHARLELSAAFALED.EENRAVARVEGSEAFAGYA.RQAFH	166
OsGA20ox6	...NVEIATILR...LAGGGGAEZARLACARLEHVSCHVPPQCAEMKAARVALDLECAHNAADIIF.....SGVFPETAN	83
CsGA20ox5	LPWKETSFSGFDCHNSF.NNPFSSVDFSSITLGEF.FEIGVYIEKCEANRLSLALTELGISGLE...BSHFRKFF.EDGSSIMRINLYFCQGG	236
CsGA20ox2	LPWKETSFSEISNDL...SGPLVHLHMFSLFGCF.EMTGNVYQCEANRTALMHLAIDSLGVE...RYHFRFF.EDGSSIMRINLYFCQGG	225
CsGA20ox3	LPWKETSFSTYADCN...HGVETVFWAGETW.RVNGVLQCEANRTALMHLAIDSLGVE...RYHFRFF.EDGSSIMRINLYFCQGG	206
CsGA20ox4	LPWKETSFVEYVADH...KSTAHDFIQIGNEL.SHGGRVYQCEANRTALMHLAIDSLGVE...RYHFRFF.EDGSSIMRINLYFCQGG	226
AtGA20ox1	LPWKETSFSEFCDDMS...RSKSVQDFVCDALGHGF.QFGGRVYQCEANRLSLALTELGISGLE...BSHFRKFF.EDGSSIMRINLYFCQGG	239
AtGA20ox2	LPWKETSFSGFSDNMS...GSRVQDFVSDTLGHEF.QFGGRVYQCEANRLSLALTELGISGLE...BSHFRKFF.EDGSSIMRINLYFCQGG	237
AtGA20ox3	LPWKETSFSEFSPEEK...IHSCVTVGVSRHMGEGY.EFEGRVYQCEANRLSLALTELGISGLE...BSHFRKFF.EDGSSIMRINLYFCQGG	238
AtGA20ox4	LPWKETSFSEFTEKENSQVTVNGLVGRVYQCEANRLSLALTELGISGLE...BSHFRKFF.EDGSSIMRINLYFCQGG	234
CsGA20ox1	LPWKETSFSEFSADES...LDHVFHYLSTLGEF.ANGRVYQCEANRLSLALTELGISGLE...BSHFRKFF.EDGSSIMRINLYFCQGG	234
OsGA20ox1	LPWKETSFSEYSSAGDEE.GEEGVGYLVRKLGAGRRGLGEVYSRCHENSRLSELMVEGSEGVDRGRHFRFF.CRNCSIMRINLYFCQGG	226
OsGA20ox3	LPWKETSFSEFNCAPGN...ARMVADYFVADLGEY.RHMGVYQCEANRLSLALTELGISGLE...BSHFRKFF.EDGSSIMRINLYFCQGG	215
OsGA20ox2	LPWKETSFSGFHDAAPF...VVADYFVADLGEY.RHMGVYQCEANRLSLALTELGISGLE...BSHFRKFF.EDGSSIMRINLYFCQGG	241
OsGA20ox4	LPWKETSFSEFHHAAAGNNSVADYFS.TLQDCEP.RHMGVYQCEANRLSLALTELGISGLE...BSHFRKFF.EDGSSIMRINLYFCQGG	287
AtGA20ox5	LPWKETSFSEFHHAAAGNNSVADYFS.TLQDCEP.RHMGVYQCEANRLSLALTELGISGLE...BSHFRKFF.EDGSSIMRINLYFCQGG	287
CsGA7ox2	SEKXNE.FNNFPHST.....FNVFSEH.QFREFVEELFSFVKTASVIEINCEGLP...FNLSEY.NDRNMLSTRFYNAE	190
OsGA20ox8	SEKXNE.FNNFPHST.....FNVFSEH.QFREFVEELFSFVKTASVIEINCEGLP...FNLSEY.NDRNMLSTRFYNAE	187
CsGA7ox1	CVKNE.FVLFVFGSN.....FNVFSEH.QFREFVEELFSFVKTASVIEINCEGLP...FNLSEY.NDRNMLSTRFYNAE	175
OsGA20ox5	LPWKETFLVFCPTFFPTAVAGDLVGNMFECDLPGFRAMEEAGEAEVLAFLMLLASEGLR...FRLHGFPHDQDTTFLHNFHFCISFD	213
OsGA20ox7	LPWKETFLVFCPTFFPTAVAGDLVGNMFECDLPGFRAMEEAGEAEVLAFLMLLASEGLR...FRLHGFPHDQDTTFLHNFHFCISFD	213
OsGA20ox6	LPWKETFLVFCPTFFPTAVAGDLVGNMFECDLPGFRAMEEAGEAEVLAFLMLLASEGLR...FRLHGFPHDQDTTFLHNFHFCISFD	261
CsGA20ox5	VAGTGHGPTPTSLILHQ.DVGGHGLP.....ANNQHSVETFPNALVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	329
CsGA20ox2	LITGTHGPTPTSLILHQ.DVGGHGLP.....ANNQHSVETFPNALVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	318
CsGA20ox3	LITGTHGPTPTSLILHQ.DVGGHGLP.....ANNQHSVETFPNALVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	300
CsGA20ox4	LITGTHGPTPTSLILHQ.DVGGHGLP.....ANNQHSVETFPNALVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	319
AtGA20ox1	LITGTHGPTPTSLILHQ.DVGGHGLP.....ANNQHSVETFPNALVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	332
AtGA20ox2	LITGTHGPTPTSLILHQ.DVGGHGLP.....ANNQHSVETFPNALVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	330
AtGA20ox3	LITGTHGPTPTSLILHQ.DVGGHGLP.....ANNQHSVETFPNALVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	331
AtGA20ox4	LITGTHGPTPTSLILHQ.DVGGHGLP.....ANNQHSVETFPNALVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	332
CsGA20ox1	LITGTHGPTPTSLILHQ.DVGGHGLP.....ANNQHSVETFPNALVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	327
OsGA20ox1	DTGTHGPTPTSLILHQ.DVGGHGLP.....AEGRWRAIRFPGALVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	319
OsGA20ox3	LITGTHGPTPTSLILHQ.DVGGHGLP.....AEGRWRAIRFPGALVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	314
OsGA20ox2	RTGTHGPTPTSLILHQ.DVGGHGLP.....VDEGRVPSVPGAMVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	334
OsGA20ox4	RTGTHGPTPTSLILHQ.DVGGHGLP.....VDEGRVPSVPGAMVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	381
AtGA20ox5	RTGTHGPTPTSLILHQ.DVGGHGLP.....VDEGRVPSVPGAMVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	334
CsGA7ox2	ENGLREHNNVNEPLIFQ.DVGGHGLP.....TEDHGWPIETNNTLVNNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	284
OsGA20ox8	ENGLREHNNVNEPLIFQ.DVGGHGLP.....TEDHGWPIETNNTLVNNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	280
CsGA7ox1	GENGLREHNNVNEPLIFQ.DVGGHGLP.....TEDHGWPIETNNTLVNNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	254
OsGA20ox5	LAVGTHGPTPTSLILHQ.DVGGHGLP.....RSDGVNVRVVEHSTFNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	308
OsGA20ox7	LITGTHGPTPTSLILHQ.DVGGHGLP.....ANNQHSVETFPNALVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	343
OsGA20ox6	GSFVCHVPSGFIPLVQDCEVGHGLP.....AGEVTVPLIPSGFVNGGLFMQNGEYKSCVHSAVNNYKERRSLAFFLORKNRVWFEF	261
CsGA20ox5	ELVAD...CESRVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	378
CsGA20ox2	CLVGR...EGRVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	370
CsGA20ox3	CLVVE...RWRVLPQGRHPTFPLRSQHYRADATINQTRWVSSR.FCOH.....	347
CsGA20ox4	EVVER...NFRVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	376
AtGA20ox1	ELDS...ITSRVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	377
AtGA20ox2	DILER...MTRVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	378
AtGA20ox3	ELVNGVSGRVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	380
AtGA20ox4	ELV...SEARVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	376
CsGA20ox1	ELVEN...ENFRVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	373
OsGA20ox1	ELVDD...HFRVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	372
OsGA20ox3	ALVDA...AHRVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	367
OsGA20ox2	...SAA...TFCHVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	389
OsGA20ox4	GAGAG...EPLVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	444
AtGA20ox5	ELVGE...EASVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	385
CsGA7ox2	HTTH.IDQFPNRSYKRYQLRLNNTHFSNQDIINISYSTT.....	331
OsGA20ox8	EYTER.IGEAFFNRSYKRYQLRLNNTHFSNQDIINISYSTT.....	326
CsGA7ox1	HCHSS.LKHLERNQ.....NTRKFSKIKTF.....	279
OsGA20ox5	EVVSE...ESPARNNTNNGEFTSRKNSFKLEVENVCTHFRKN.....	352
OsGA20ox7	ELIDD...RHRNNTNNGEFTSRKNSFKLEVENVCTHFRKN.....	383
OsGA20ox6	ELVGE...EHRVPFTNSHSELEFTRQHYRADATINQTRWVSSR.FCOH.....	300

**Figure S2.** Multiple sequence alignments of GA20ox proteins from 5 CsGA20ox proteins, 5 AtGA20ox proteins, 8 OsGA20ox protein and 2 CsGA7ox proteins. The GA20ox conserved sequence LPWKET was labeled in green box. Amino acid identity of 100% is marked with a black background, amino acids identity of higher than 75% is marked with a pink background, amino acids identity of more than 50% is marked with a light green background.



**Figure S3.** Ten conserved motifs from all GAox proteins from cucumber, *Arabidopsis* and rice. The logos of ten conserved motif sequences were obtained from MEME Suite website. The bit score means information content of each position in the amino acid sequence.



**Figure S4.** Heatmap of the expression profiles of CsGAox family genes in 10 cucumber tissues. Values, which were shown on the heatmap, represent the average FPKM value of three biological replicates. Clustering was based on log2-transformed FPKM values of 17 CsGAox genes. Ovary, cucumber ovary tissue (unexpanded); Exp. Ovary.(Fert.), cucumber expanded ovary tissue (fertilized); Exp. Ovary.(UnFert.), cucumber expanded ovary tissue (unfertilized).