

Target	Allele	Deletion size	Position and Original Sequence	Deleted Sequence
CCT9	cct9-1	[-11]	022 TGTCTTCTGTCAACGACGCGTCACCGACGCGG 022 TGTCTTCTG-----TCACCGACGCGG	TCACCGACGCG
		[-5]	273 GAACCATCCGAGGTCGAGCCGGCCTGGTTCGTA 273 GAACCAT-----GTCGAGCCGGCCTGGTTCGTA	CCGAG
	cct9-2	[-8]	022 TGTCTTCTGTGCGGGACGACGTTCACCGACGCGG 022 TGTCTTCTG-----CGTTCACCGACGCGG	CGGGAGCA
	cct9-3	[-11]	014 TCCTTCTGCGGGAGCACGTTCACCGACGCGCGG 014 TCCTTCTGCGG-----CCGACGCGGCG	GAGCACGTTCA
	cct9-4	[-25]	243 GGAACCATCCGAGGTCGAGCCGGCCTGGTTCGT 243 GGAAC-----CGT	CATCCGAGGTC GAGCCGGCCTG GTTCTAGCCC CCCGC
CCT10	cct10-1	[-16]	358 GGGGTGGTGGTACTGTGGTGTCCCAAACGGGTG 358 GGGGT-----CCCAAACGGGTG	GGTGGTACTGTG GTGT
	cct10-2	[-14]	359 GGGGTGGTGGTACTGTGGTGTCCCAAACGGGTG 359 GGGGT-----GTCCCAAACGGGTG	GGTGGTACTGTG GT
	cct10-3	[-7]	359 GGGGTGGTGGTACTGTGGTGTCCCAAACGGGTG 359 GGGGTGGTGGTA-----GTCCCAAACGGGTG	CTGTGGT
	cct10-4	[-6]	359 GGGGTGGTGGTACTGTGGTGTCCCAAACGGGTG 359 GGGGTGGTGGTAC-----GTCCCAAACGGGTG	TGTGGT
CCT9 / CCT10	cct9-5	[-11]	022 TGTCTTCTGTCAACGACGCGTCACCGACGCGG 022 TGTCTTCTG-----TCACCGACGCGG	TCACCGACGCG
		[-8]	272 TTGCTATGAACGGAACCATCCGAGGTCGAGCCG 272 TTGCTATGAACGGAACC-----TCGAGCCG	ATCCGAGG
	cct9-6	[-5]	014 TTTTCAGATGTCCTTCTGCGGGAGCACGTTTAC 014 TTTTCAGATGTCCTTCTGCGG-----CGTTCAC	GAGCA
		[-6]	274 TTGCTATGAACGGAACCATCCGAGGTCGAGCCG 274 TTGCTATGAACGGAACC-----GGTCGAGCCG	ATCCGA
	cct9-7	[-6]	012 TTTTCAGATGTCCTTCTGCGGGAGCACGTTTAC 012 TTTTCAGATGTCCTTCTGC-----ACGTTTAC	GGGAGC
		[-15]	267 TATGAACGGAACCATCCGAGGTCGAGCCGGCCT 267 TATGAACGGA-----CCGGCCT	CCATCCGAGGT CGAG
	cct9-8	[-26]	-010 CCCTTTTCAGATGTCCTTCTGCGGGAGCACGTT -010 CCCTT-----TT	TTCAGATGTCCT TCTGCGGGAGC ACG
		[-7]	273 TTGCTATGAACGGAACCATCCGAGGTCGAGCCG 273 TTGCTATGAACGGAACC-----GTCGAGCCG	ATCCGAG
	cct10-3	[-7]	359 GGGGTGGTGGTACTGTGGTGTCCCAAACGGGTG 359 GGGGTGGTGGTA-----GTCCCAAACGGGTG	CTGTGGT
	cct10-4	[-6]	359 GGGGTGGTGGTACTGTGGTGTCCCAAACGGGTG 359 GGGGTGGTGGTAC-----GTCCCAAACGGGTG	TGTGGT
	cct10-5	[-10]	359 CCGGGGTGGT-----GTCCCAAACGGG 359 CCGGGGTGGTGGTACTGTGGTGTCCCAAACGGG	GTAAGTGGT
	Gi1 / Gi2	gi1-1	[-16]	0003 TGACATGCTTGGTAGCTCAAGAGCCTGCCAAG 0003 TGACATGCTTG-----CCCAAG
[-17]			0692 CATGGAATCCTTTAAATTTGAATGTGATCCATT 0692 CATGGAATCCT-----CCATT	TTAAATTTGAATG TGAT
[-14]			1248 CAGATGTACTTGCAACATCGCCATTGAGTAGGA 1248 CAGATGTACTT-----CAGTAGGA	GCAACATCGCC ATT
gi2-1		[-9]	0006 CACATTTGATTTGACATGCTTGGTAGCTCAAG 0006 CACATTTGATTTGACATGCT-----AAG	TGGTAGCTC
		[-8]	1246 AGATGTACTTGCAACATTTGCCGTTTCAAGACCTC 1246 AGATGTACTTGC-----CGTTTCAAGACCTC	AACATTGC
gi2-2		[-8]	1246 AGATGTACTTGCAACATTTGCCGTTTCAAGACCTC 1246 AGATGTACTTGC-----CGTTTCAAGACCTC	AACATTGC

Supplementary Table 1. All allelic variants generated through gene editing of photoperiod genes recovered at the T1 stage.

Gene	crRNA Name	Forward Primer	Reverse Primer
CCT9	CCT9-g1	TGGCGCTACATGCATCTAGG	CGTTCCGGTTCACGGGGAATA
	CCT9-g2	GGGTCAGCTAGTCCAGTTCG	CGTTCCGGTTCACGGGGAATA
CCT10	CCT10-g1	TCCATCCATTTGCTGCACCA	TTCGTCTCTGGCCTTTGCTT
	CCT10-g2	TGCTTCTGCTGTCTCAGTGG	TTCTGCTGCTTCGTCTCTGG
Gigantea1/Gigantea2	Gi1/Gi2-g1	AGCGTCCCATCTATGATGCG	GAGTAGGGCTTTGGTGGCAT
	Gi1/Gi2-g2	AGCTTCAGTATGTTGGCGCT	TCATTCACGTTGGGGATGCA
Gigantea1/Gigantea2	Gi1/Gi2-g3	GAGAGATGATGCCCTGGTCG	ATGGCCCTGATGTTGAGTGG
		TCAGGGAGAAAACGGCTTCC	AAGTTCCTGCATCTGAGGCC
Gigantea1/Gigantea2	Gi1/Gi2-g4	CGACGAGCATTCCATCGGTA	TTATTCGTCCGGTCCAGGCC
		TCCTCCATCCTTGGTGAGCT	GGAAGCCGTTTTCTCCCTGA

Supplementary Table 2. Primers used for amplicon prep of T7E1 crRNA mutagenesis assay in protoplast.

Primer Name	Primer Sequence (5' – 3')
P1	TACCAAGCATGTCAGATTATCTACACTTAGTAGAAAATTATGGTAGCTCAAGA GCCTGCCCAAATCTACACTTAGTAGAAAATTATGCCACG
P2	CTAAGGTAGATAATCTGACATGCTTGGTAGCTCATTTTTTTCCTAGGGG GATCTTTAAACATACGAACAGATC
P3	TCCCGCAGAAGGACATCTATCTACACTTAGTAGAAAATTAACCTCGGATGGT TCCGTTCATAGATCTACACTTAGTAGAAAATTATGCCACG
P4	CTAAGGTAGATAGATGTCCTTCTGCGGGAGCACGTTTTTTCCTAGGG GGATCTTTAAACATACGAACAGATC
P5	GCGGCAGCCC GAAGAAGAAGCGCAAAGTGTGATTAATTAATCCTGGGC CATGAAGCTGTC
P6	TTAATTAAGGCGCGCCCGGTCCGTTAGCTAATTAGGCCTAGGAAAAAAAA ACGTGCTCCCGCAGAAGGACATCTATCTACACTTAGTAGAAAATTAACCTC GGATGGTCCGTT CATAGATCTACACTTAGTAGAAAATTATGCCACG
P7	CCTAATTAGCTAACGGACCGG
P8	TCTAGAGAGGGGCACGACCGGTCCGCTGACTGCTGACTGCAGCGGTCCCCA ACCCTTAATAAATTCGTATAATGTATGCTATACGAAGTATTAGGTCCGGT CCGGATCTAGTAACAT
P9	TTAATTAATCACACTTTGCGCTTCTTCTT
P10	CTGCAGTGCAGCGTGACC
P11	TTAATTAAGGCGCGCCCGGTCCGTTAGCTAATTAGGCCTAGGAAAAAAAA AGACACCACAGTACCACCACCCGATCTACACTTAGTAGAAAATTAGGGGT GGTGGTACTGTGGTGTCCATCTACACTTAGTAGAAAATTATGCCACG
P12	TTAATTAAGGCGCGCCCGGTCCGTTAGCTAATTAGGAAAAAAAAAGGCG ATGTTGCAAGTACATCTGGATCTACACTTAGTAGAAAATTAGAATGTGATCCAT TCTTAGTAATATCTACACTTAGTAGAAAATTATGCCACG
P13	TTAATTAAGGCGCGCCCGGTCCGTTAGCTAATTAGGAAAAAAAAAGACAC CACAGTACCACCACCCGATCTACACTTAGTAGAAAATTAGGGGTGGTGGT ACTGTGGTGTCCATCTACACTTAGTAGAAAATTATGCCACG

Supplementary Table 3. Primers used for vector construction and vector component amplification.

PCR Number	Vector Component	29140 Primer Pairs (CCT9)	29141 Primer Pairs (CCT10)	29143 Primer Pairs (Gi1 / Gi2)	29144 Primer Pairs (CCT9 / CCT10)
PCR1-1	crRNA Cassette with promoter (PrOsU3) and terminator (tSoUbi4)	P6 and P5	P11 and P5	P1 and P5	P3 and P5
PCR1-2	Extra PrOsU3 Promoter for crRNA	N/A	N/A	P2 and P12	P4 and P13
PCR2	CRE / Axig1 / WUS Cassette	P7 and P8	P7 and P8	P7 and P8	P7 and P8

Supplementary Table 4. Primer pairs used to amplify and assemble editing vectors.

Component Name	Cassette Number	Description
PrSoUbi4	1	The constitutive sugarcane ubiquitin-4 promoter
cLbCas12a (formerly Cpf1)	1	Maize-codon optimized LbCas12a endonuclease
tSoUbi4	1	Terminator from the sugarcane ubiquitin 4 gene
PrOsU3 + crRNAs	2	Rice U3 promoter for pol III dependent transcription of non-coding RNAs
LoxP	3 & 4	Cre-mediated recombination site from Escherichia phage 1
PrZmHSP12	3	Heat shock inducible promoter from maize
cCre	3	The coding sequence of Cyclization Recombination protein (CRE) from bacterial phage P1
tNOS	3 & 4	Synthetic Nopaline synthetase terminator
eFMV	4	Enhancer derived from Figwort Mosaic Virus
ePCISV	4	Transcriptional enhancer from Peanut Chlorotic Streak Virus
eMMV	4	Transcriptional enhancer from Mirabillis Mosaic Virus (MMV)
PrZmAxig1	4	An auxin inducible maize promoter
cZmWUS	4	Maize WUSCHEL gene
PrUbi1	5	Maize Ubiquitin 1 promoter
cPMI	5	Synthetic phosphomannose isomerase gene
tUbi1	5	Maize Ubiquitin 1 terminator

Supplementary Table 5. Components and the cassettes of the editing vector they were assembled into.

Target	crRNA	crRNA sequence (5' – 3')
CCT9_Exon1	1	TTTC CCGGGATGTGGCACCCAGCAACAC
CCT9_Exon2	2	TTTG CTATGAACGGAACCATCCGAGGT
CCT9_Exon2	3	TTTC AGATGTCCTTCTGCGGGAGCACG
CCT10_Exon1	4	TTTG GGACACCACAGTACCAACACCCC
CCT10_Exon1	5	TTTC ACCCGTTTGGGACACCACAGTAC
CCT10_Exon1	6	TTTC CGGGGTGGTGGTACTGTGGTGTC
CCT10_Exon1	7	TTTG AGCTGGACGCCACGCTGGGCCTC
CCT10_Exon1	8	TTTG CCGCGCGGTGCCGAGGCCAGCG
CCT10_Exon1	9	TTTG TGTGCACACACAGCGGATATACC
CCT10_Exon2	10	TTTG CAGCTCATTGCCGTCGTCGATCA
CCT10_Exon2	11	TTTC ACCCTGGGTCTCACCTGCGCATA
CCT10_Exon2	12	TTTG AGAAGCAGATAAGATATGCATCC
Gigantea1_Exon1	13	TTTA CGGCTGTCTGTTCCGGGCTACTG
Gigantea1_Exon1	14	TTTC GCCCGTTGATGATTACGGCTGT
Gigantea1_Exon1	15	TTTC TGTGCGGGTTTCGCCCGTTGATG
Gigantea1_Exon2	16	TTTC TAGTTTCTTGGGCAGGCTCTTGA
Gigantea1_Exon2	17	TTTC TTGGGCAGGCTCTTGAGCTACCA
Gigantea1_Exon2	18	TTTG AATCTGACATGCTTGGTAGCTCA
Gigantea1_Exon3	19	TTTG GCCATTCTTGTTTGAAGGCACAA
Gigantea1_Exon3	20	TTTG AAGGCACAAATTTGGCATATGT
Gigantea1_Exon3	21	TTTG TGCCTTCAAACAAGAATGGCCAA
Gigantea1_Exon3	22	TTTA CAGCTGACACCGATCAATTCCCT
Gigantea1_Exon8	23	TTTA ACAGCAGCAGCTGTTCCCTGCGCT
Gigantea1_Exon10	24	TTTC ATTACTAAGAATGGATCACATTC
Gigantea1_Exon10	25	TTTC GTCGGTCCAGGCCATGCCTTAAT
Gigantea1_Exon10	26	TTTC CCAGATGTACTIONGCAACATCGCC

Supplementary Table 6. crRNA screened in etiolated maize leaf protoplast and measured for editing efficiency by T7E1. Target gene and exon and sequence provided. Selected gRNA for stable experiment are highlighted by red text.

Gene	crRNA Name	crRNA Sequence	Exon Target
CCT9	CCT9-g1	CTATGAACGGAACCATCCGAGGT	CCT9-Exon2
CCT9	CCT9-g2	AGATGTCCTTCTGCGGGAGCACG	CCT9-Exon2
CCT10	CCT10-g1	GGACACCACAGTACCACCACCCC	CCT10-Exon1
CCT10	CCT10-g2	CGGGGTGGTGGTACTGTGGTGTC	CCT10-Exon1
Gigantea1/Gigantea2	Gi1/Gi2-g1	TTGGGCAGGCTCTTGAGCTACCA	Gi1-Exon2 Gi2-Exon1
Gigantea1/Gigantea2	Gi1/Gi2-g2	AATCTGACATGCTTGGTAGCTCA	Gi1-Exon2 Gi2-Exon1
Gigantea1	Gi1/Gi2-g3	ATTACTAAGAATGGATCACATTC	Gi1-Exon11 (Does not target Gigantea2)
Gigantea1/Gigantea2	Gi1/Gi2-g4	CCAGATGTACTTGCAACATCGCC	Gi1-Exon11 Gi2-Exon10

Supplementary Table 7. Gene targets with their associated crRNA used for transformation experiments. crRNA sequences and target exons.

Gene	Forward Primer	Reverse Primer	Probe
ZCN8	CACTGGATGGTGAC AGATATTCC	GCCAAGTTGACG GAACAGC	ATGAGAGGCCGGACCC AAGATCTG
ZCN7	CACTGGATGGTGAC AGATATTCC	CGTACCCCTGCC AAGTTGG	ATGAGAGACCAGATCCA AGATCTGGTATCCA
ZMM4	TCAGGCACGTCGCT TCAG	GCCTCTCGCAAG CAACAAG	CGCCGCCGACAGCAGC TATAAACTAG
Zm-EF1a (reference)	GCGCCGTCACCGTA TCC	GCTCGTCGGGCG TCAGTA	ATCAGAGGCGAGCAGAA ACCACACCAC

Supplementary Table 8. Primer sequences for qRT-PCR amplification of *ZCN8*, *ZCN7*, and *ZMM4*.

Supplementary Sequence File 1. Sequences for *ZmCCT9* (Zm00001eb391230), *ZmCCT10* (Zm00001eb418700), and *ZmGi1* (Zm00001eb337600) / *ZmGi2* from the tropical inbred NPB6195 used for cRNA design.