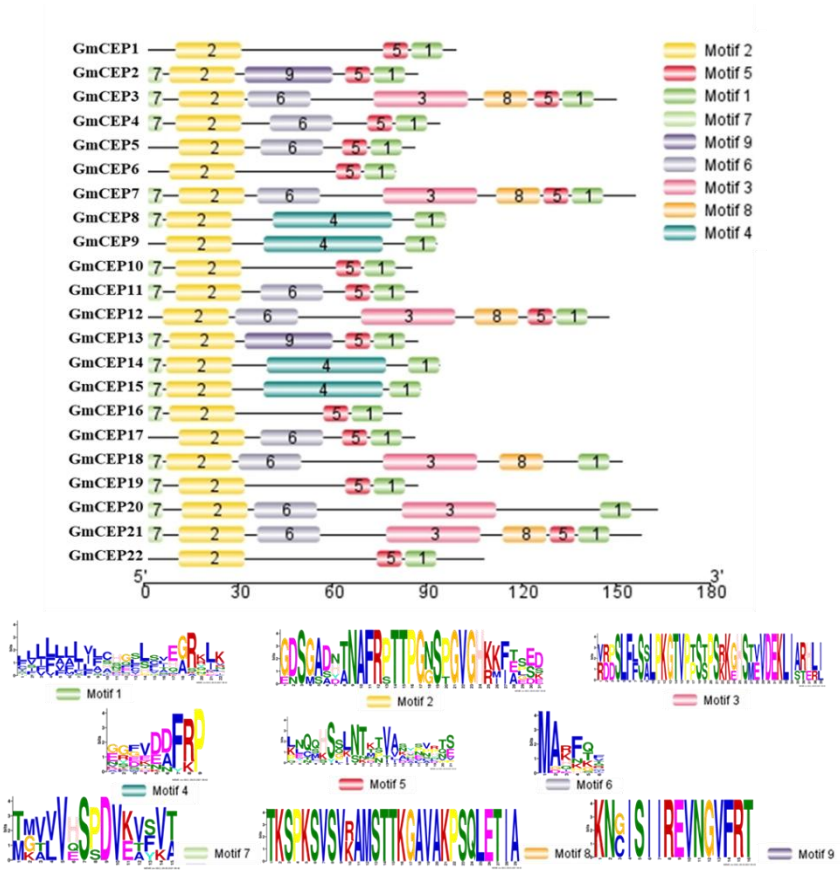

Figure S1. Motifs analysis of GmCEPs. Each block represented the position and strength of a motif. The blocks of GmCEPs motif were predicted using MEME. The motif sequence were listed in lower panel.

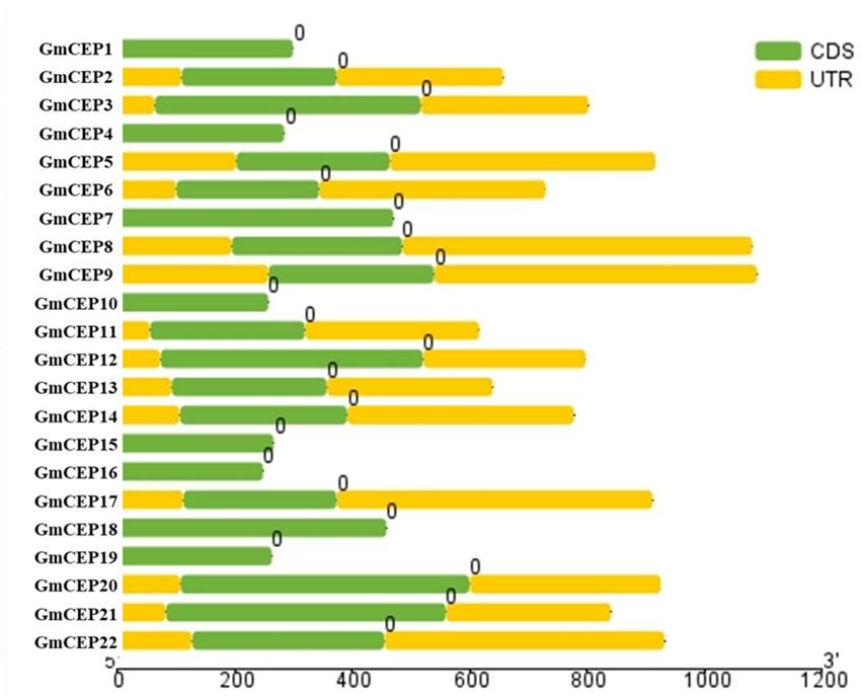

Figure S2. Gene structure of 22 *GmCEP* genes. The gene structure information of *GmCEPs* were obtained through gff file of soybean, the diagram was constructed by Tbtools software.

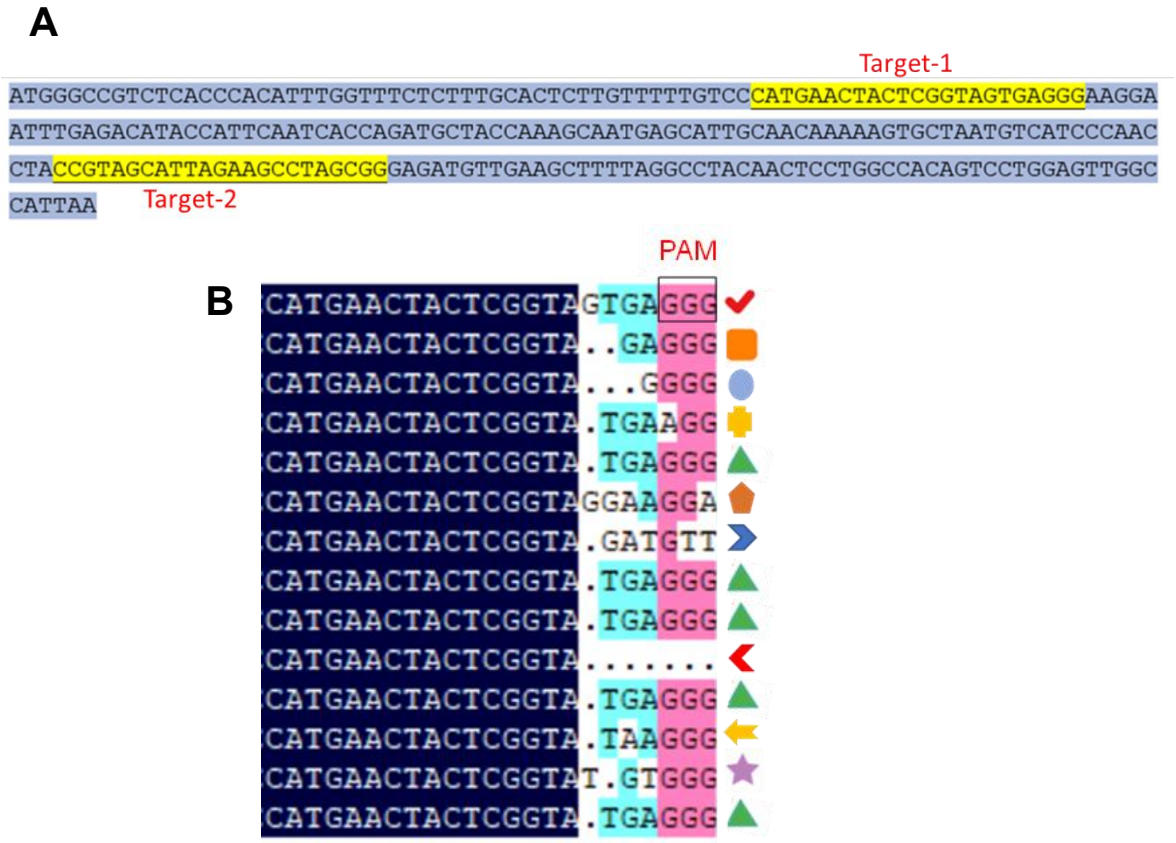

Figure S3. Validation of the mutation of *GmCEP6*-edited hairy roots. (**A**) Sequence of a region of soybean *GmCEP6* with two target sites indicated. (**B**) Alignment of sequences of target-1 mutated alleles identified from cloned PCR fragments from crispr cas9 *GmCEP6* (KO) transgenic root lines. Highlighting blue denotes the degree of homology of the aligned fragments, and only aligned regions of interest are displayed. Each trait represents a different mutation type. The most mutation was a base shift, represented by a green triangle, with a total of 5 (n=13).

Table S1. Primer sequences used in this study.

Primer Name	Sequence (5′-3′)	Purpose
GmCEP6-qRT-F	ATGGGCCGTCTCACCCACATTTG	qRT PCR
GmCEP6-qRT-R	ATGGCCAACTCCAGGACTG	qRT PCR
GmCYP2-qRT-F	CGGGACCAGTGTGCTTCTTCA	qRT PCR
GmCYP2-qRT-R	CCCCTCCACTACAAAGGCTCG	qRT PCR
GmNIN1a-qRT-F	CATCTTGAGCCTCTACCACC	qRT PCR
GmNIN1a-qRT-R	GCTTTGACTCTAAAAGTGCCGG	qRT PCR
GmENOD40-1-qRT-F	TGGACAACACCCTCTAAACCA	qRT PCR
GmENOD40-1-qRT-R	GTGAGGGAGTGTGAGGAGTGA	qRT PCR
GmNSP1-qRT-F	GGTCTATAACTTTTGCTTCCAGC	qRT PCR
GmNSP1-qRT-R	CAGTGTCTTCGCCAAGAACTTG	qRT PCR
GmHAP2-1-qRT-F	CACGCCATCTACATGCGAC	qRT PCR
GmHAP2-1-qRT-R	ACTGGAATTGTCGGCCGCTG	qRT PCR
GmHAP2-2-qRT-F	GGAGTGCCTTAGGATCTCAACC	qRT PCR
GmHAP2-2-qRT-R	TACCGCTTGCTTACCGGCTG	qRT PCR
GmCEP6-Promoter-F	GGGGACAAGTTTGTACAAAAAAGCAGGCTTCATGC ACTGGCACGGAGATTTAG	Vector construction
GmCEP6-Promoter-R	GGGGACCACTTTGTACAAGAAAGCTGGGTCTGGGTG TTTAGGCAAGGA	Vector construction
GmCEP6-hairy-OE-F	GGGGACAAGTTTGTACAAAAAAGCAGGCTTCATGG GCCGTCTCACCCACATTTG	Vector construction
GmCEP6-hairy-OE-R	GGGGACCACTTTGTACAAGAAAGCTGGGTCATGGCC AACTCCAGGACTG	Vector construction
GmCEP6-Crispr-BsF1	ATATATGGTCTCGATTGATGAACTACTCGGTAGTGA GTT	Vector construction
GmCEP6-Crispr-BsR1	ATTATTGGTCTCGAAACCTAGGCTTCTAATGCTACG CAA	Vector construction
GmCEP6-	TGATGAACTACTCGGTAGTGAGTTTTAGAGCTAGAA	Vector

Crispr-F01	ATAGC	construction
GmCEP6-	AACCTAGGCTTCTAATGCTACGCAATCTCTTAGTCG	Vector
Crispr-R01	ACTCTAC	construction