

Table S1 Information of primers used in this study

Primers name	Primer sequence (5' to 3')	Primer purpose
Template-SpCas9 target1-F	TTAATACGACTCACTATAGGGGTAAGTGGATACAGGTACGATGTTTTAGAGCTAGAAATAG	Amplifying transcription template of sgRNA
Template-SpCas9 target2-F	TTAATACGACTCACTATAGGGGCCAACATTGCCGTCGATTTGTTTTAGAGCTAGAAATAG	Amplifying transcription template of sgRNA
Template-SpCas9 -R	AGCACCGACTCGGTGCCACTTTTTCAAGTTGATAACGGACTAGCCTTATTTAACTTGCTATTTCTAGCTCTAAA	Amplifying transcription template of sgRNA
Template-SaCas9 target1-F	TAATACGACTCACTATAGATTAATAATTCCAAAGATACGTTTTAGTACTCTGGAAACAG	Amplifying transcription template of sgRNA
Template-SaCas9 target2-F	TAATACGACTCACTATAGCAAATATTAATGAGACGAGATGTTTTAGTACTCTGGAAACAG	Amplifying transcription template of sgRNA
Template-Cpf1 target12-F	CCCTAATACGACTCACTATAGGTAATTTCTACTAAGTGTAGAT	Amplifying transcription template of CrRNA
Template-Cpf1 target1-R	ACATCGCGTTTCAATTTATTATATCTACACTTAGTAGAAATTA	Amplifying transcription template of CrRNA
Template-Cpf1 target2-R	TATATAGGGCAAAGAGTTAGCTTATCTACACTTAGTAGAAATTA	Amplifying transcription template of CrRNA
Mu-SpCas9 target1-F	AGTTGGTTCGTTCTCGCTTGAATAATG	Detecting mutations
Mu-SpCas9 target1-R	TGTCTTCGGCCCTCAGTC	Detecting mutations
Mu-SpCas9 target2-F	GAATGTAAGAAAGAACACCGAAC	Detecting mutations
Mu-SpCas9 target2-R	CTGCTCCACGAGTAAACG	Detecting mutations
Mu-SaCas9 target1-F	AGTTGGTTCGTTCTCGCTTGAATAATG	Detecting mutations
Mu-SaCas9 target1-R	ATCTGTTCTGCTCCACGAGTAAAC	Detecting mutations
Mu-SaCas9 target2-F	CAGTTGGTTCGTTCTCGCTTGAATAATG	Detecting mutations
Mu-SaCas9 target2-R	CGCTGGTCAGGTCGAAGATGTTG	Detecting mutations
Mu- Cpf1 target1-F	CAGTTGGTTCGTTCTCGCTTGAATAATG	Detecting mutations
Mu- Cpf1 target1-R	CGCTGGTCAGGTCGAAGATGTTG	Detecting mutations
Mu- Cpf1 target2-F	CATCTCGGTGGTAGTCGCACTC	Detecting mutations
Mu- Cpf1 target2-R	CGACGGCAATGTTGGCGATAAAC	Detecting mutations

Table S2 Frequency of CRISPR targeting sites in all honeybee 16 chromosomes

chr.	Length	TTN	NGG	NNGRRT	The integrated system
chr1	27754200	7111456	1703894	753122	9568472
chr2	16093500	4091992	1031086	426048	5549126
chr3	13619445	3613676	783131	369438	4766245
chr4	13404451	3512073	810385	357949	4680407
chr5	13920984	3616030	846742	376499	4839271
chr6	17812983	4766166	977883	470703	6214752
chr7	14262382	4052546	684171	363842	5100559
chr8	12786769	3456449	719831	346378	4522658
chr9	12729961	3512008	678441	334110	4524559
chr10	12657134	3045754	773391	320922	4140067
chr11	16444887	4551683	829267	415422	5796372
chr12	11533137	3033628	693013	312725	4039366
chr13	11279722	2872073	749752	306298	3928123
chr14	10910039	2921990	649760	293352	3865102
chr15	9922473	2691121	561361	260608	3513090
chr16	7238532	1977500	386703	186865	2551068
Totality	222370599	58826145	12878811	5894281	77599237

Numbers in purple and red represents the total length of chromosome and the total number of targeting sites, respectively.