

Table S2. Plasmids used in this study

Name	Description	Backbone	application	Sources
LHZ881	KmARS1, <i>HphMX4</i>	/	Vector backbone for centromere plasmid	[38]
LHZ882	KmARS1, KmCEN5, <i>HphMX4</i>	LHZ881	Centromere plasmid for verification the function of KmCEN5	
LHZ883	KmARS1, KmCEN1 and flanking sequence, <i>HphMX4</i>	LHZ881	Centromere plasmid for verification the function of KmCEN1 and its flanking sequence	
LHZ884	KmARS1, KmCEN2 and flanking sequence, <i>HphMX4</i>	LHZ881	Centromere plasmid for verification the function of KmCEN2 and its flanking sequence	
LHZ885	KmARS1, KmCEN3 and flanking sequence, <i>HphMX4</i>	LHZ881	Centromere plasmid for verification the function of KmCEN3 and its flanking sequence	
LHZ886	KmARS1, KmCEN4 and flanking sequence, <i>HphMX4</i>	LHZ881	Centromere plasmid for verification the function of KmCEN4 and its flanking sequence	
LHZ887	KmARS1, KmCEN5 and flanking sequence, <i>HphMX4</i>	LHZ881	Centromere plasmid for verification the function of KmCEN5 and its flanking sequence	
LHZ888	KmARS1, KmCEN6 and flanking sequence, <i>HphMX4</i>	LHZ881	Centromere plasmid for verification the function of KmCEN6 and its flanking sequence	
LHZ889	KmARS1, KmCEN7 and flanking sequence, <i>HphMX4</i>	LHZ881	Centromere plasmid for verification the function of KmCEN7 and its flanking sequence	
LHZ890	KmARS1, KmCEN8 and flanking sequence, <i>HphMX4</i>	LHZ881	Centromere plasmid for verification the function of KmCEN8 and its flanking sequence	
LHZ620	KmARS1, KmCEN5, PLAC4-Cre, <i>KanMX6</i>	/	/	[34]
LHZ892	KmARS1, Cre, <i>KanMX6</i>	LHZ620	Cre plasmid mediated by ARS1	
LHZ893	panARS, Cre, <i>KanMX6</i>	LHZ620	Cre plasmid mediated by panARS	
LHZ531	ARS1, Cas9, gRNA, <i>URA3</i>	/	CRISPR vector	[37]
LHZ891	gRNA-RHY101F/RHY101R	LHZ531	CRISPR plasmid for the deletion of <i>LAC4</i> and its promoter	
LHZ894	<i>LAC4</i> upstream sequence- <i>TEF</i> promoter -loxP- <i>LAC4</i> -loxP sequence- <i>LAC4</i> downstream sequence	PMD18-T	Providing donor sequence to replace <i>LAC4</i> and its promoter with a cassette of <i>TEF</i> promoter -loxP- <i>LAC4</i> -loxP	
LHZ895	<i>LAC4</i> upstream sequence- <i>TEF</i> promoter-loxPsym- <i>LAC4</i> -loxPsym sequence- <i>LAC4</i> downstream sequence	PMD18-T	Providing donor sequence to replace <i>LAC4</i> and its promoter with a cassette of <i>TEF</i> promoter and loxPsym- <i>LAC4</i> -loxPsym	
LHZ896	<i>LAC4</i> upstream sequence- <i>TEF</i> promoter-loxPsym- <i>LAC4</i> - <i>LAC4</i> downstream sequence	PMD18-T	Providing donor sequence to replace <i>LAC4</i> and its promoter with a cassette of <i>TEF</i> promoter and loxPsym- <i>LAC4</i>	
LHZ897	gRNA-RHY102F/RHY102R	LHZ531	CRISPR plasmid for insertion of loxPsym site at Chr I (747278bp)	
LHZ898	gRNA-RHY103F/RHY103R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr VIII (440003)	
LHZ899	gRNA-RHY104F/RHY104R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr VII (409354)	
LHZ900	gRNA-RHY105F/RHY105R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr I (1673871)	
LHZ901	gRNA-RHY106F/RHY106R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr II (896924)	
LHZ902	gRNA-RHY107F/RHY107R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr I (1451427)	
LHZ903	gRNA-RHY108F/RHY108R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr III (326046)	
LHZ904	gRNA-RHY109F/RHY109R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr IV (704908)	
LHZ905	gRNA-RHY110F/RHY110R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr V (346042)	
LHZ906	gRNA-RHY111F/RHY111R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr VI (1069906)	
LHZ907	gRNA-RHY112F/RHY112R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr III (1219332)	
LHZ908	gRNA-RHY113F/RHY113R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr IV (1172245)	
LHZ909	gRNA-RHY114F/RHY114R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr V (756338)	
LHZ910	gRNA-RHY115F/RHY115R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr VI (753935)	
LHZ911	gRNA-RHY116F/RHY116R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr VII (689479)	
LHZ912	gRNA-RHY117F/RHY117R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr II (717538)	
LHZ913	gRNA-RHY118F/RHY118R	LHZ531	CRISPR plasmid for the insertion of loxPsym site at Chr VIII (610289)	