

**Table S2 Oligos for amplifying Arabidopsis DNA**

Oligo name	Oligo sequence	Purpose	Note
At1g53430-F2	CTgtaagcaaaactaactaaccac	For detection of mutations at At1g53430 site	
At1g53430-R2	ctcacGTTTAGCATCTTCTGGACA	For detection of mutations at At1g53430 site and gene cluster inversions	Designated as an open arrow in Fig. S5A and B
At1g53440-F1	tagatgatatttttaaccgtgac	For detection of gene cluster inversions and large chromosomal deletions	Designated as F2 in Fig. 4A and as a filled, tailless arrow in Fig. 5A and B
At1g53440-F2	tattcggatcatcaaggtca	For detection of mutations at At1g53440 site	
At1g53440-R2	TTCTTAAGCACCATTTGGACActac	For detection of mutations at At1g53440 site	
At1g53430-F1	ATTGGTCCATGAGTGAGC	For detection of gene cluster deletions, inversions and large chromosomal deletions	Designated as F1 in Fig. 3A and Fig. 4A, and as an open tailless arrow in Fig. 5A and B
At1g53440-R3	aagggtctcttttttcaag	For detection of gene cluster deletions and inversions	Designated as R2 in Fig. 3A and as a filled arrow in Fig. 5A and B
At1g70450-F3	TTCTTCTCCAACAGCACCGTCAG	For detection of mutations at At1g70450 site and gene cluster deletions	Designated as F1 in Fig. 3B
At1g70450-R2	CACTGGCCTACCTTCCctgtc	For detection of mutations at At1g70450 site and gene cluster inversions	Designated as an open arrow in Fig. S8A and B
At1g70450-R3	GGTGACctgcaaaacaagataaat	For detection of gene cluster duplications	Designated as an open arrow in Fig. S9
At1g70460-F	TACTCTGGTCTGGTGGTTAC AAT	For detection of gene cluster duplications	Designated as a tailless filled arrow in Fig. S9
At1g70460-F3	GAGGAGGAGGTTATACACGG TCAG	For detection of mutations at At1g70460 site	
At1g70460-R2	AGTACTGGCCTTCCCTTCCctactc	For detection of mutations at At1g70460 site and gene cluster inversions	Designated as an filled arrow in Fig. S8A and B
At1g70460-R3	tgcaaaacaaaacaaaacataca	For detection of gene cluster deletions	Designated as R2 in Fig. 3B
At4g16960-F	gtctttaggtggtttgatgtta	For detection of NHEJ-mediated mutagenesis	
At4g16960/940-R	CCATTTGATCCAAGTCTTTG	For detection of mutations at At4g16960 and At4g16940 sites	
At4g16940-F	agcaccacctcagccccatac	For detection of mutations at At4g16960 site and gene cluster deletions	Designated as F2 in Fig. 3C
At4g16860/950-F	tggagggaaggaagacgaagtt	For detection of mutations at At4g16860 site	
At4g16860-R	ATTTGTTCCCTTTCTTGTA	For detection of mutations at At4g16860 site and gene cluster deletions	
At4g16960-F2	tctgtatcatattagtttagttcg	For detection of gene cluster deletions	Designated as F1 in Fig. 3C
At4g16940-R2	aaagagaataacacagatttattt	For detection of gene cluster deletions	Designated as R2 in Fig. 3C
ADH1F	TCGAGGAAGTGAGGTTGCT	For detection of mutations at the ADH1 site	
ADH1R2	TGGCTGAAGATCAGTCACTCC	For detection of mutations at the ADH1 site and large chromosomal deletions	Designated as R in Fig. 4A