

Supplementary Figures:

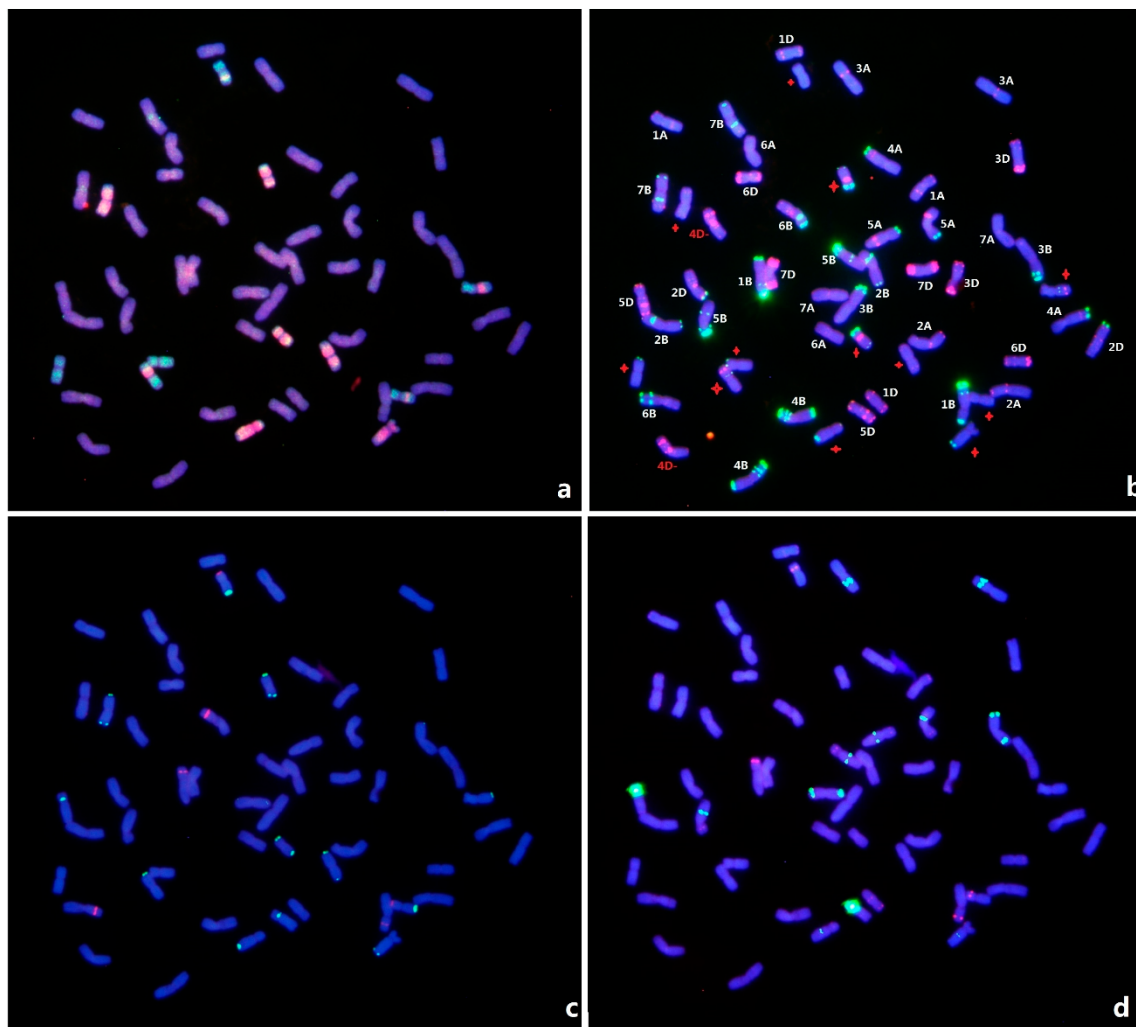


Figure S1. Sequential ND-FISH of Zhong 2

Oligo-B113 (green) +Oligo-pDb12H (red) (a), Oligo-pSc119.2 (green) + Oligo-pTa535 (red) (b), Oligo-pTa71 (red)+ Oligo-pSt122 (green)(c), and Oligo-3A1(green) + Oligo-5SrDNA (red) (d) as probes, respectively.

Wheat Pina-D1 DQ363911	MKALFLIGLL	ALVASTAFAQ	YSEVVGSDYV	AGGGGAQQCP	VETKLNSCRN	50
Thinopyrum intermedium MH745805	. . T F . . L - . .	. . . V	. G A		L	47
Thinopyrum intermedium MH745804	. . . F . . V V . .		. G		I	50
Hy36-1 MH745807	. . . F		. R		LD	50
Dasypyrum villosum MH745812	. . T F . . L - . .	. . . V	. G		L	47
Wheat Pina-D1 DQ363911	YLLDRCS TMK	DFPVTWRWWK	WWKGGCQELL	GECCSRLGQM	PPQCRCNIIQ	100
Thinopyrum intermedium MH745805	 T	 R	 L			97
Thinopyrum intermedium MH745804		 H				100
Hy36-1 MH745807	 T . . M	 L	 R			100
Dasypyrum villosum MH745812	 T	 R		 S		97
		▲▲▲▲▲	▲▲▲▲			
Wheat Pina-D1 DQ363911	GSIQGDLGGI	FGFQRDRASK	VIQEAKNLPP	RCNQGPPCNI	PGTIGYYW	148
Thinopyrum intermedium MH745805					. S . S	145
Thinopyrum intermedium MH745804					. . S	148
Hy36-1 MH745807	 S			K D .	. S . S	148
Dasypyrum villosum MH745812					. S . S	145

Figure S2. Alignment of PINA genes sequences among wheat, *Thinopyrum intermedium* and *Dasypyrum villosum*. The dots reflect the identical amino acids among the sequences. Triangles show the tryptophan-rich region (WRWWKWK) of *Pina* genes. Boxes indicated the Cysteine residue of the *Pina* genes.



Figure S3. Spikes (a) and grains (b) of CS (A), Zhong 5(B), Hy36(C), and Hy37(D).