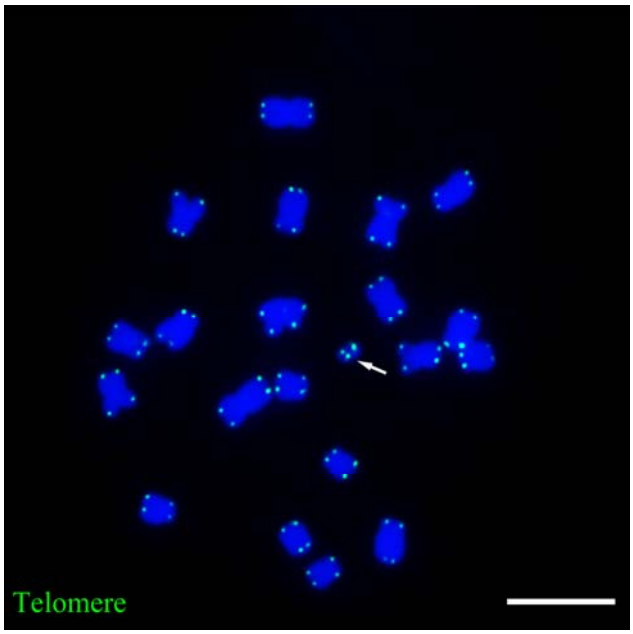
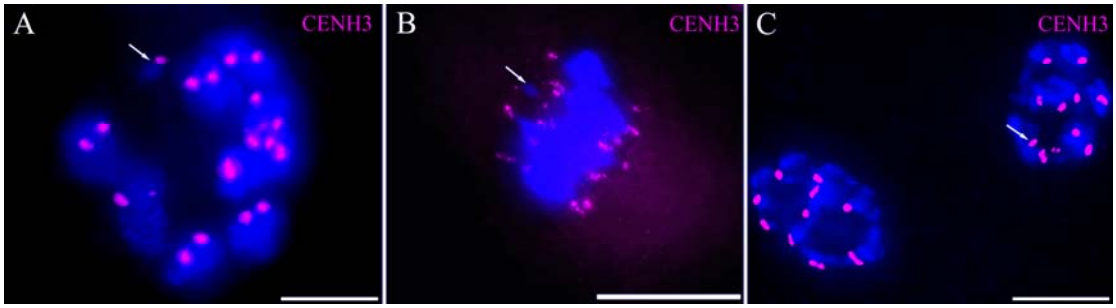


Supplemental Figure 1. FISH Detection of Telomeres in sDic-15.

Telomere sequences are labeled in green and the arrow marks the sDic-15 chromosome. Bars = 10 μm.



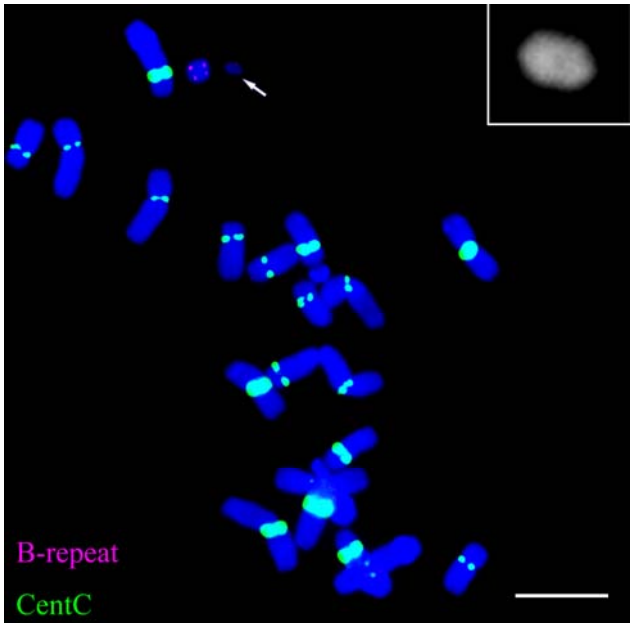
Supplemental Figure 2. CENH3 Detection in sDic-15 Meiotic Cells.

Immunostaining with CENH3 (magenta) antibodies on the sDic-15 chromosome (arrow) in meiotic cells. Bars = 10 μm.

(A) Diakinesis.

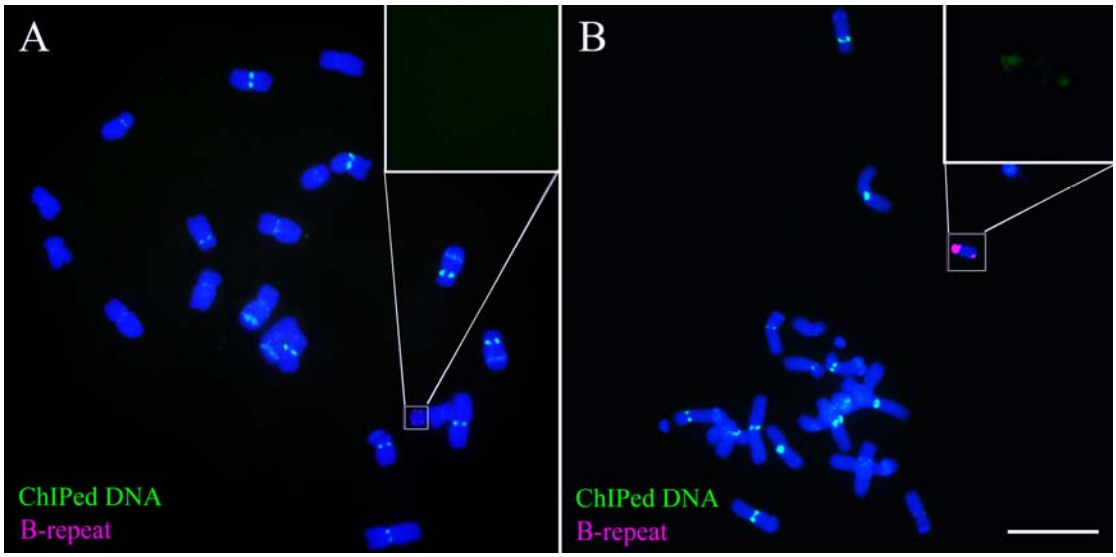
(B) Metaphase I.

(C) Anaphase I.



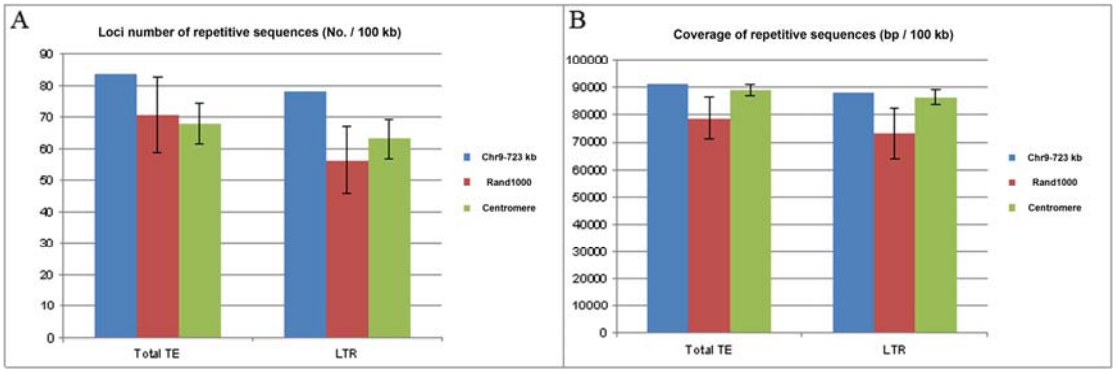
Supplemental Figure 3. FISH Detection of the Fragment from sDic-15.

The ZmBs sequences are labeled in magenta and CentC is labeled in green. The arrow marks the small fragment which is derived from sDic-15 through introchromosomal rearrangement. Bars = 10 μm.



Supplemental Figure 4. FISH Using ChIPed DNA as Probes.

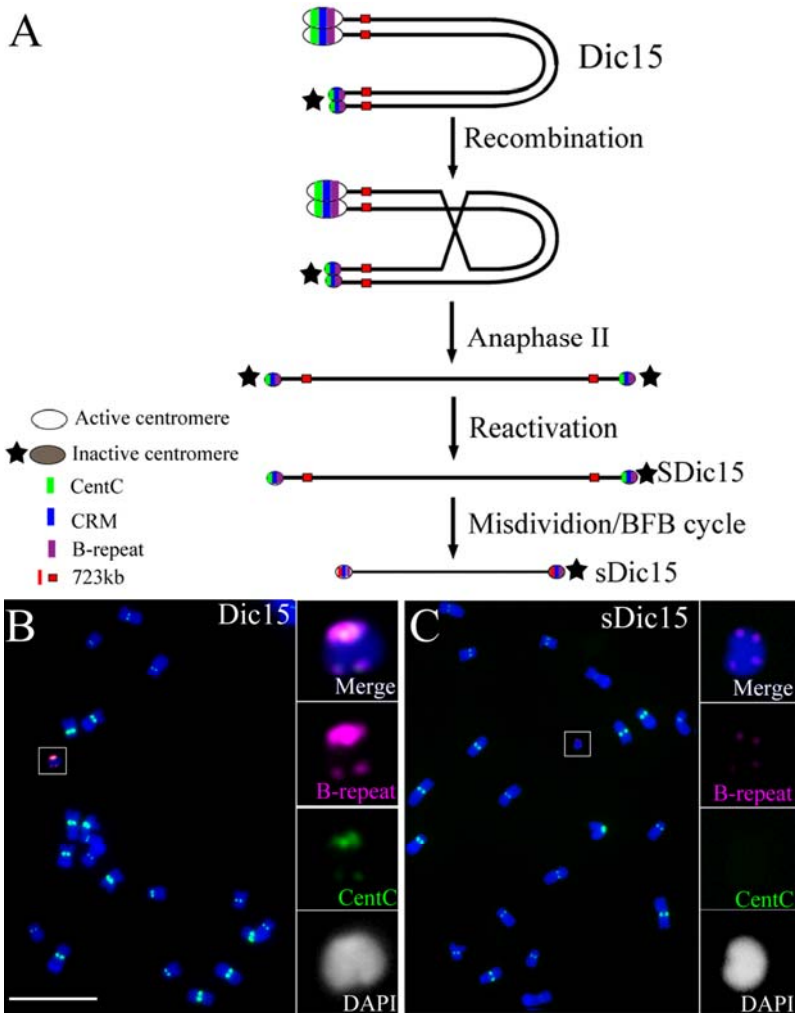
The ZmBs sequences are labeled in magenta, the anti-CENH3 ChIPed DNA is labeled in green and hybridize with sDic-15 **(A)** and Dic-15 **(B)** chromosome. The green signals of sDic-15 and Dic-15 are shown in the inset. Bars = 10 μm.



Supplemental Figure 5. The TE and LTR Distribution on the 723 kb.

(A) The loci number of repetitive sequences per 100 kb of the 723 kb region compared with 1000 random genome regions and the centromere regions in "control".

(B) The coverage of repetitive sequences per 100 kb of the 723 kb region compared with 1000 random genome regions and the centromere regions in "control".



Supplemental Figure 6. Model of Chromosome sDic-15 Formation.

(A) Dic-15 contains two fold-back structures and can produce bridges and new dicentric chromosomes through intrachromosomal recombination. Following the BFB cycle, a new centromere is formed and the stable dicentric chromosome sDic-15 is released. The new centromere loses CentC sequences and has fewer CRM and B repeats, but recruits a 723 kb region from the genome as a CENH3 binding domain.

(B) Dic15 is indicated in the FISH image. The B-repeat is labeled in magenta and CentC is labeled in green. Bar = 10 μm.

(C) sDic15 is indicated in the FISH image. The B-repeat is labeled in magenta and CentC is labeled in green.

Supplemental Table 1. Detailed Information on the 15 Genes Located in the 723kb Region of sDic-15.

Number	Name	Position	Annotation
1	GRMZM2G505453	9:54474714-54475013	pseudogene
2	GRMZM2G505459	9:54484413-54484512	transposable_element
3	GRMZM2G584775	9:54503057-54503343	pseudogene
4	GRMZM2G584772	9:54504471-54504578	pseudogene
5	GRMZM5G817459	9:54524582-54534558	transposable_element
6	GRMZM2G087035	9:54755707-54758580	transposable_element
7	GRMZM5G820607	9:54887924-54888484	hypothetic protein
8	GRMZM2G558475	9:54985839-54985954	transposable_element
9	GRMZM2G427058	9:54986709-54986993	hypothetic protein
10	GRMZM2G533389	9:54986877-54991260	putative acyl-CoA N-acyltransferases (NAT) family protein
11	GRMZM2G533393	9:54991923-54992035	transposable_element
12	GRMZM2G057729	9:55029735-55032079	transposable_element
13	GRMZM2G057743	9:55061431-55094370	K homology RNA-binding domain
14	GRMZM5G856741	9:55095172-55096352	hypothetic protein
15	AC184851.4_FG005	9:55107050-55107382	unknown

Supplemental Table 2. Expression of Six Protein-coding Genes in the 723kb Region of sDic-15.

		qRT-PCR(seedlings)	
Name	**Nucleotide Position**	**Control**	**sDic-15**
GRMZM5G820607	9:54887924-54888484	+	++
GRMZM2G427058	9:54986709-54986993	+	++
GRMZM2G533389	9:54986877-54991260	+	++
GRMZM2G057743	9:55061431-55094370	+	+
GRMZM5G856741	9:55095172-55096352	NT	NT
AC184851.4_FG005	9:55107050-55107382	NT	NT

NT, not tested; +, expression; ++, increased expression

Supplemental Table 3. FISH Probe Primers Used in This Study.

Name	Sequence
GRMZM2G057743-1F	GCGCGGCTACCACTACGACCAG
GRMZM2G057743-1R	CGGCGTGGCTCATCATGTTGTG
GRMZM2G057743-2F	TCGGCAAAGGTGGGAAGATCATAGA
GRMZM2G057743-2R	CCCCCCTTCTCCCCTTCTCTGTATT
GRMZM2G057743-3F	CGCCCCCTCCTTGGTTCATAAAA
GRMZM2G057743-3R	GCGGGTCACTTGATGGCCTAGCTAT
GRMZM2G057743-4F	GGCCGTCGGAGCTGGATGTCT
GRMZM2G057743-4R	CCGCCTCCGCTGCTTCTACTTC
GRMZM2G057743-5F	GCGGCGAGAGCGGAAGTAGAAG
GRMZM2G057743-5R	CGCCCATGCCAAGCCTCGTAC
GRMZM2G057743-6F	CGGCGACAAACCACAGGCTCT
GRMZM2G057743-6R	GGCGGCCCACAAAAGCATCTAT

Supplemental Table 4. qRT-PCR Primers Used in This Study.

Name	Sequence
GRMZM5G820607-F	CACGCTCGACCGATTGGATGAC
GRMZM5G820607-R	GGCGCACGTATGTTCTTCCACCTC
GRMZM2G427058-F	CCTGCGCGGTGGATCTGGTAC
GRMZM2G427058-R	TCGCCACCAAGCTCATGTCCG
GRMZM2G533389-F	TTCCGAAGTTGGGCAAGTGGTG
GRMZM2G533389-R	TGGGACAAGTAGAAGAGCTGGCTGAT
GRMZM2G057743-F	TCGGCAAAGGTGGGAAGATCATAGAG
GRMZM2G057743-R	GGCATCTGCGAAACACCCAAATAATC