

B chromosomes

Jones, 1995; Bougard and Jones, 1997; Camacho et al., 2000; Pokorná & Reifová, 2021

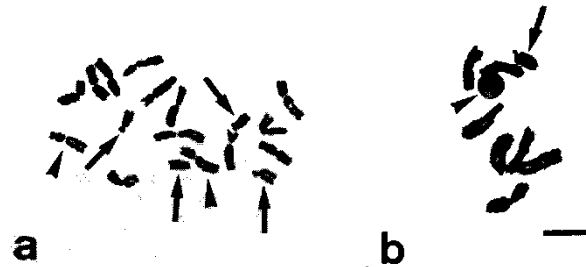
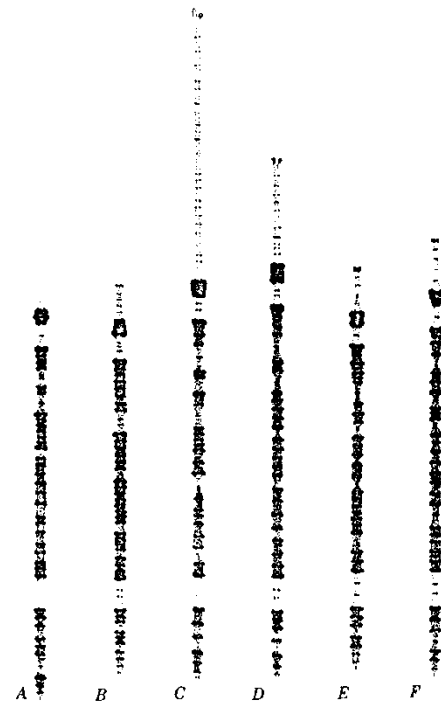


Figure 1. Niwa & Tsujimoto 1992, *Plant Breeding* 109:78-81. Rye root-tip and diakinesis chromosomes. Arrows indicate B chromosomes (note pairing at diakinesis). Arrow heads are the satellite chromosomes. Bar = 10 μ m.



Figure 2. Top: A B-chromosome from maize. Bottom: B chromosomes from rye plants from different countries.



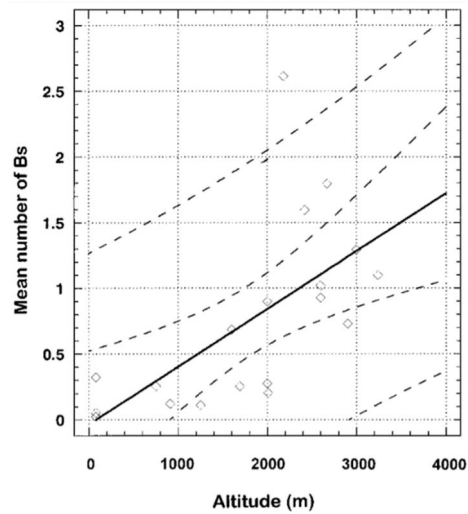


Figure 3. Rosato et al., 1998

Mitotic stability

Mitotic drive

Meiotic drive

E.g., *Lilium callosum*:

$1B \times 0B \Rightarrow 80\% 1B$

rec $\Rightarrow 50\% 0B, 50\% 1B$



Figure 4. bdlilies.com

Non-disjunction

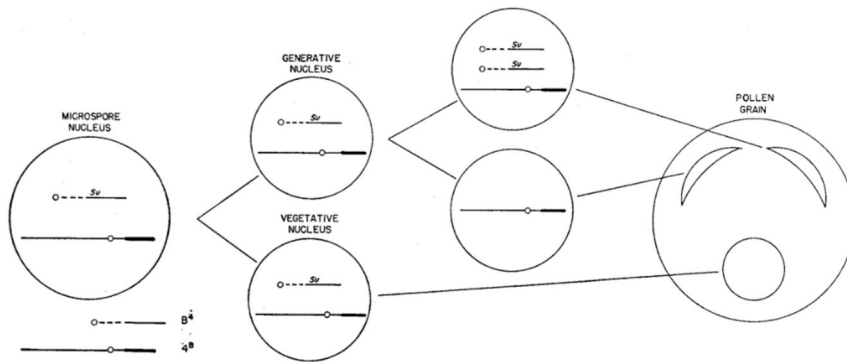


Figure 5. Non-disjunction of B chromosomes during microgametogenesis of maize.
Roman, 1947

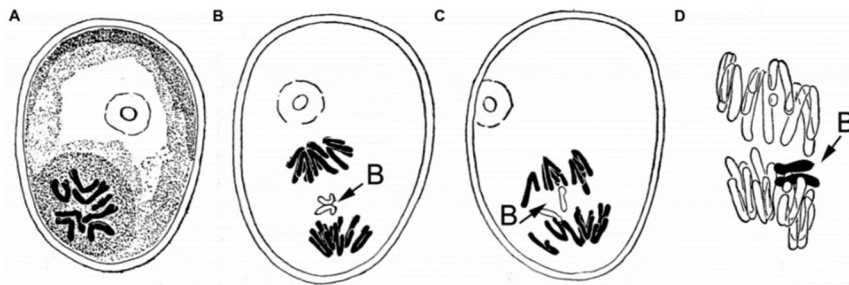


Figure 6. From Hasegawa 1934, redrawn by Houben 2017. A- pollen mitosis; B- non-disjoined, lagging B chromosomes; C- disjoined B's; D - B's showing non-disjunction

Table 1. Kamayo, 1957: B chromosomes in *Lillium callosum*

Stage:	% Bs @ micropylar pole
Metaphase I	75.4
Anaphase I	84.1
Met II / Ana II	80.0
Postmeiotic mitoses	73.1
% Eggs with B's	83.8

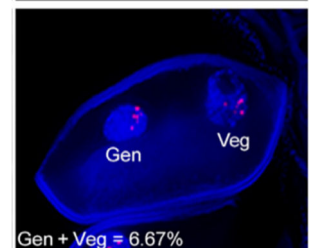
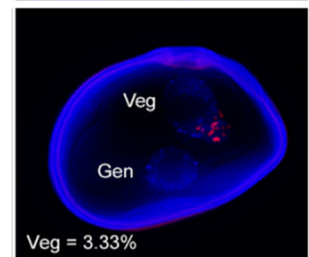
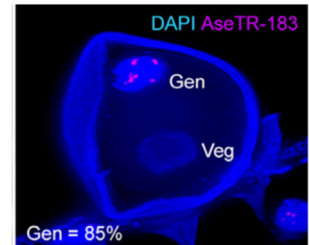
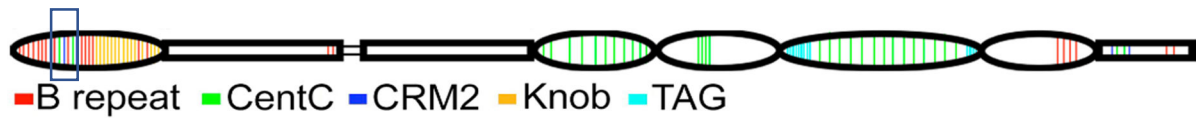
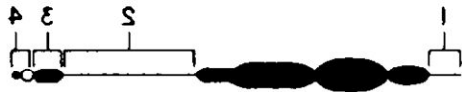
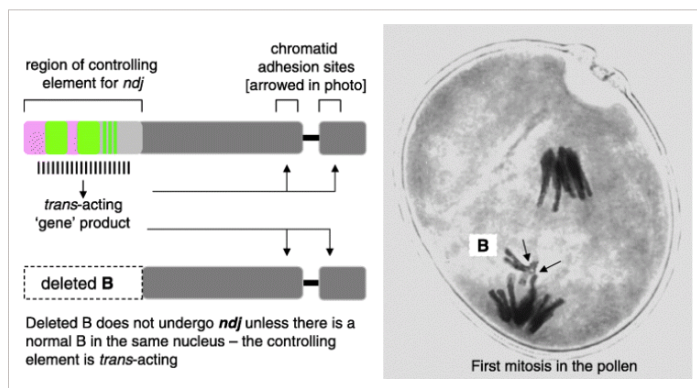


Figure 7. Wu et al, 2019
(Houben lab)

Carlson and Roseman, 1992



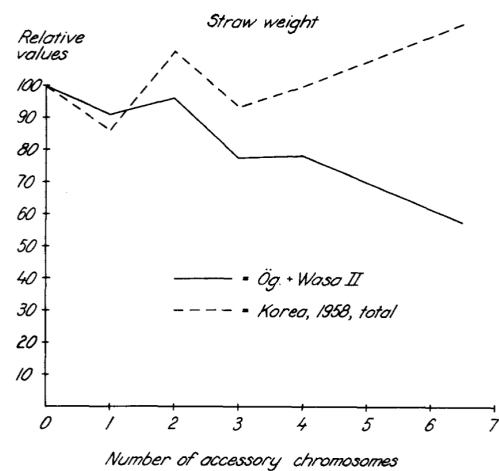
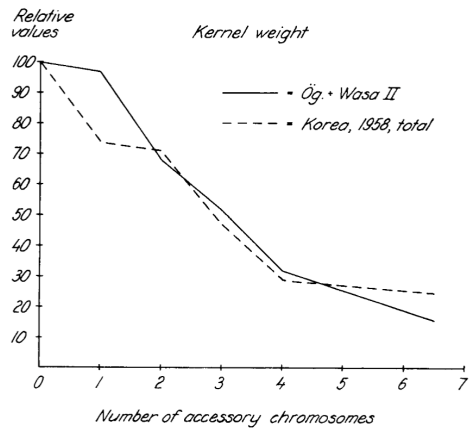
Jones and Puertas, 1993; Jones and Pasakinskiene, 2004



Banei-Moghaddam et al., 2012; Chen et al, 2024

Balancing forces

Müntzing, 1963

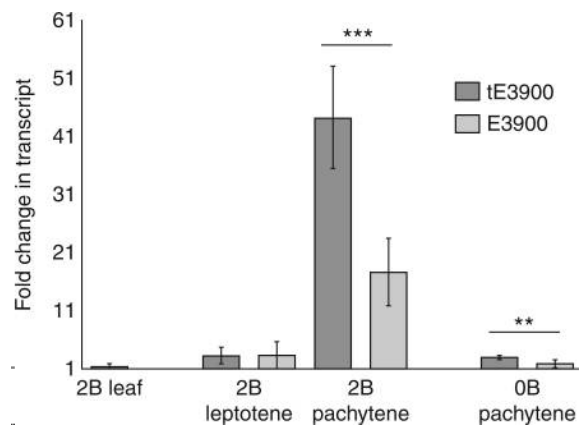


ARNE MÜNTZING

Percentage abnormal cells, mean $\pm$ s.d. (n)

0B	2B	2B-del
94 $\pm$ 9 (108)	29 $\pm$ 19 (90)	55 $\pm$ 17 (30)
t-test (P)	0.01	0.04

Pereira et al, 2016



How B's influence the A's

Huang et al, 2020

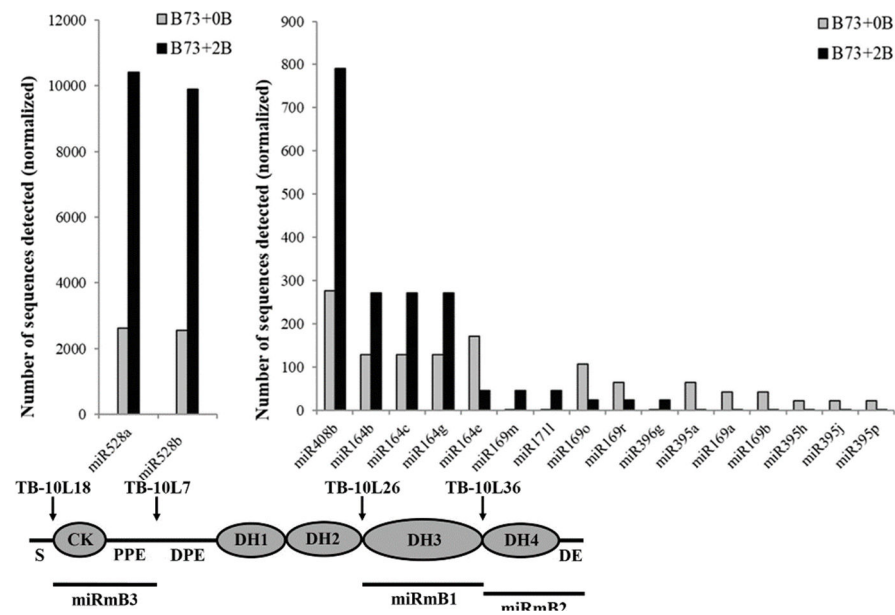


Figure 9. Map positions of B-derived miRNA genes.

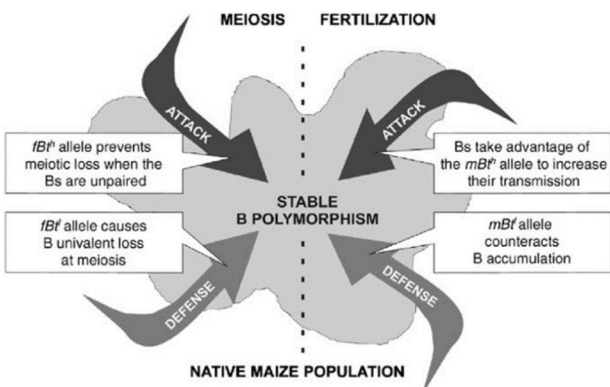
Genetic control

Romera, Jiménez, and Puertas, 1991

Population:	Year	Madrid		La Coruña	
		% B's	#B/plant	% B's	# B/plant
Paldang 20	1987	17	0.33		
	1988	21	0.42	22	0.44
	1989	20	0.40	30	0.63
Paldang 60	1987	55↓	1.21		
	1988	42	0.89	54↓	1.19
	1989	38	0.82	47	1.02
Puyo 20	1987	22↑	0.44		
	1988	47	0.98	19↑	0.39
	1989	57	1.30	34	0.66
Puyo 60	1987	57	1.36		
	1988	71	1.78	52	1.15
	1989	74	1.74	50	1.04

- selfish
 - adaptive value
- } Interplay between these two forces determines the number of B's found in a given plant.

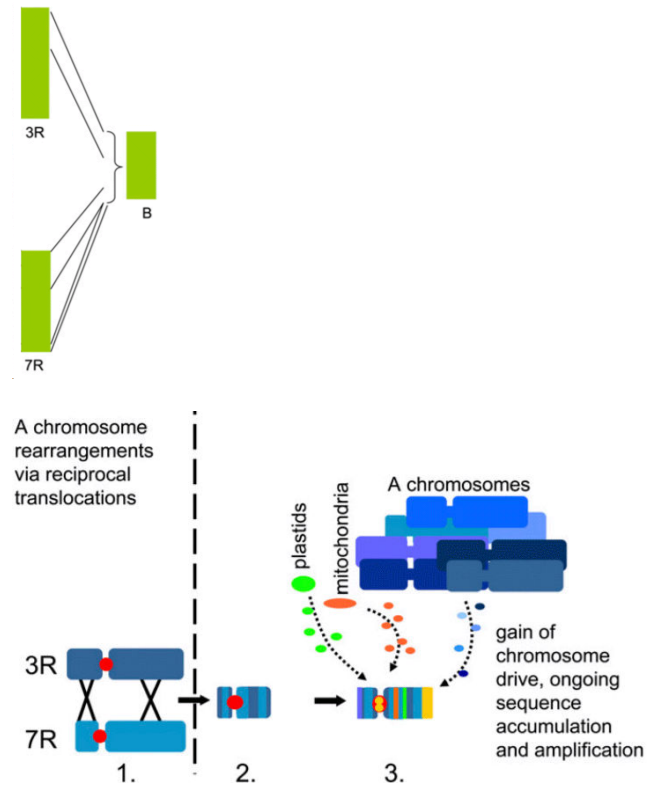
González-Sánchez et al., 2003



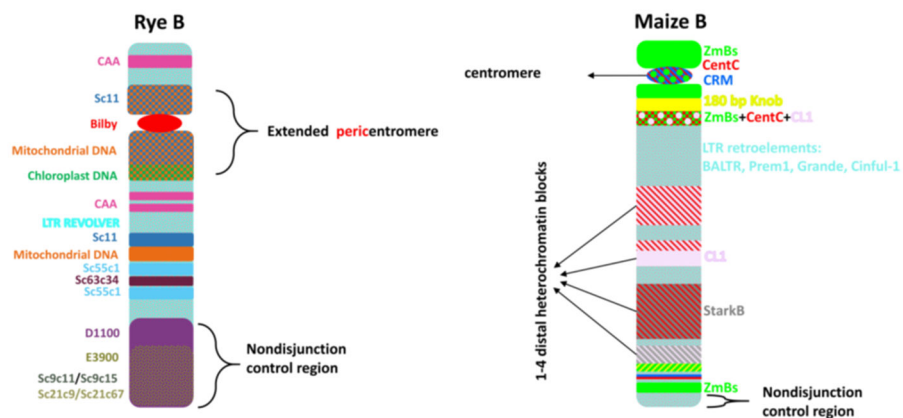
Origin & composition

Martis et al 2012

The rye B chromosome



Marques et al, 2018



Use in breeding

Birchler, 2015

