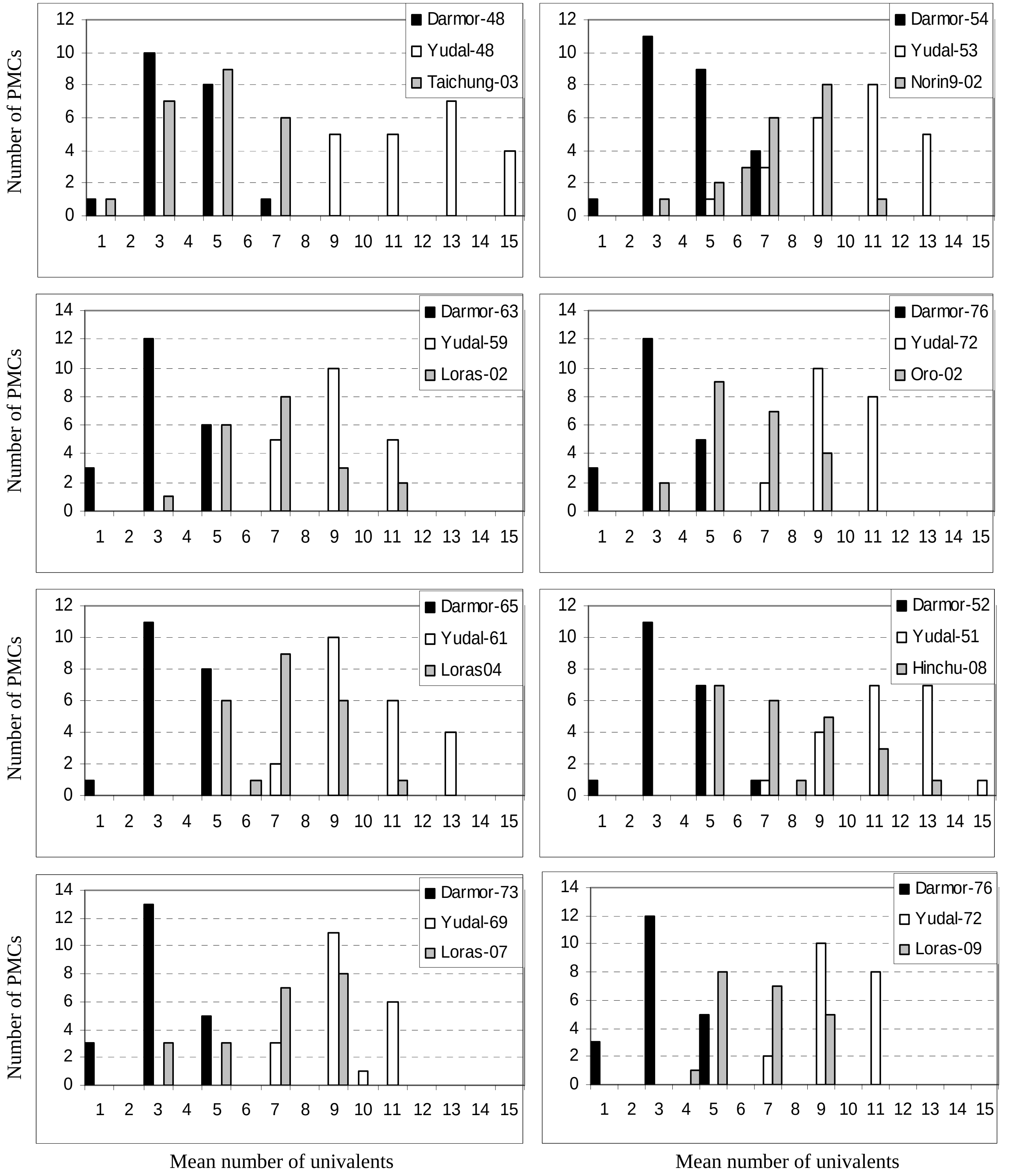
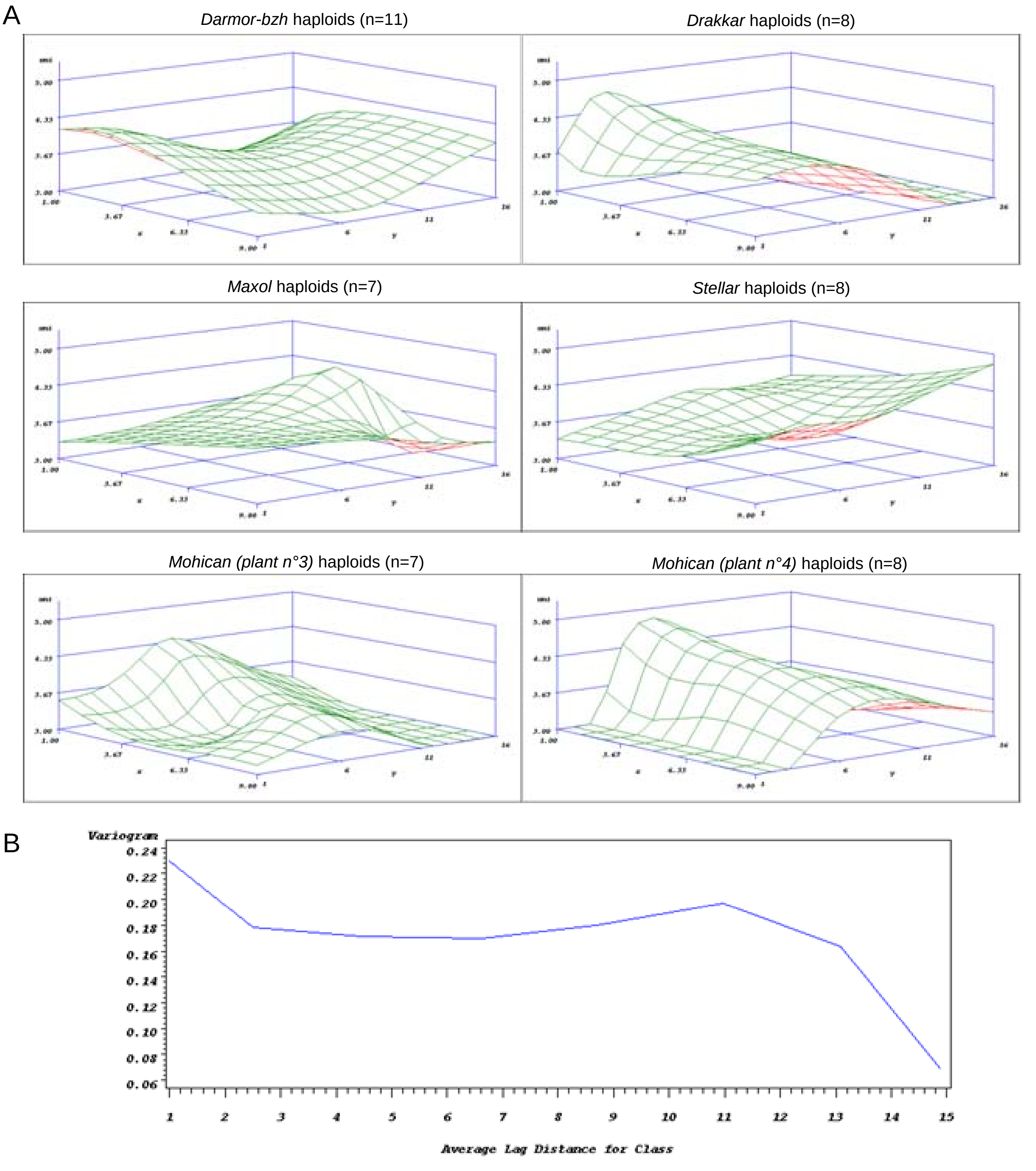


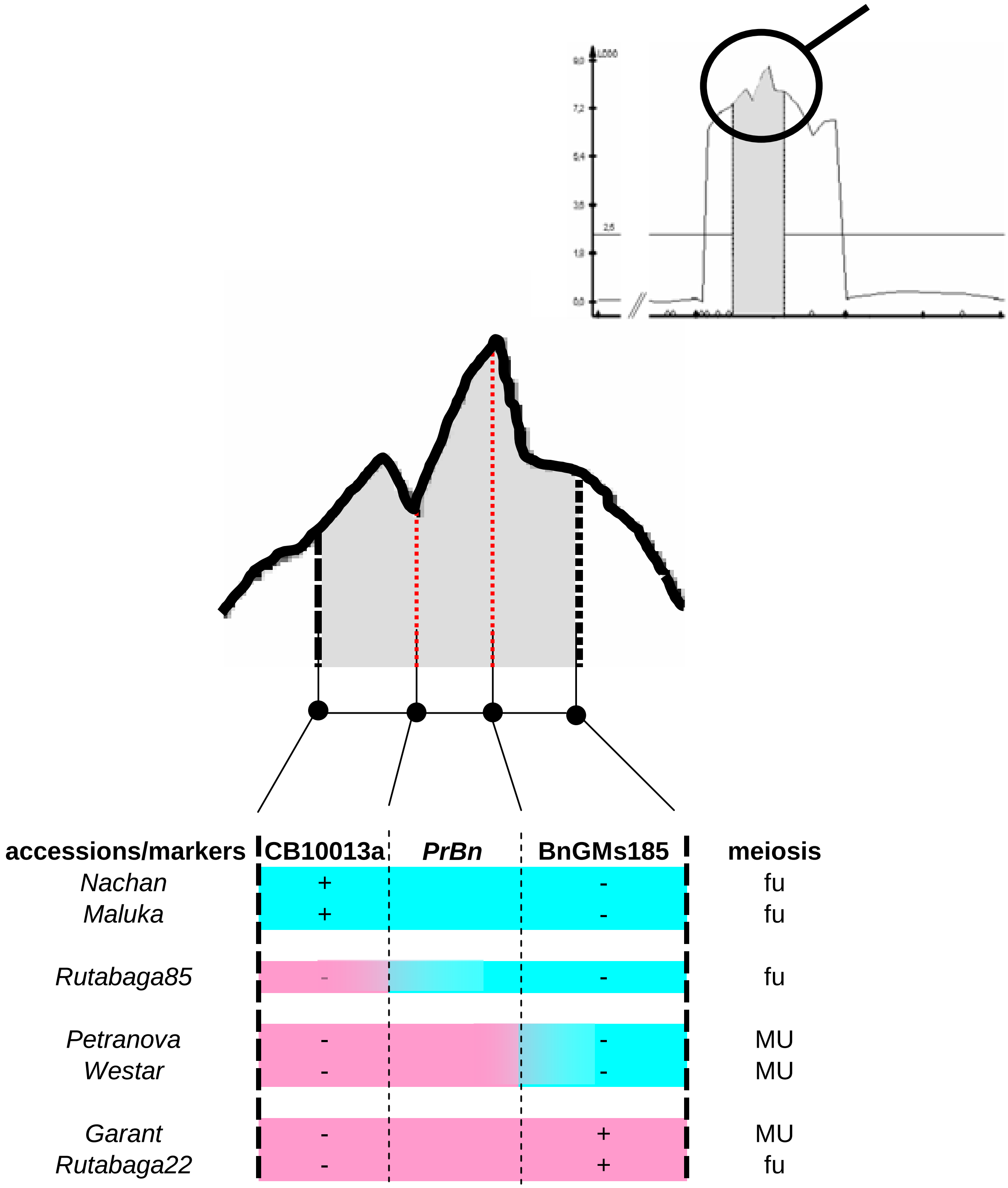
Supplemental Figure 1: Description of *B. napus* allohaploids showing an intermediate meiotic behavior. Grey histograms represent the frequency distributions of the number of univalents per Pollen Mother Cell (PMC) in allohaploids which showed an averaged intermediate meiotic behavior (6<mean # univalents<8). For comparison, the frequency distributions of the number of univalents per PMC in the *Darmor-bzh* and *Yudal* allohaploids closest in the greenhouse are shown by the black and white histograms, respectively. *Tai03*, *Oro02*, *Nor02* and *Hin08* are allohaploids isolated from accessions *Taichung*, *Oro*, *Norin9* and *Hinchu*, respectively. *Lor02*, *Lor04*, *Lor07* and *Lor09* are four allohaploids isolated from the same accession *Loras*.



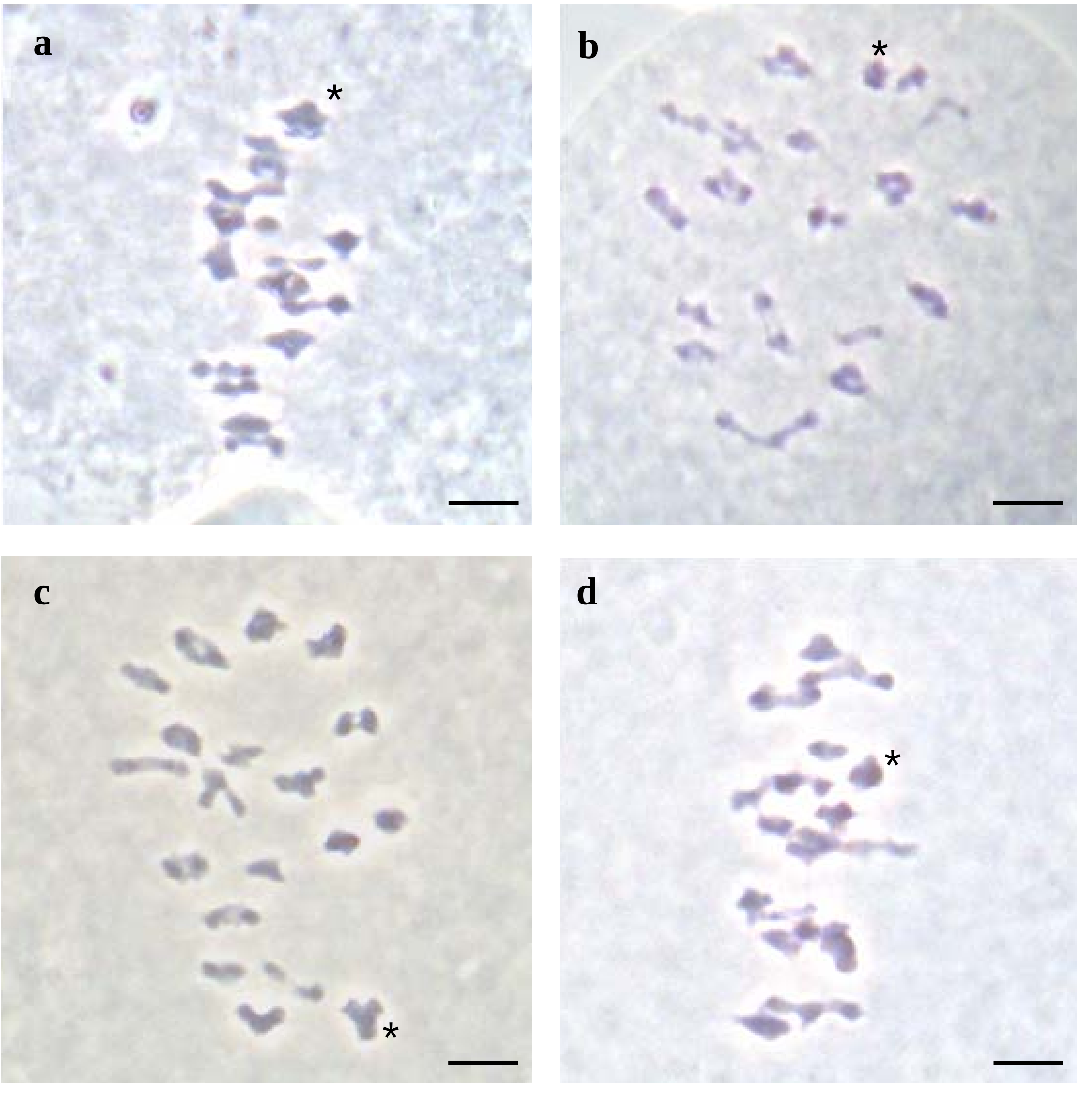
Supplemental Figure 2: Spatial variation of meiotic behavior measured for allohaploids isolated from the same plants but positioned at different locations in the greenhouse.

(A) The plots, obtained using Proc G3D (SAS Institute Inc., 1999), represent the shape of the surface obtained for allohaploids isolated from five accessions (with two plants representing *Mohican*) that were grown at the same time in the greenhouse. For each surface plot, the mean number of univalents scored for each allohaploid was plotted as a vertical variable (**z**) for the position of this allohaploid in the greenhouse, on a grid of columns by rows (**y** and **x**, respectively). The response surfaces were different between some accessions (e.g. *Darmor-bzh* compared to *Mohican*) but alike for some others (e.g. the two plants representing *Mohican* and *Drakkar*) and no common trends were apparent.

(B) Plot of the variogram computed using the same dataset as below (Proc Variogram, SAS Institute Inc., 1999). This variogram describes how differences in the number of univalents vary as the distances between the points at which this variable is measured increases (e.g. increasing variation with increasing distances would indicate that "neighbors" are more likely to share a common pattern of variation than plants separated by larger distances). The lag distance (X-axis) is the size of the bins into which the pairwise distances between all of the points of the dataset were grouped (the "neighborhood size"); in this example, the most appropriate lag distance was first determined as 2.2 and a total of seven lags was used (so that reasonable number of pairs were grouped in each bin). Then, for each bin, the variance of the pairwise difference in the number of univalents was calculated and plotted on the Y-axis. As the variogram appears relatively constant across all distances, the number of univalents appears to be free of spatial correlation (when all accessions are considered together).



Supplemental Figure 3: Hypothetical position of *PrBn* owing to the multilocus genotypes of recombinant varieties at the *PrBn* region.



Supplemental Figure 4: Representative Metaphase I nuclei of Brassica napus allotetraploid accessions showing no difference in chiasma frequency.
(a) Darmor-bzh (fu at the haploid stage), *(b) Norin6* (fu at the haploid stage), *(c) Westar* (MU at the haploid stage), *(d) Spok* (MU at the haploid stage).
Chiasmata were recorded according to the criteria established by Sanchez-Moran et al. (2001). Bivalent configurations at metaphase I felt into two categories, rods and rings. Rods were considered to be bound by one single chiasma in one arm only, whereas rings were considered to have both arms bound by one chiasma. With that proviso, mean cell chiasma frequencies and their corresponding standard deviations were estimated (N=20 PMCs) as follows: *(a)* 35.45±0.82; *(b)* 35.15±0.67; *(c)* 35.85±0.74 and *(d)* 35.4±0.82. However these estimates are biased downwardly because it is not possible to detect indisputably the presence of a second chiasma in one arm although they do exist (Nicolas et al., 2009) (see * for ambiguous bivalents). Bars = 5 µm.

Supplemental References:

Nicolas, S.D., Leflon, M., Monod, H., Eber, F., Coriton, O., Huetau, V., Chevre, A.M., and Jenczewski, E. (2009). Genetic Regulation of Meiotic Cross-Overs between Related Genomes in Brassica napus Haploids and Hybrids. The Plant Cell **21,** 373-385.

Sanchez-Moran, E., Armstrong, S.J., Santos, J.L., Franklin, F.C.H., and Jones, G.H. (2001). Chiasma formation in Arabidopsis thaliana accession Wassileskija and in two meiotic mutants. Chromosome Res. **9,** 121-128

SAS Institute (1999). SAS/STAT User's Guide, Version 8. SAS Institute, Cary, NC.

Supplemental Table 1: Differences of the LS-means between accessions within the MU and fu groups

fu group

variete	variete	Estimate	Standard Error	DF	t Value	Pr > |t|
Darmor	Akamar	0.8689	0.1054	226	8.24	<.0001
Darmor	Brutor	0.5993	0.1552	186	3.86	0.0002
Darmor	Capricorn	-0.05811	0.1034	224	-0.56	0.5747
Darmor	Drakkar	0.00875	0.1453	237	0.06	0.9520
Darmor	JetNeuf	-1.0900	0.1779	237	-6.13	<.0001
Darmor	Loras	-1.3071	0.2232	239	-5.86	<.0001
Darmor	Maxol	0.04628	0.1532	239	0.30	0.7628
Darmor	Mohican	0.1816	0.08733	216	2.08	0.0387
Darmor	Nachan	-0.4099	0.1313	191	-3.12	0.0021
Darmor	Norin1	-0.2513	0.1254	176	-2.00	0.0467
Darmor	Norin10	-0.3233	0.1205	163	-2.68	0.0081
Darmor	Norin6	-0.1621	0.1286	182	-1.26	0.2091
Darmor	Oro	-1.3881	0.2220	239	-6.25	<.0001
Darmor	Rutab22	-0.1288	0.1629	201	-0.79	0.4298
Darmor	Rutab85	-0.1220	0.1417	177	-0.86	0.3902
Darmor	Stellar	-0.1087	0.1453	237	-0.75	0.4550
Darmor	Taïchung	-1.3933	0.1999	203	-6.97	<.0001

MU group

variete	variete	Estimate	Standard Error	DF	t Value	Pr > |t|
Garant	Yudal	-0.09221	0.06853	66.6	-1.35	0.1830
Asp Kale	Yudal	0.1356	0.06009	67.4	2.26	0.0272
Hinchu	Yudal	-0.4908	0.1312	59	-3.74	0.0004
Loras	Yudal	-0.2977	0.07444	67.9	-4.00	0.0002
Norin9	Yudal	-0.1222	0.1068	63.3	-1.14	0.2566
Oro	Yudal	-0.2398	0.06670	67.7	-3.60	0.0006
Petranov	Yudal	-0.1874	0.09940	67.3	-1.89	0.0637
Spok	Yudal	-0.06979	0.07934	53.9	-0.88	0.3829
Westar	Yudal	0.1010	0.09096	55.4	1.11	0.2717

Analyses were performed separately on the fu and MU groups. Least-squares means (LS-means) were computed using the LSMEANS statement of Proc MIXED (SAS Institute Inc., 1999) for the *accession* effect. A multiple comparison adjustment for the *p*-values and confidence limits for the differences of LS-means was applied.