Table 2. Analysis of the segregation types found in reciprocal testcrosses to $\underline{bz}_2$ of the Bz/ plants shown in Table 1.

Family	Ratios (Bz:bz) obtained when the Bz/ plants were crossed:							
	as ♀ x $\underline{bz}_2$				as ♂ x $\underline{bz}_2$			
	near 1:1 ♀ and ♂	near 1:1 ♀ only	large excess Bz	large excess bz	near 1:1 ♀ and ♂	near 1:1 ♂ only	large excess Bz	large excess bz
1990	9	1	2	1	9	1	1	2
1991	7	1	3	0	7	0	3	1
1992	6	4	5	1	6	5	0	5
1993	1	2	2	1	1	1	0	4
1994	6	5	0	0	6	0	0	5
1995	9	1	2	0	9	0	2	1
1996	1	1	2	3	1	0	0	6
Totals	39	15	16	6	39	7	6	24

Note: Ears with a large excess of Bz or bz are those giving significant χ^2 deviations from the 1:1 ratio ($P < 0.01$).

chromosome 1 is also present, or when two chromosomes 1 are deficient for different regions in the same gamete. However, a possibility exists that pollen sterility is present in trisomic 1 plants regardless of chromosome breakages, since non-disomic ratios are not found in plants with normal pollen, except for family 1995.

Achille Ghidoni

2. Genetic and cytological investigation of nonrandomly transmitted chromosomes in trisomic 10 plants.

An instance of nonrandom transmission of chromosomes in trisomic 10 plants was reported in last year's Maize Genetics News Letter (45: 115-119). Among the progeny of the cross $\underline{R}^{nj}\underline{R}^{st}\underline{r}$ x $\underline{rr}$ the $\underline{R}^{st}$ class was significantly less than the $\underline{R}^{nj}$ class. Moreover, the $\underline{R}^{nj}\underline{R}^{st}$ class was

also deficient. After making reciprocal crosses to an r tester, a greater discrepancy in the recovery of the same classes appeared when the trisomic plants furnished the pollen.

As an interpretation of the data, it was suggested that a chromosomal condition linked to $\underline{R}^{st}$ affected its ability to be inherited. Accordingly, root tips were taken from samples of the $\underline{R}^{st}$ and $\underline{R}^{nj}$ classes obtained in the cross cited above. The expectation was that most $\underline{R}^{nj}$ individuals would be disomic ($\underline{R}^{nj}\underline{r}$) and that few would be trisomic ($\underline{R}^{nj}\underline{rr}$). On the other hand, most $\underline{R}^{st}$ individuals were expected to be trisomic if a chromosome condition linked to $\underline{R}^{st}$ negatively affects the transmission of this chromosome 10 alone. Thus, the chromosome bearing $\underline{R}^{st}$ would usually be transmitted in the presence of a normal chromosome 10 (which in this case carried r), or without the second chromosome 10 when a crossover separated $\underline{R}^{st}$ from the unfavorable chromosomal condition.

Table 1 shows the frequency of trisomic and disomic individuals in the $\underline{R}^{nj}$ and $\underline{R}^{st}$ classes.

Table 1. Frequency of trisomic and disomic individuals in the $\underline{R}^{nj}$ and $\underline{R}^{st}$ classes obtained by counting chromosomes in root tips.

Chromosome numbers	20	21	Total
$\underline{R}^{nj}$ Class	36	13	49
$\underline{R}^{st}$ Class	23	80	103

The cytological data fit well with the expectation indicated above. Other samples of the same classes were progeny tested by crossing reciprocally to an r tester. The results are summarized in Table 2.

Table 2. Frequency of ears showing disomic and non-disomic ratios after crossing $\underline{R}^{nj}$/ and $\underline{R}^{st}$/ plants to an $\underline{r}$ tester.

	Ears with disomic ratios	Ears with non-disomic ratios
$\underline{R}^{nj}$ Class	9	3
$\underline{R}^{st}$ Class	1	55

While the result for the $\underline{R}^{nj}$ class fits with the expectation (as was confirmed also by the cytological finding), the $\underline{R}^{st}$ class shows a remarkable deficiency of ears with disomic ratios. This suggests that a crossover separating the gene $\underline{R}^{st}$ from the linked chromosome condition is infrequent. It is obvious from a comparison of the genetic data with the cytological data reported in Table 1 that many individuals giving non-disomic ratios for $\underline{R}^{st}$:$\underline{r}$ had 20 chromosomes.

A deficiency in the chromosome 10 carrying $\underline{R}^{st}$ cannot entirely explain the phenomenon, unless the deficient chromosome is consistently excluded from pairing configurations and is therefore preferentially lost during meiosis. If the deficiency is small, it is unlikely to drastically affect the pairing ability of this chromosome. On the other hand, if it is a large deficiency, the chromosome may be transmissible only in the presence of a normal chromosome 10, and this does not account for the many plants with 20 chromosomes still giving non-disomic ratios. The problem requires further investigation.

Achille Ghidoni
Valeria Semini