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Improvement of Endosperm Quality in Triticale

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ABSTRACT

Lines with good floral fertility were easily obtained in a hexaploid Triticale derived from the cross between *Triticum durum* (Enano de Jaén) and an inbred self-fertile line of rye (*Secale cereale*). However all the lines show a poorly shrivelled endosperm.

Thinking that it would be possible that the seed shrivelling was due to an incompatibility between the *Secale* chromosomes and the *Triticum* plasmagenes, we intended to induce mutations or destruction of such plasmagenes by means of irradiation and subsequent reconstruction of the damaged chromosomes. The procedure was as follows:

In Triticale potted plants 3-5 ears were emasculated and immediately the plants were irradiated in a gamma field with a dose of 1500-3000 r. After irradiation the emasculated ears were pollinated using pollen of sister plants of the same line.

From a total of 77 progenies it was possible to select 5 with smoother seeds.

Any difference between the original lines and the selections must be due either to dominant nuclear mutations, or plasmagenic mutations.

In order to ascertain if the better endosperm quality was due to plasmagenic influences, reciprocal crosses were made between the 5 selections and their original lines. The endosperm quality was examined in the parents and crosses.

Seed shrivelling was estimated with a scale of 1 to 5. The 5 corresponds to maximum shrivelling, as in the original lines, and the 1 to a degree of smoothness similar to the grain of the durum wheat. The results are recorded in TABLE 1.

The differences in endosperm quality between the reciprocal crosses seem to indicate a plasmagenic influence in the character. Therefore the irradiation could be an effective tool for the induction of favourable plasmagenic changes in order to lessen the harmful effects of the interaction between *Triticum* plasmagenes and *Secale* chromosomes.

The plasmagenic change could be either a mutation or a destruction.

TABLE 1. Seed shrivelling in Triticale lines, selections and reciprocal crosses.

Material ♀ × ♂	Number of plants	Seed shrivelling
Line 37	13	5,0
Line 37 × Selection 1	19	5,0
Selection 1 × Line 37	48	4,8±0,2
Selection 1	84	4,5±0,3
Line 40	13	5,0
Line 40 × Selection 2	6	5,0
Selection 2 × Line 40	113	4,7±0,2
Selection 2	85	4,1±0,4
Line 41	27	5,0
Line 41 × Selection 3	27	5,0
Selection 3 × Line 41	139	4,4±0,2
Selection 3	90	3,6±0,4
Line 41	27	5,0
Line 41 × Selection 4	36	4,9±0,1
Selection 4 × Line 41	127	4,8±0,1
Selection 4	84	4,1±0,5
Line 6110	18	5,0
Line 6110 × Selection 5	19	4,7±0,2
Selection 5 × Line 6110	70	4,6±0,2
Selection 5	77	3,6±0,5

A couple of the lines selected in these experiments will be released to the farmers for the next planting in small samples distributed through the Spanish Extension Service. This cereal is to be planted as a substitute of rye, barley or oats for animal feeding. Its crude protein content is near 19%.

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