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1. Endosperm mutants induced by a chemical mutagen.

Endosperm mutants have been induced in an inbred line by NES (Neutral Ethyl Sulphate). The treatment was as follows:

1.5 gr/l for 24 hrs. at 24°C.

The mutants were detected and isolated in the second and third generations after treatment.

These mutants were classified in three phenotypic groups: floury, shrunken and sugary. Each group may include different origins, but this is not to be directly related to mutations within the observed individuals. One might have to incriminate the cultivation techniques of the M_1 plants. Because of the induced sterility not all these plants were selfed; however, they were isolated to prevent outcrosses. The occurrence of the same aberrant type in different lines could be explained either by natural crosses between M_1 plants, or, but not necessarily, by an increased mutation rate.

In order to identify the nature of these mutants, a set of crosses were performed: (i) all mutants were intercrossed within each group (diallel) and (ii) all mutants were crossed with a set of 16 U.S. marked lines. Furthermore, a liguleless mutant was crossed with a "liguleless leaf" marker.

Results

Starchy endosperm: Diallel crosses between mutated lines revealed three different mutations in a group of 12 lines tested. Crosses with the "floury endosperm" (fl_1) and "opaque endosperm" (o_2, o_1) marked lines were negative.

Half starchy endosperm: Diallel crosses revealed four different mutations in a group of 7 lines tested. Crosses with the "dull endosperm" (du_1) marker were negative.

Shriveled endosperm: The 3 lines tested have the same mutation, "etched endosperm" (et).

Shrunken endosperm: Two mutants out of the three lines tested were found to be "shrunken endosperm" (sh_2).

Sugary endosperm: The three mutants have the same mutated factor, "sugary endosperm" (su_1).

The liguleless leaf mutant is due to a mutation at the lg_1 site.

The above results are summarized in the following table:

Table 1

| Mutant types | Tester | Results |
|--|-----------------|---------|
| Starchy endosperm (3 tested mutants) | fl ₁ | - |
| | o ₁ | - |
| | o ₂ | - |
| Half starchy endosperm (4 tested mutants) | du ₁ | - |
| Shriveled endosperm | et | + |
| Shrunken endosperm | sh ₁ | - |
| | sh ₂ | + |
| Sugary endosperm | su ₁ | + |
| | su ₂ | - |
| Liguleless | lg ₁ | + |

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1. The geographic distribution of the fl^a gene (floury recessive in two doses) in the Paraguay Republic.

The fl^a gene is an allele of fl₁, but differs from fl₁ in that it is recessive in two doses (Mazoti, 1940, Anales del Instituto Fit. de St. Catalina 2:17-26). This fl^a gene has a wide geographic distribution in Paraguay, integrating with the genotype of the floury variety of corn with yellow aleurone designated "Blanco."

The experimental results are as follows:

Floury fl/fl x floury "Blanco" = all floury