

NEW ARGENTINE FERTILITY RESTORATION SOURCE FOR CYTOPLASMIC MALE STERILITY

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The limiting factor for the sunflower hybrid production using cytoplasmic male sterility was, until 1969, the lack of genes for fertility restoration. The sunflower plant breeders in the whole world have been devoted to this task and we also started to search for new and better restoration fertility sources.

In the Pergamino Agricultural Experimental Station, material with cytoplasmic male sterility was received from France in the middle of 1970. It had been multiplied during 1969 by a private company. The designations of these lines were: 1365A₁; 1365A₂; 1366A, 1367A with their corresponding maintaining isogenic lines.

This material was sown in a greenhouse in may 1970, showing lack of uniformity in the female lines as well as in the maintainers. Taller plants with greater vigour turned up in lower proportion. They seemed to be of a hybrid type, probably due to the presence of out-crosses. In the cytoplasmic male sterile line 1367 A from 29 plants tested 8 were out of type, possibly hybrids (designated H). The plants considered normal showed good uniformity. They were devoted to the increase of material. The others considered hybrids were used for crossings within the lines or by longer cycled commercial varieties. The purpose of this process was to look for fertility restoration genes and to get at the same time longer cycled material so as to increase the seed production limited by the earliness of the original material with good possibilities for some southern regions of our country.

The material obtained in 1970 was sown in the experimental field at the usual season in november of the same year (fig. 1). A careful fertility observation was practiced in F₁ among plants out of the type, considered hybrids, crossed to commercial varieties. Fertile plants were found in only one crossing.

Over 38 plants coming from a sterile head of a hybrid type plant from the 1367 A line, crossed by a plant from Pehuén INTA variety,

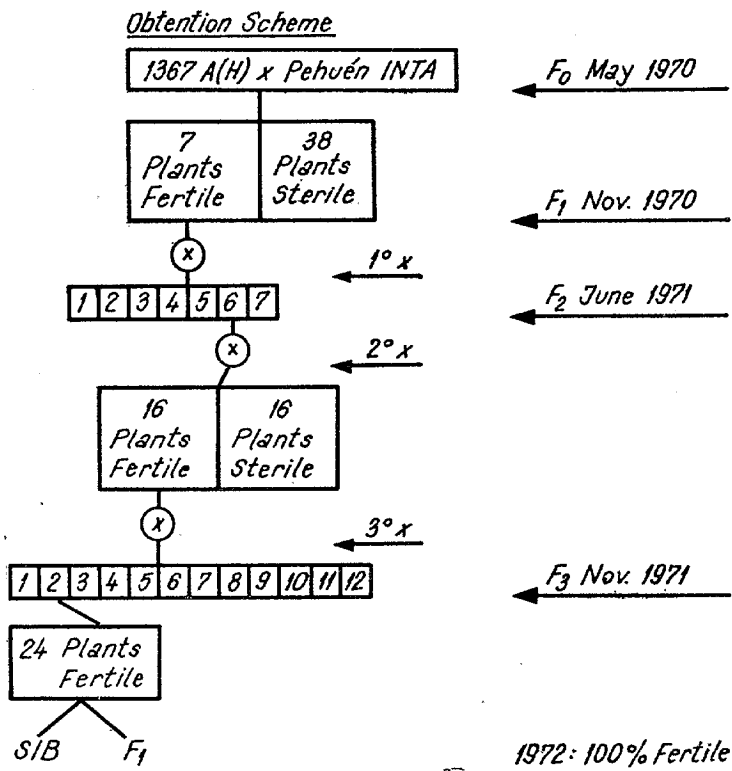


Fig. 1 — The working scheme for Rf screening.

7 plants were fertile and were selfed. The other 2 lines 1365 A and 1366 A which were also crossed with the same variety gave only sterile plants.

The Pehuén INTA variety was registered in 1969. Two Russian varieties VNIIMK 8931 and 6540 and two lines resistant to races 1 and 2 of *Puccinia helianthi*, CA 3-R originated in Pergamino and 119-2 of Canadian origin, were included in its pedigree. The above named rust resistance lines owe their resistance to the Canadian line 953-102-1-122.

The selfed plants in the F₁ of 1970 were sown in a greenhouse in June 1971. It was observed in the F₂ that most of the progenies segregated for fertility in the proportion 1 : 1 (50% fertile — 50% sterile). All fertile plants were selfed and the obtained progenies studied in F₂. The best progenies segregated exactly 1 : 1.

All the material was sown in the experimental field in 1971. In general, the progenies in F₃ remarkably increased the fertility proportion. Most of them varied from 85 to 95%. The 43% of lines gave 100% fertility, though some of them had very few plants.

In the F_2 progeny, which was selected for the main agronomic characteristics, only 2 out of 12 heads chosen segregated small proportion of sterile plants. The other 10 plants gave 100% fertility.

As the plant vigour was considerably reduced compared to the F_2 , sibs were done for maintenance, gathering pollen from 5 plants and pollinating the best 5 sterile ones. With such a pollen mixture, several crossings were done, to verify the fertility in F_1 , using sterile lines as mothers. In 1972, the fertility in F_1 was 100%. This line was named AGP70-20-6-2-5.