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STUDY OF INHERITANCE OF TWO DIFFERENT TYPES OF BRANCHING IN SUNFLOWER (*H.Annuus* L.)

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SUMMARY

Two sunflower lines possessing two different types of sunflower branching and one line of non-branching type were included in the study. The aim of the study has been to find the mode of inheritance of branching.

According to the results produced, the different types of branching are controlled by different genes in a different position. The non-branching type appears as prevailing. This result favours the use of branching as a basis for fertility restorer lines in hybrid seed production.

Key words: Sunflower, inheritance, branching.

INTRODUCTION

The great structural diversity of sunflower plants is subject to investigation by many researchers. The study of plant branching is important not only from a theoretical point of view, but is of importance for production of hybrids seed. Putt (1964) and Hockett (1970) reported for different dominant recessive relations of the genes determining the branching. Brigham (1988) reported his observations on branching. Liu (1988) also made studies on the same type of branching. Miller (1982) summarized that branching in the wild sunflower is determined, in some cases, by dominant genes, while in the cultivated sunflower the branching type is determined mainly by recessive genes. The aim of the present study was to determine the mode of inheritance of one type of basal branching as compared with another type of branching and non-branching.

MATERIAL AND METHODS

In 1987 at the experimental fields of IWS "Dobroudja" General Toshevo several plants with two basal branches emerging from the main stem were selected, isolated and self-pollinated (Fig.1). The side branches are almost equal, symmetrical and slightly shorter in size compared with the main stem. These materials, after a three-year self pollination, have remained uniform which allowed to include them in the present study. The type of branching was called "B". In 1990, the line 294 R produced by these materials was crossed with two different types of plants:

- line L-2052 - a non-branching type of the stem (Figure 2)
- line Z-20 - with branching at different levels of the stem, called "A" (Figure 3)

Reciprocal crossing between the line 294 R and the hybrid 294 R x Z-10 was made. Observations were conducted on the plants in the F1 and F2 crosses between the lines: 294R x Z-10; 294RxL-2052 and Z-10xL-2052. The criterion X2 was determined.

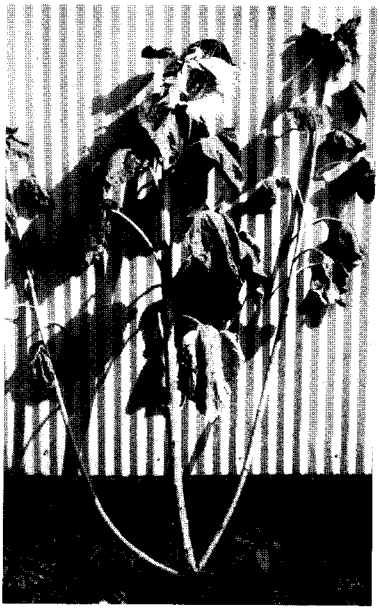

Figure 1.

Figure 2.

Figure 3.

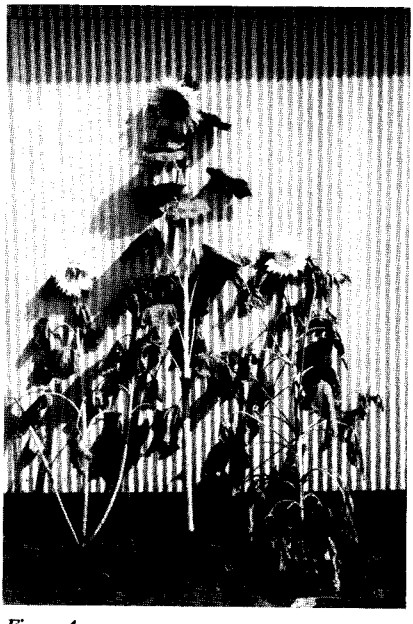

Figure 4.

Figure 5.

RESULTS AND DISCUSSION

All plants from F1 of the three crosses have been of non-branching type (Figure 4 and Figure 5). After self pollination of F1 plants, the distibution on the character "branching" was as following in F2 plants:

1. Non-branching plants, branching plants od the "A" type and branching plants of the "B" type in correlation 136:64:48, were produced in the F2 cross Z-10x294R. X2 was 4,38 and $0,05<p<0<01$.
   In the reciprocal crossing of 294 R line with hybrid 294 R x Z-10, the distribution was 96 plants of the "B" type and 126 non-branching plants. X2 was 4,12 and $0,20<p<0.10$.
2. In the cross of 294 R with L-2052, in F2, the distribution was 185 non-branching plants and 47 branching of the "B" type. The criterion X2 was 2,08; $0,20<p<0,10$.
3. In the cross of Z-10 x L-2052, in F2, the distribution was 191 non-branching plants and 47 branching of the "A" type, $X2=3,54$ and $0,10<p<0,05$.

From the obtained results it is evident that the two types of branching, "A" and "B", are controlled by different recessive genes. They make the expression of branching types ("A" and "B") possible only in the homozygous recessive state.

CONCLUSION

The presence of different types of branching is favorable for hybrid seed production, especially when they are controlled by recessive genes. In the "A" type, which has many side branches, the pollen is provided for a long time, but in the plants of this type the side heads are smaller and with smaller seeds than the heads and seeds of the non-branching plants. The plants with branching of the "B" type are also more suitable for genetic studies because of the larger heads and seeds.

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ESTUDIO SOBRE LA HERENCIA DE DOS TIPOS DISTINTOS DE RAMIFICACION EN GIRASOL (*Helianthus annuus* L.)

RESUMEN:

Dos líneas de girasol con dos tipos diferentes de ramificación y una línea sin ramificación fueron incluidas en este estudio. El objetivo del estudio ha sido estudiar el tipo de herencia de la ramificación.

De acuerdo con los resultados obtenidos, los diferentes tipos de ramificación están controlados por diferentes genes en distinta posición. El tipo no ramificado aparece como dominante. Estos resultados favorecen el uso de ramificación en las líneas restauradoras en la producción comercial de híbridos.

ETUDE DE L'HÉRITABILITÉ DE DEUX DIFFÉRENTS TYPES DE BRANCHING CHEZ LE TOURNESOL (*Helianthus annuus* L.)

RÉSUMÉ:

Deux lignées de tournesol caractérisées par deux types de branching et une lignée non branchue ont été incluses dans cette étude sur l'héritabilité de ce caractére.

Selon nos résultats, les divers types de branching sont contrôlés par différents gènes sur différents sites. Le type non branchu est apparu prévalent. Cette observation confirme l'intérét de l'utilisation du branching chez les restaurers de fertilité pour la production de semences hybrides.