

# Rate of Hybridity Required for Full Exploitation of Heterosis in Hybrid Varieties of Winterrape

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The newly proposed economic reform package of the EEC, named AGENDA 2000, is a threat to winterrape growers all over Europe. The expected decline of payment support on farmers' oilseed areas will violently reduce the economic advantage of rapeseed productions and cut back winterrape acreages in Europe. In this situation, the success of the first hybrid varieties of winterrape provides a token of confidence to the domestic oilseed growers. The heterotic yield advantages of hybrid varieties will care for some compensation or at least moderation of the expected economic losses in the forthcoming years.

Several hybrid systems have been developed in oilseed rape and the first hybrid varieties are now under seed production. A preliminary decision of the EEC proposes that the Certified Seed of hybrid varieties of rapeseed shall exhibit a minimum of 90% hybridity regardless which hybrid system is used. On this basis, "composite hybrid varieties" lacking genetic fertility restoration, are allowed within their 70% to 80% sterile hybrid plants to contain a portion of at least 63% "real" hybrids plus the required fertile pollinator plants. On the other hand, "restored hybrid varieties", which do not require pollinators for their fertilization, according to EEC regulation must contain a minimum of 90% hybridity.

Seed production of the restored MSL-hybrid varieties during the last three years indicated that a sterility of 98% tolerated in the Basic Seed of the sterile mother line may result in variable hybridity rates in the final Certified Seed. Dependent on weather conditions during flowering time the fertiles which remained in the Basic Seed may cause rather different rates of undesired cross pollinations. Since the final hybridity of the Certified Seed is effectively influenced by the prevailing weather conditions and, therefore, hard to predict, hybridity rates lower than 90% may be borne in Certified Seed lots of these hybrid varieties. Notwithstanding, high grain yields have been harvested in large scale farmers' fields of these hybrid varieties in 1997 confirming their superior performance potential.

In the following report of H.C. Becker and coauthors the question of heterotic yield advantage in rapeseed varieties in dependence of their hybridity has been investigated intensively in yield trials at 7 locations over 2 years. In order to obtain accurate estimates, dihaploid (DH) lines were experimentally mixed with their pertinent F<sub>1</sub>-hybrids in different rates ranging from 100% DH and 0% F<sub>1</sub>-hybrids to 0% DH and 100% hybrids. The results confirmed the findings made in farmers' fields: It was found that the yield of the mixed populations did not increase in a straight line with an increasing hybrid fraction. The maximum yield was obtained already with a rate of about 50-75% hybrids and not only in plots of pure 100% hybrids.

Consequently, yield potential of the restored MSL-hybrid varieties will not be impaired by their actual hybridity unless it is significantly lower than 75%. Likewise, composite hybrids will secure their full yield with a rate of hybrids between 70% and 80%. The Canadian hybridity standard for Canola hybrid varieties correspondingly has been fixed at a minimum of 75%. In conclusion, farmers in Europe can be certain that MSL hybrids will realize their full yield potential under all given conditions. A limited number of non-hybrids in the Certified Seed unavoidable at seed production, does mean no lack of seed quality. It is rather the "brand mark" of the breeder.