CONTROlLED heterosis as a method of forage crop improvement is receiving increased attention by forage crop breeders. However, most forage crops with their small perfect flowers, few seeds per flower, and high seeding rates (number of seeds required per acre) do not lend themselves readily to controlled hybridization on the extensive scale required for a commercial hybrid program. Consequently, the economical production of commercial F₁ hybrid seed has been the major obstacle in this method of breeding. That this obstacle is not insurmountable is evidenced by the many possible solutions that have been proposed by plant breeders working with this problem.

Karper and Quinby (2), for example, have suggested the use of bulk emasculation with hot water, or the utilization of "antherless" or male-sterile abnormalities to facilitate the production of hybrid sorghum seed on a commercial scale. Stephens (3) has offered a detailed plan for producing hybrid sorghum seed, using the recessive male-sterility factor. The suggestion that mass emasculation in wheat might be accomplished by chilling was mentioned by Suneson (4) in 1937. Atwood (1), working with Trifolium repens, has isolated genes for self-compatibility and self-incompatibility and has considered the possibility of using these genes in the production of F₁ hybrid seed.

A thorough consideration of this problem and a method for producing hybrid alfalfa seed was presented by Tysdal and Kiesselbach (5) in 1944. In addition to the elements just mentioned, they considered competition as a factor in determining the yields obtained from hybrid seed, which, according to their plan, would carry a certain percentage of selfed or sibbed seed from the parent plants. When they compared the yield performance of Ladak alfalfa and a low-yielding inbred with mechanical mixtures of the two varieties, they found that the mixtures yielded more than might be expected. Those results caused them to conclude that, "It would apparently require a relatively high percentage of selfing in order to detract greatly from the hybrid yield".

Studies begun with pearl millet in 1936 soon revealed that this annual grass was highly cross pollinated and lost vigor upon selfing. The increased yield shown by certain hybrid combinations indicated that the maximum yield in pearl millet could be obtained in the F₁