The Polycross Progeny Performance as an Index of the Combining Ability of Alfalfa Clones

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Maximum improvement in alfalfa and other cross-fertilized forage crops can only be attained by utilizing high combining ability between the components of the ultimate commercial product. To reach this objective, two elements are necessary. First, a method of selecting the high combining components, and second, a method of utilizing this superior combining ability in a commercial product.

In the case of alfalfa, it is believed that high combining ability can be utilized by the production of either hybrids or synthetic varieties. Single-cross hybrid alfalfas have been produced on an experimental scale by interplanting relatively self-sterile clones of two selected plants in isolated field crossing blocks. Under natural conditions, the resulting progenies have been more than 95% F₁ hybrids. These single-cross hybrid alfalfas have been tested under field conditions and the better ones have been found higher yielding in forage and seed and more resistant to diseases and insect pests than commonly grown varieties.

If it is found not to be economical to produce single-cross hybrids by the vegetative propagation of the two plants making up the hybrid, there is still an opportunity to utilize high combining clones in a synthetic variety. A synthetic variety may be defined as a variety that is developed by crossing, composting, or planting together two or more strains or clones, the bulk seed being harvested and replanted in successive generations. By natural intercrossing the strains or clones are "synthesized" into a new variety. A synthetic variety can be increased through successive seed generations so long as the desired characteristics of the variety are retained. Evidence is accumulating which indicates that superior synthetic varieties can be produced through the utilization of high combining clones.

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