GENETICS OF SELF-COMPATIBILITY IN
TRIFOLIUM REPENS

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Of fundamental importance to the breeding of any species is a practical means of obtaining inbred lines. With self-compatible plants relatively few difficulties have been encountered in obtaining inbreds, but with species in which the plants have been self-incompatible, the progress of inbreeding generally has been retarded. When attempts were made in white clover to obtain inbred seed by self-pollination, it was found that most plants set very few seeds per head under the conditions tested (7, 5, 2). A few individuals have been found with relatively high pseudo-self-compatibility (3), but several difficulties have been encountered in utilizing this character in a breeding program. Any method, genetic or otherwise, that would assure true self-compatibility would seem to offer considerable promise. Genetic factors for such true self-compatibility have been found in several other species, and there seemed no reason to suspect that similar factors might not be found in white clover. The literature on incompatibility factors in other species has been reviewed recently by Stout (6).

MATERIALS AND METHODS

The original female parent of the plants used in this investigation was the same plant that was used in a previous study of cross-incompatibility (1) in which the genetic constitution of the plant as regards incompatibility alleles was shown to be $S_1S_4$. The male parent came from a seed lot collected in a closely grazed pasture in Preston County, W. Va. These plants were crossed by hand in the greenhouse during the winter of 1938-39, and the $F_1$ and $F_2$ generations were planted in the field in 1939 and 1940, respectively. Selections for greenhouse study among both $F_1$ and $F_2$ generations were made during their first summer in the field, but the plants were not self-pollinated in the field until their second summer when they flowered profusely. The main bases for selecting among both $F_1$ and $F_2$ plants were general vigor, good flowering, and absence of disease, wherever possible. The technics used for both self- and cross-pollination were the same as those described previously (2).

EXPERIMENTAL RESULTS

The plant used as female parent was described before (1) as being practically self-incompatible, but during the years of this investigation this same plant showed moderate pseudo-self-compatibility (Table 1). No explanation for such inter-annual variation is available at present, but other evidence has indicated that pseudo-self-com-