Polycross Performance in Sudan Grass and its Possible Significance

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SUDAN grass breeders in the United States have made notable progress in altering many characteristics of this important annual pasture grass. Karper and Quinby transferred the genes for sweetness, sienna glume color and some of the genes for disease resistance from Leoti sorghum to develop Sweet Sudan. From crosses and backcrosses involving the same parents, Burton selected Tift Sudan characterized by high resistance to many of the foliage diseases that attack this grass. Wisconsin workers, Hogg and Ahlgren (4), made progress lowering the prussic acid in Sudan grass. Out of a doublecross involving Tift Sudan and low HCN selections out of lines from Texas and Kansas, D. C. Smith, H. L. Ahlgren, and J. M. Sund selected Piper Sudan, carrying a low level of cyanogenetic glucoside and good disease resistance. When compared with common Sudan in forage yield trials, however, these varieties often produce no more dry matter and sometimes yield less. This is particularly true in the absence of some of the foliage diseases that affect yields noticeably.

A review of the literature (2) reveals that inbreeding is usually accompanied with some loss in vigor. Most studies indicate that by careful selection and recombination of selected lines, it may be possible to develop lines as vigorous as the common open-pollinated variety. It seems highly improbable, however, that vigor can be increased appreciably except as some method of utilizing the \( F_1 \) hybrid on a commercial scale may be found. In an effort to throw some light on this question, the following study was begun.

MATERIALS AND METHODS

In 1951, forty-five inbred lines of Sudan grass developed by C. L. Lefebvre (while associated with the Division of Forage Crops and Diseases, Beltsville, Md.) were planted in a polycross nursery at Beltsville, Md., as follows: Single hills of each inbred line were planted, and the \( F_1 \) hybrid was selfed.