RESPONSE OF COTTON VARIETIES TO PRE-EMERGENCE CIPC ON PIEDMONT SOIL

In Louisiana and Arkansas experiments on the response of cotton varieties to pre-emergence herbicides there were no marked differential effects. Since the action of chemicals on weed seed varies widely with different soils and climatic factors, it is possible that varietal responses also may be quite different. Consequently, experiments were conducted during 1957 and 1958 at Athens, Georgia, on Cecil clay loam to determine possible variety × herbicide interactions under Piedmont Plateau conditions.

Eleven varieties and strains were used as follows: Austin, Z106, SUD37, Pope, Coker 100W, SUD43, M8948, Pima S-1, Brazos, Plains, and Empire. Isopropyl-N-(3-chlorophenyl) carbamate (CIPC), the only pre-emergence herbicide recommended for cotton in Georgia, was applied at rates of 12 and 24 pounds per acre (recommended dosage is 6 to 9 pounds per acre) in an attempt to appraise critically differentially varietal responses and to determine the effects of overdosage. A split-plot design with 4 replicates was used with rates of CIPC (0, 12, and 24 pounds per acre) as whole plots and varieties as sub-plots. Applications were made with a calibrated experimental plot sprayer after the cotton was planted. In 1957, the cotton plants were pulled, counted, and weighed 4 weeks after emergence. In 1958, initial counts were made; then the plants were thinned to a uniform stand and grown to maturity. In both years, untreated plots were hand weeded. In 1957, percentages of germination were 66, 65, and 61 following the 0, 12, and 24 pounds per acre CIPC applications, respectively. Average plant weights were 1.2, 1.2, and 1.0 g, respectively. The F values for stand and green weight as affected by CIPC were significant, but no significant variety × herbicide interaction occurred. Yield reductions in this study appeared unlikely. In 1958, germination of cotton seed again was reduced by CIPC, particularly at the 24 pounds per acre rate. Although the F value for the variety × herbicide interaction was not significant, the varieties Austin, Coker 100W, and Empire showed a trend toward reduced stands following treatments with CIPC at 24 pounds per acre. Average over-all yield was not decreased by CIPC at any rate used.

These results indicate that yield reduction caused by differential cotton varietal response to pre-emergence applications of CIPC on Piedmont soil is not probable even if 3 to 4 times the normal dosage is used. Furthermore, the somewhat reduced stands induced herbicidally in 1958 were not reflected in final average yields, which emphasizes the relative safety of CIPC for farm use.—J. B. Weaver, JR., formerly Assistant Agronomist, College Experiment Station, Athens, Ga., and Ellis W. Hauser, Research Agronomist, Crops Research Division, ARS, USDA, Experiment, Georgia.

CROSS-COMPATIBILITY OF ANNUAL AND PERENNIAL RYEGRASSES WITH TALL FESCUE

The possibility of combining desirable traits of ryegrass and the fescues, meadow (Festuca elatior L.) and tall (F. arundinacea Schreb.), has received sporadic attention at several experiment stations in the United States and abroad. Although intergeneric hybrids have been obtained, further selection has been limited because of sterility and the small number of hybrids available for study. Most hybridization studies have involved emasculation and various types of pollen transfer, but White obtained hybrids by enclosing unemasculated inflorescences of Lolium perenne L. with panicles of Festuca pratensis Huds.

Information obtained by Beddows and Crowder was used in developing the methods used for this study. Beddows reported that the ryegrasses were largely self-sterile, while Crowder found that the panicule-type inflorescence of fescue was dominant to the spike-type ryegrass inflorescence. The technique adopted involved the pollination of unemasculated ryegrass spikes with tall fescue pollen on detached panicles. Tall fescue served as the male parent with the inflorescences being placed above those of the ryegrass. Prior to flowering, 4 spikes of ryegrass were placed in a 35-pound parchment bag together with one detached panicle of tall fescue. The tall fescue culms were kept in vials of water throughout the pollination period. The stems of both parents were wrapped with cotton and the bags fastened securely around the cotton; then each bag was tied to a stake for support. Four parchment bags were placed on each maternal parent; therefore 16 ryegrass spikes and 4 detached tall fescue culms were needed for each cross. The tall fescue culms were removed from the bag when pollination was complete. Seed from each ryegrass parent was labeled, kept separate, and planted in sterilized soil.

In 1953, 19 annual and 10 perennial ryegrass plants were crossed with tall fescue. Seed was planted in the fall and the progenies were observed when in bloom the following spring. Plants with panicule-type inflorescences were removed as F1 hybrids; hybrids of ryegrass × tall fescue. Twenty-one hybrids were obtained from the annual ryegrass × tall fescue crosses, and one hybrid was obtained from the perennial ryegrass crosses. The range in viable hybrid seed produced per plant from the annual ryegrass was 0 to 5. Although the total number of plants in this study was relatively small, the number of hybrids obtained from the annual ryegrass parents as compared with those from the perennial parents suggests that tall fescue is more compatible with annual than with perennial ryegrass.

In 1957, 25 annual ryegrass plants were pollinated with tall fescue in an effort to obtain additional F2 hybrids.

1 Cooperative investigations between the Crops Research Division, ARS, USDA, and the Kentucky Agricultural Experiment Station. The investigation reported in this paper is in connection with a project of the Kentucky Agr. Exp. Sta. and is published with approval of the Director.
