Comparative Standing Ability and Yield of Variety Blends of Oats

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LODGING in oats, *Avena sativa* L., is one of the limiting factors in the use of higher soil fertility to increase production. Varieties are most susceptible to lodging just before and at the heading stage. Experiments were designed to test the hypothesis that blends of 2 varieties, differing in maturity, would be less subject to lodging during storms since usually no more than 50% of the plants would be in the most susceptible stage for lodging at any given time and would receive some support from the second variety. There was also a possible advantage from blending varieties differing in height or in type of straw strength. Improvement from blends must finally be compared with the improvement possible from breeding with the available materials.

Bartel (1) compared the breaking strength of straws of wheat from before heading to maturity. Straw strength decreased rapidly for all varieties beginning 6 days before heading and continuing 10 to 14 days and then increased slowly over the next 10 days.

Intra-varietal diversification in oats was proposed by Jensen (4) on the theoretical grounds that multiline varieties should possess broader protection against diseases and have broader adaptation than single line varieties. He suggested combining a number of lines similar in height, maturity, and appearance but differing in certain genetic factors, especially resistance to diseases. He reported combinations of six oat varieties in pairs and all together. Yields of these mixtures were generally similar but not statistically superior to the average of the varieties when grown separately.

Borlaug (2) reported four multilineal wheat varieties in the process of development for protection against stem rust losses in Mexico. Lines within a variety differed in rust resistance but were similar agronomically.

Browning (3) reported that yield of the blend of Clintland and Mo. 0–205 oats exceeded the mean of the 2 varieties grown in pure stands during an epidemic of race 7 of stem rust, to which Mo. 0–205 is resistant and Clintland susceptible. Less rust developed on Clintland plants in the blend than in pure stands. In one year the stiff-strawed Clintland supported the higher yielding but weak-strawed Mo. 0–205 variety.

Probst (5) using variety blends in soybeans in the absence of diseases found that in general the blends were not superior in yield to the highest yielding variety in a blend but had a stabilizing effect on variety × year interactions. The latest maturing variety in the blend averaged 0.2 to 2.7 days earlier than the same variety in pure culture. Lodging of a blend was similar to the most lodging-susceptible variety in the blend.

MATERIALS AND METHODS

Six varieties of spring oats were compared when grown alone and as equal blends of 2 varieties in all combinations in nursery yield trials at Lafayette, Indiana, during the 4 years, 1956–59. A completely randomized design with 4 replications was used. Each plot consisted of four 7½-foot rows 1 foot apart with the center 2 rows harvested for yield. Seed of the varieties was tested for germination in soil in the greenhouse and a seeding rate of 35