ON many farms in the Northeast problems have arisen in the establishment of smooth bromegrass, *Bromus inermis*, Leyss. In some cases poor stands of seedlings have been obtained; in other cases, a sufficient number of plants were obtained, but these were small and 2 years or more were necessary from the time of seeding until a well established sod was developed.

Published results from investigations on seeding establishment with forage species (2, 3, 4) have indicated differences among them in emergence when seeded at various depths under different soil conditions. Detrimental effects of a companion crop on small seeded grasses and legumes may result from competition for light during a wet season, or competition for moisture during a dry season (5, 6). No published information was found on the effects of a companion crop on bromegrass seedlings seeded in the spring. One trial (1) indicated that oats seeded with bromegrass on September 27 had little effect on hay yields the following year but with a late seeding, October 12, oat stubble provided winter protection for the bromegrass seedlings, thus resulting in an improved stand and higher yields the following year.

Most of the work on seedling establishment of bromegrass has been done in the Midwest where this species has been extensively used. In the more humid Northeast where there has been increasing interest in bromegrass in association with alfalfa or Ladino clover for hay, grass silage, and pasture, the problem of obtaining vigorous stands has been encountered. Seeding bromegrass alone or with a legume is difficult. Thus oats are often used as a companion crop to carry the bromegrass seed through the grain drill. This procedure introduces two problems: one, placing the bromegrass seed too deep; the other, the competitive effect of the oats during the seedling stage.

To provide more information on these two problems, the investigations were conducted at State College, Pennsylvania, on soil classified as Hagerstown silty clay loam of moderate fertility. The treatments were randomized design with four replications in which the dates of the first sub-plots and strains of bromegrass were the second sub-plots. The land was harrowed shortly before the eight seeding dates: August 23 and September 20, 1944; March 30, May 2, June 8, and August 17, 1945; and July 14, 1946. The depths of seeding used were 1/4 inch, 1 1/2 inch and 2 inches. By placing a wide board across the plot and using its straight edge as a guide, furrows were opened to the proper depth as measured with a ruler. Three Achenbach strains were used on the first three planting dates. One hundred seeds of each seed lot were used to plant each treatment. In the treatments where a companion crop was used, oats were seeded at a rate of 1 1/2 bushels per acre in the same furrow and at the same depth as the bromegrass.

Several weeks after each planting date, counts were made of the number of seedlings which had emerged from all dates of seeding (Table 1). The combined dry weights of the stems and leaves of seedlings grown without a companion crop ranged from 4 to 17 times heavier than the corresponding parts of seedlings grown with a companion crop of oats. Similarly, seedling weights of the stems and leaves of bromegrass seedlings grown without a companion crop ranged from 4 to 5 times more tillers than those grown with a companion crop of oats. Similarly, seedling weights of the stems and leaves of bromegrass seedlings grown without a companion crop ranged from 4 to 5 times heavier than the corresponding parts of seedlings grown with a companion crop of oats. Similarly, seedling weights of the stems and leaves of bromegrass seedlings grown without a companion crop ranged from 4 to 5 times more tillers than those grown with a companion crop of oats.

Results

**EFFECT OF COMPANION CROP**

The companion crop of oats, harvested in 1945 at all dates of seeding (Table 1). The weights of the stems and leaves of bromegrass grown without a companion crop ranged from 4 to 17 times heavier than the corresponding parts of seedlings grown with a companion crop of oats. Similarly, seedling weights of the stems and leaves of bromegrass seedlings grown without a companion crop ranged from 4 to 5 times more tillers than those grown with a companion crop of oats.