Effect of Cutting Height on Turf Density of Merion, Park, Delta, Newport, and Common Kentucky Bluegrass

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Kentucky bluegrass, Poa pratensis L., is the major constituent in turf for northern portions of the United States. In recent years a small number of specific varieties have been selected from the diverse genotypes found in this species. The best known and most highly publicized of these is Merion, a single plant selection found on a golf course near Philadelphia, Pennsylvania. Merion's carpet-like resiliency and dark green color have won for it an enthusiastic following among those homeowners who will give it the required care. From the agronomic standpoint Merion's low, tight growth, even when mowed short, is a deterrent to weed encroachment. Engle (2) maintained a Merion turf at a cutting height of \(\frac{3}{4}\) inch that in the seventh year provided 80% of the turf cover while other strains had been destroyed to the extent that they provided only 15 to 40% of the cover (the remainder being weeds, clover, and invading grasses). Like all improved varieties, Merion has its limitations. It is a poor seed producer, thus making seed cost high. Although highly resistant to leaf spot (Helminthosporium vagans) it may be severely weakened by rust (Puccinia poae-suedicella) and mildew (Erysiphe graminis). In addition, Merion bluegrass establishes slowly because of its characteristic low seeding vigor.

The more recent release of a few new bluegrass strains, some of which do not evince all of the weaknesses of Merion, has led to the need for additional comparative evaluations. Since the ability to form a low dense turf is probably the principal virtue of Merion bluegrass, the purpose of this investigation was to compare the relative turf-forming qualities of Merion and other named bluegrass strains. Hanson (4) in "Grass Varieties in the United States" described six named bluegrass strains. Of these only Troy, a pasture variety, and Arboretum, a variety described as not outstanding in most tests, were omitted from this evaluation. One source of common Kentucky bluegrass was included.

LITERATURE REVIEW

Kuhn and Kemp (6) compared a low-growing and a tall-growing strain of Kentucky bluegrass and found that the short-growing strain when clipped either at approximately 1 or \(\frac{3}{4}\) inches produced strikingly more tops, roots, and rhizomes than the tall-growing one. A summary was made by Patterson (8) of performance tests in Washington comparing Merion, Newport, Delta, and three Pacific Northwest (PNW) selections. In density Merion and the PNW selections rated excellent, Newport good, and Delta fair. As to rhizome production, Newport and the PNW selections rated excellent, Merion good, and Delta poor. Delta and the PNW selections were graded excellent in seedling vigor as compared to a poor rating for Merion and Newport. Goss,\(^1\) also at Washington, describes Delta and Park as having considerably lower surface density than Merion, Newport, and several PNW selections. During two field seasons Merion in his tests was the only strain that produced a low shoot yield and Park and Delta were the only bluegrasses that produced low root yields. He found no true positive correlation between shoot and root production. Davis (1) found Merion better able to resist invasion by bentgrass and weeds than Park and common bluegrass. He attributed this result to the denser sod of the Merion strain. Under Minnesota conditions Thomas (9) reports Park makes a tougher, more durable sod than Merion bluegrass. Wood (10), in Vermont, found Merion formed a denser sod than common Kentucky bluegrass.

EXPERIMENTAL PROCEDURE

Merion, Newport, Park, Delta, and common \(^1\) bluegrasses were planted in the greenhouse on October 12, 1959. The seedings were made in sand in clay pots \(6\frac{1}{2}\) inches in diameter and \(6\frac{1}{2}\) inches deep at the rate of one pound per 1,000 square feet. The seed was covered with approximately \(\frac{1}{4}\) inch of finely ground peat. Three replications in a randomized block design were used to evaluate the effects of 3 cutting heights, namely, \(\frac{3}{4}\), 1, and \(1\frac{1}{2}\) inches. The pots, a total of 45 in number, were buried in the moist gravel of the greenhouse bench to a level of \(\frac{1}{2}\) inch from the top. Optimum fertility was maintained by applying to each pot 8 fluid ounces of a commercial liquid fertilizer made up from salts analyzing 23-21-17 plus minor elements. The fertilizer solution was applied weekly and the cultures watered daily or as needed to maintain an optimum moisture level.

Evans (3) in experiments with Kentucky bluegrass has shown that under a long day bluegrass shoots grow upright and under a short day they are decumbent. In accordance with his findings and particularly to facilitate clipping, an 18-hour day was maintained throughout the experiment by means of 300-watt incandescent flood lamps. Clipping of the grasses at the designated cutting heights of \(\frac{3}{4}\), 1, and \(1\frac{1}{2}\) inches was begun on February 10, 1960, when all were well established, and continued at weekly intervals until the conclusion of the experiment. The final harvest was made on May 14, 1960, at which time the sand was carefully washed from the roots and rhizomes over a \(\frac{3}{4}\)-inch mesh screen with a rapid stream of water. The entire top growth was clipped away from the roots and rhizomes and the rhizomes were removed from the roots. Oven dry weights were obtained for all three fractions.

RESULTS AND DISCUSSION

The influence of each of the three cutting heights on greenhouse yields of roots, rhizomes, and top growth of common and the four bluegrass strains is shown in Table 1. These results were obtained upon completion of 13 weekly clippings. Top growth as shown here includes the accumulated weekly clippings at the three cutting heights plus the final harvest of the entire top growth (obtained by clipping all cultures at the junction of roots and tops).

It was surprising that increases in severity of cutting treatment did not always result in a decrease in the production of roots, rhizomes, and tops. A possible explana-

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\(^1\) Seed lot consisting of a mixture made up from seed grown in North Dakota, South Dakota, and probably Nebraska.

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