

WATER USE RATE EVALUATIONS AMONG KENTUCKY BLUEGRASS CULTIVARS

Water use rate is defined as the total amount of water required for turfgrass growth plus the quantity lost by transpiration and evaporation from soil and plant surfaces. The water use rate reflects the quantity of water that is lost from the turfgrass plant over a period of time. If this specific amount is not replaced through normal precipitation it must then be provided by means of irrigation. Otherwise the turf will suffer wilt and possibly death by moisture stress. The increased concern for efficient water usage and the regulations limiting lawn irrigation in urban areas have resulted in the need to assess the water use rate of turfgrass species and cultivars. The objective of this particular series of experiments was to determine the comparative water use rates of a series of Kentucky bluegrass cultivars. Are there inherent genetic differences in the use of water among these cultivars? This is significant in terms of minimizing irrigation requirements and maximizing the water available through precipitation.

The experiments were conducted in a climatically controlled wind tunnel apparatus having a wind velocity of 4 mph, a constant temperature of 90° F, and a relative humidity of 30%. Four inch sod plugs were collected from the field plots, placed in a growth chamber under controlled conditions for a three week period, and then placed in the wind tunnel for a period of 12 hours. The weights of the plugs were measured before and immediately after removal from the wind tunnel. The plugs were then dried, weighed, and the difference determined as a measurement of water loss.

Table 2. Comparative water use rates of 17 Kentucky bluegrass cultivars.

Very low	Low	Intermediate	High	Very high
Prato	Pennstar	Merion	A-34	Sodco
Cougar	Park	Galaxy	Newport	Sydsport
Delta	Nugget	Monopoly	Fylking	
Kenblue	Windsor	Baron		

The comparative water use rates of 17 Kentucky bluegrass cultivars are compared in Table 2. Significant differences were found in the water use rate among these bluegrass cultivars. Ranking very low in water use

rate were Prato, Cougar, Delta, and Kenblue. In the low category were several of the improved Kentucky bluegrass cultivars including Pennstar and Nugget. In contrast, Sodco and Sydsport ranked very high in their water use rate while A-34, Newport and Fylking ranked in the high category. The results of these experiments indicate that there are differences in water use rates among the Kentucky bluegrass cultivars and that one might wish to consider this factor when selecting the particular cultivars to be included in the Kentucky bluegrass blend. Finally, a brief mention might be made that the water use rate of turfgrasses may also be manipulated through certain cultural practices. In general, the water use rate is lowered as (a) the cutting height is lowered, (b) as the nitrogen fertility level is decreased, (c) as the irrigation rate and frequency is decreased, and (d) when the turf has been subjected to a serious disease attack.

FACTORS ASSOCIATED WITH THATCH ACCUMULATION

This series of experiments is being supported by a grant from the O. J. Noer Research Foundation. The primary objective is to investigate the factors contributing to minimum thatching of turfgrasses. This information can then be utilized by turfgrass breeders to select for minimum thatching cultivars early in the breeding program. Two aspects of this research will be reported in this paper.

A Merion cultural-thatch study was initiated in 1962 with the objective of evaluating a whole range of Kentucky bluegrass cultural systems to determine which ones would result in the minimum thatching tendency. The specific cultural treatments included (a) cutting heights of 1 and 2 inches, (b) clippings removed versus return, (c) an annual dethatching versus none, and (d) annual nitrogen fertility levels of 4, 6, 8, 10, 12, and 14 lbs. per 1000 sq. ft. These cultural treatments were combined in all possible combinations in a split, split, split plot arrangement of four replications.

Thatch measurements made in the fall of 1972 revealed no significant difference in thatch accumulation from any of the cultural systems included in the study. However, if one steps outside the immediate plot area there is a significant thatch accumulation evident. The only differential between this and the Merion cultural-thatch study is that no pesticides have been applied to the experimental area whereas the adjacent alley received chlordane applications in 1963 and 1966. This observation leads one to conclude that the activity of earthworms and other small animals in the Merion cultural-thatch study area was sufficient across all cultural systems, including cutting heights of 2 inches, clippings returned, no dethatching, and nitrogen fertility levels as high as 14 lbs. per 1000 sq. ft., that no thatch formation resulted. These observations suggest that turfgrass areas receiving insecticide applications which control earthworms are much more prone to thatch accumulation.