Differential Sensitivity of Turfgrass Organs to Water Stress

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The effect of environmental stress on the growth and physiology of grasses adapted to turf is gradually becoming recognized as a major factor in their culture. The recovery by Kentucky bluegrass from heavy use and production of both tillers (intravaginal branches) and rhizomes (extravaginal branches) has made it the most widely used cool-season species adapted to turf culture. The production of tillers and rhizomes, however, by cool-season perennial grasses is minimal during periods of water stress, and their recuperative and sod-forming characteristics are diminished.

Overall plant growth is sensitive to water stress and has been proposed as a measure of plant tolerance to water stress. Also, the various organs of a plant may differ in their sensitivity to water stress. The concept of relative growth may be useful for comparing differences among plant organs.

Water stress often increases root:shoot ratios and the increase usually is related to a decrease in shoot growth. The vegetative shoot of Kentucky bluegrass includes all organs except roots: i.e., leaves, crowns, tillers and rhizomes.

Research at Iowa State University was initiated with Merion Kentucky bluegrass to determine the effect of water stress on lateral bud (axillary) development into tillers and rhizomes and to determine the relative growth of the various organs of the plant.

Results are reported as follows:

- Lateral bud meristems (axillary) were most sensitive to increases in osmotic pressure.
- The decrease in lateral bud development subsequently resulted in a decrease in tiller and rhizome numbers.
- Relative growth rates of various organs of Kentucky bluegrass further established that shoot dry-matter loss in response to water stress was due primarily to decreased tiller and rhizome growth.
- The effect of increasing osmotic pressure had relatively similar and less severe effects on leaf and root growth.
- Increase in root:shoot ratio of water stressed Kentucky bluegrass is due primarily to a decrease in relative growth of tillers and rhizomes.

"Oktoberfest Time"

Oktoberfest! You make Our Day,
  Goodbye Drought and Hot Summer Play.
Welcome Fest, cool beer and relaxation,
  While Hot Summer's on It's vacation.
Surprising! what Man and Plant can survive,
  Super-stress and Toasted alive.
Superintendent's and Super-turf,
  Have done the Golf Course Proud,
They've Earned much Praise!
  And I would like to Shout it Loud.

Kenneth R. Zanzig