Turfgrass research review

by Dr. James B. Beard

How compaction affects turf

COMPACTION AND WEAR OF TURFGRASSES.
W. E. Cordukes. Greenhouse-Garden-Grass 6(3). 1967. (Plant Research Institute, Ottawa, Ontario, Canada).

From 1965 to 1967 studies were conducted to assess the compaction affects on typical turfs of eastern Canada. Five mixtures containing combinations of either Merion or Common Kentucky bluegrass with Pennlawn red fescue or Norlea perennial ryegrass were established in the fall of 1962 on a sandy loam soil. Compaction was achieved using a modified aerifier equipped with 16 metal shoes. The two compaction treatments involved 10 or 50 passes by the compaction machine over an area 3 feet wide by 20 feet long. The compaction treatments were applied at various intervals during the year (spring, summer and fall) to simulate varying seasonal compaction affects. Also, evaluated were four renovation procedures which involved combinations of irrigation, fertilization, aeration and vertical slicing. Observations made included evaluations of turfgrass injury, weed invasion, bulk density of the soil, capillary pore space, water percolation rate and quantity of rooting.

Following the compaction treatments the area showed visible wear with the grass becoming brown and eventually thinning. The soil was obviously depressed as a result of the compaction. Subsequently, the area was invaded by dandelion and common plantain. Seasonal compaction treatments increased the soil density by approximately 6 per cent and reduced the total pore space by 6 to 12 per cent. Compaction also resulted in a reduced rate of water percolation and decreased the total quantity of roots in the upper 6 inches of the root zone.

Eventually, the compaction treatments were discontinued and the area was permitted to recover. Full recovery in terms of density of desirable species occurred within one year. Based on the soil density and total pore space determinations, no significant differences were found one year after the compaction treatments were terminated.

Aeration, vertical slicing, or a combination of the two, increased the rate of recovery from compaction. Merion Kentucky bluegrass recovered more quickly than common Kentucky bluegrass or Pennlawn red fescue. Ten compaction passes per day from July to October reduced the water percolation rate from 10 to 15 fold. *Comments:* The study reported above was conducted on a sandy loam soil. The degree of compaction, in terms of effects on soil density and pore space, would be even more severe on a clay soil. As a result, greater turfgrass injury would be expected as well as a slower rate of recovery. It is also evident that the turf is capable of recovery if not excessively compacted and if traffic is withheld for a period of time. In colder climates where the soil is subjected to the rigors of winter freezing and thawing, soil compacted can be alleviated to the extent that the soil density and pore space is corrected to the level present prior to the time the compaction occured.

OTHER REFERENCES OF INTEREST:

1. Ball-bouncing and ball-rolling as a function of mowing height and kind of soil have been studied at Weibullsholm B. Langvad. 1968. (from Weibulls, Landskrona, Sweden).

2. Controlled release nitrogen fertilization of turfgrass. C. R. Skogley and J. W. King. Agronomy Journal. 60:61-64. 1968 (from the Department of Agronomy and Mechanized Agriculture, University of Rhode Island, Kingston, R.I. 02881).

3. Bahia Grass. G. M. Whitton. Florida Turf. 1(2):1-6. 1968. (from the Florida Turfgrass Association, 4065 University Boulevard, North, Jacksonville, Fla.).

4. The effects of temperature and light on vegetative growth. V. B. Youngner. California Turfgrass Culture. 18(3):22-24. 1968 (from the Department of Agronomy, University of California at Riverside, Riverside, Calif. 92502).