Topdressing Crumb Rubber to Improve High Trafficked Turf Characteristics

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Topdressing plays many roles in enhancing the turfgrass environment. Among these benefits, include thatch control, smooth surface, modification of the surface soil and winter protection (1). Putting greens and sports fields profit from this maintenance practice, primarily because they are high traffic areas and the importance of a smooth and uniform surface. Specifically, soccer and football fields are subject to more abrasive action due to the nature of the games played on them. In most cases, a sand/organic matter mix or 100% sand will be used to promote qualities all ready mentioned. However, the most intensively worn out areas usually by mid-season are past the point of repair, and topdressing will not alleviate the problem. Additionally, sand has more abrasive edges, leading to scarification of the crown tissue area. This can be detrimental for the playing field due to intense traffic areas on the field becoming the most sparse areas or the least dense turf stand (Soccer and football fields have shown the most wear in between the hashmarks and the goal mouth and mid-field portions, respectively). The abrasive action of the sand can also be detrimental to turf in areas that are under reduced light conditions (e.g. shade) and subsequently reduced growing and recuperative conditions. This effect is magnified especially on low to medium maintenance sports fields. With the absence of turf, the playing quality and aesthetics are dramatically reduced which can ultimately lead to player injuries.

Topdressing crumb rubber, applied in the same manner as any other topdressing, can dramatically reduce the abrasive action caused by the nature of athletic activity. With an increase in surface area and rounder edges versus sand, the crumb rubber is able to cushion the crown tissue while still providing a smooth and uniform surface and also improving color and reducing compaction. Inevitably, this improves the playing quality and aesthetics of the playing surface.

A trial plot was established on an 80% sand:20% peat mix at the Robert Hancock Turfgrass Research Center at Michigan State University, East Lansing, Michigan on 29 July 1993 to determine optimum topdressing rates for high trafficked areas, especially high school athletic fields and playgrounds. Crumb rubber was topdressed in a 2x5 randomized complete block design with three replications. There were two levels of crumb rubber (10/20 mesh and 1/4" size) and five treatment amounts (0", 0.05", 0.10", 0.125", and 0.25" of crumb rubber added to the surface). Crumb rubber was topdressed on 29 July, 11 September, and 5 October with a Scott's rotary spreader and then dragged in for as even distribution as possible on a *Lolium perenne* (Perennial ryegrass) and *Poa pratensis* (Kentucky bluegrass) turfgrass stand. Treatment areas were 3.0m x 3.6m. The rubber particles settles down to the soil surface, thus protecting the crown tissue area. The rubber stays at the soil surface because of being lighter or having a lower particle density; rubber's particle density is 1.1 g/cc versus soil particle density being 2.65 g/cc, on average. At the same time, crumb rubber is reducing impact absorption (surface hardness measured with the Clegg Impact Tester) (2), reducing compaction (thereby providing a favorable environment for growth and recovery), and improving turfgrass color.

Wear treatments were initiated on 26 August and ran through 14 November and were applied by the Brinkman Traffic Simulator (BTS) (3). Two passes by the BTS is equivalent to the traffic experienced in one football game between the forty yardlines and within the hashmarks. Subsequently, in that 81-day period, 49 football games were simulated.

Overall, first year data did reveal the importance crumb rubber has in reducing impact absorption as well as improving soil temperatures and turf color. The data demonstrate that crumb rubber can be an effective tool for improving turfgrass quality as well as soil characteristics under high traffic conditions.

References

1 Beard, J.B. 1973. Turfgrass Science and Culture. p. 494.

2 Rogers, John N. III, and Waddington, D.V., "Portable Apparatus for Assessing Impact Characteristics of Athletic Field Surfaces ", Journal Paper NO. 8017, Pennsylvania State University, College of Agriculture, Agricultural Experiment Station, University Park, PA, 1988. p. 96-110.

3 Cockerham, Stephen T., "Cleated-Shoe Traffic Concentrated on a Football Field", California Turfgrass Culture, 39 : (3 & 4) p. 11-12.

Before Topdressing(3)						After Topdressing(1)					
1A	4B	Chk	1A	2A	Chk	1A	4B	Chk	1A	2A	Chk
Chk	3A	3B	2A	4B	3B	Chk	3A	3B	2A	4B	3B
3B	2A	1B	4B	Chk	4A	3B	2A	1B	4B	Chk	4A
2B	Chk	4A	3A	1B	1A	2B	Chk	4A	3A	1B	1A
4A	1B	Chk	2B	3A	2B	4A	1B	Chk	2B	3A	2B

Legend--> A = 1/4" Particle Size
B = 10/20 mesh

Chk = Check; no rubber
1 = 1/21" rate
2 = 1/10" rate
3 = 1/8" rate
4 = 1/4" rate

Note: 1/21" rate indicates the actual rate in the "Before" experiment but the actual amount in each treatment is 3x the rate in each treatment i.e. 1/21" rate = 3/21" or 1/4" rate = 3/4".