

support our assumption and to prove that the coaches were wrong in persisting to dictate such low cutting levels.

In speaking with Dr. Donald Waddington, Research Professor in Turfgrass Science, Penn State University, he totally agreed with the need to maintain higher cutting levels for cool season turf grasses for all the reasons previously cited. Dr. Waddington cited research that was performed on turf height and its effect on the speed of the athletes. This research was conducted at California Turf Nurseries in Camarillo, California under the direction of Tobias Grether, President of Cal-Turf, Inc. The actual testing was conducted and the research report written by Juergen Gramckow, an engineering student at Stanford, California.

The study dealt with all the concerns we cited initially. The study attempted to answer the question: What constitutes a good athletic field? They suggested that, "the probable answer would be, an area covered with a self-regenerating plant capable of withstanding wear and affording sufficient traction to athletic shoes. Traditionally, the surface should eliminate mud, dust and dirt, as well as

absorb some of the impact of the falling or tackled player. Traction should be of such a nature as to release cleats before ankle or knee injuries are sustained". In order to conduct their study, they considered four basic physical characteristics of the cover and its associated growth medium. They are as follows:

1. Impact energy adsorption of the surface
2. Shear strength of the grass and growth medium (traction)
3. Wear qualities of the turf grass
4. Total downward displacement of turf and soil upon impact

The study was painstakingly conducted and graphs containing quantitative data were prepared to support the conclusions drawn from all of the testing.

The portion of the study of greatest interest to us was the section on the effect of turf height on the speed of running football players:

Ten (10) high school football players were arbitrarily run twenty (20) times on (20) different tracks over a two day period. The tracks differed in height of cut from three (3) inches to one-half (1/2) inch. Six (6) tracks contained fescue; six

(6) contained bluegrass; and eight (8) contained Bermuda grass. The ten (10) running times for each track were averaged in order to determine the average track speed. No significant difference in time could be attributed to either the height of the stand or the variety of grass contained on the track.

Certainly these data make it abundantly clear that cool-season turf grasses could be cut at higher levels without impeding the speed of athletes. Our recommendation would be to keep Kentucky bluegrass, ryegrass and tall fescue at a height of two (2) to two and one-half (2 1/2) inches for general maintenance with the game heights never lower than one and one-half (1 1/2) inches. A higher level of one and three quarter (1 3/4) or two (2) inches would be even more desirable.

The Grether and Gramckow study further concluded that in order to improve the impact absorption and shear qualities of the field "the turf grass should be held between 1 1/2 to 2 inches and kept moderately moist". It was also obvious in their study on wear tolerance that the

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