Matt Roche details research work on thatch undertaken by the Queensland Department of Primary Industries and Fisheries Turf Research Group and asks whether thatch is a real or perceived threat when it comes to sporting injuries.

**Thatch or fiction?**

In recent years, sporting professionals, medical experts, stadium managers and turf scientists have disagreed over the influence of thatch on traction and injury occurrence to athletes participating on natural turf sporting surfaces.

Thatch generally varies in depth depending on species selection, field usage (wear patterns) and regular or scheduled management activities such as mowing and scarification.

In their recent work, Orchard et al. (2005) and Chivers et al. (2005) have expressed concern claiming that a heavier thatch layer leads to higher traction and trapping of players’ footwear with studs, blades or spikes during 1992 and 1998, in an attempt to depict injuries incurred in Australian Rules football when the injury occurred.

They studied available videos of 34 ACL injuries occurred in Australian Rules football during 1992 and 1998. In an attempt to depict the factors involved in each injury. Of the 34 ACL injuries studied, 56 per cent of the athletes were injured in a non-contact situation, with sidestepping accounting for 37 per cent of that total, landing (32 per cent), landing and stepping (16 per cent), decelerating (10 per cent) and undertaking crossover cut manoeuvres (5 per cent).

**MEASURING TRACTION**

Rotational and transitional (linear) traction are the two types of forces encountered when a player’s foot becomes fixed in its original position during changes of direction. Being able to take an accurate and meaningful measurement of rotational traction is therefore important in determining the influence of thatch on traction.

The portable testing unit measures the angle through which the foot becomes fixed in its original position. The automated tester can be found in Volume 8 of the Queensland Department of Primary Industries and Fisheries’ (QDPI&F) Turf Research Group.

The second level (wear frequency) involved imposing two wear treatments (weekly and fortnightly wear applications at equivalent overall intensity to simulate a home-and-away schedule) within each of the couch strips and a fortnightly wear treatment only within each of the oversewn ryegrass strips. In both situations, the worn treatments were compared with an unworn control treatment.

**TRACTION TESTING**

Traction testing has been conducted at four to five week intervals during the winter-early spring period in 2006 and 2007. This has involved taking a total of 160 measurements from each sub-plot over the trial area (i.e.: five sub-treatments receiving weekly or fortnightly wear treatments per cultivar x eight cultivars x four replications = 160).

In winter 2006, bare ground increased rapidly before reaching relatively stable levels of residual cover after about five to six weeks of wear. By the end of the 10-and-a-half week trial period, sub-plots ranged from 100 per cent bare ground through to complete ground cover.

Once torsion was adjusted for the level of bare ground, there were no longer any significant differences between treatments for torsion. These data, however, in all probability reflected some deterioration in the root-rhizome system on badly denuded sub-plots, because subsequently they were slow to recover and in some cases had to be replaced by new sod.

The portable tester measures the maximum torque reached during rotation of the studded disc, while generating a profile of torque (traction) showing changes over time and calculates the angle through which the studded disc moved before reaching maximum torque. Further information about the automated tester can be found in Volume 8.5 (Oct-Nov 2006) of Australian Turfgrass Management.

**THATCH VS TRACTION**

To investigate in more detail the influence of thatch on traction, the QDPI&F turf research team used an ongoing wear trial, which involves eight Cynodon cultivars in a randomised block design located at Redlands Research Station in Cleveland, Queensland. The experimental site was constructed in March 2006 on an irrigated 15cm sand carpet profile with internal drainage to remove excess water. Individual plots (6m x 2m) of the eight cultivars were allocated at random within each of the four blocks.

Superimposed over the basic experiment was a two-level strip-plot design to accommodate wear treatments, which of necessity must be applied in straight lines. Strips within each level were again allocated at random.

The first level involved oversowing perennial ryegrass into two of the five sub-plots per cultivar to simulate standard winter management of elite fields, leaving the remaining three as a pure green couch sward.

The second level (wear frequency) involved imposing two wear treatments (weekly and fortnightly wear applications at equivalent overall intensity to simulate a home-and-away schedule) within each of the couch strips and a fortnightly wear treatment only within each of the oversewn ryegrass strips. In both situations, the worn treatments were compared with an unworn control treatment.

For players, the higher the rotational traction the greater the tendency is for a foot to become fixed in its original position during changes of direction. Being able to take an accurate and meaningful measurement of rotational traction is therefore important in determining the influence of thatch on traction.
better condition than after a further five weeks of continued wear through to the end of the trial.

The above indirect inferences as to the effect of thatch on traction were subsequently confirmed by direct comparisons of peak traction values with or without above-ground material present in the control plots on 26 April and 5 July, 2007.

On both occasions, a small area in each of the 32 unworn (control) couch sub-plots was removed mechanically down to the stolons, so that the effect on traction could be determined by comparing traction measured in the cut area with a paired second reading taken among the intact thatch in the same sub-plot (see photo pg 44).

The dry matter yield of thatch was also determined on 5 July by cutting a 35cm x 35cm quadrat from each of the 32 control sub-plots and drying it at 65-70°C. On both occasions, we found no significant difference in traction, despite the removal of an average of 450g/m² of above-ground dry matter on the second occasion (Table 1).

**CONCLUSIONS**

Recent postulations by Orchard et al. (2005) and Chivers et al. (2005) that a heavier thatch layer leads to higher traction and trapping of players’ boots, thereby contributing to non-contact ACL injuries, would therefore appear to overestimate and over-emphasise the significance of the thatch layer.

Our findings indicate that the main plant factor determining traction is the stolon and rhizome and general root growth on and just within the ground surface. Provided the rhizomes of the established sod are still intact in areas where the top growth has been completely worn away, we have recorded almost no change in traction in these bare areas compared with nearby areas where the top growth is still intact (Roche et al., 2007).

Our experience elsewhere in sportsfield benchmarking activities is that, provided the rhizome-root layer is still intact and healthy, bare areas where the top growth has been completely worn away, can still record traction levels that are adequate for good playability (>30-35Nm – e.g. Bell and Holmes, 1988; Baker, 1999) and, in fact, tend to show little or no apparent reduction in traction compared with nearby areas with intact top growth.

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