



Herbage Accumulation and Tiller Density of Irish Temperate Grazing Swards As Affected By Treading Damage of Dairy Cows

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Practical Implications

Expansion of milk production in Ireland will mean that operations will establish in soils with poor drainage and, consequently at high risk of treading damage. Treading damage can be minimised by reducing grazing pressure using 'on-off' grazing during periods of increased risk of treading damage. Kennedy *et al.* (2009) have shown that restricting access time of cows to pasture during periods of inclement weather reduces supplementary feed requirement and minimises sward damage because of poor ground conditions, while not significantly affecting milk production. In agreement with that, grazing wet soils in Victoria, Australia, with on-off grazing, in grazing periods of two hours in the morning and two hours in afternoon, reduced severity of treading damage (Ward *et al.*, 2003), this being attributed to a reduction in the decline in soil strength.

A reduction of pasture availability which occurs at times of relative pasture deficit would require an inclusion of supplements into the diet. For example: for the case of Site 1, a 30% reduction of the BD (badly damaged) plots in relation to the other treatments was equivalent to a deficit of 685 kg DM ha⁻¹. So, assuming that to produce 1.6 kg milk solids per day, a 550 kg cow needs to ingest approximately 17 kg DM of high quality grass (12 megajoules of metabolisable energy) (Holmes *et al.*, 2002), the feed of 43 cows was wasted and concentrates would have been required.

Conclusions

The detrimental effects of treading damage on subsequent grass growth and herbage accumulation are dependent on frequency, severity of the damage, pasture species and also on soil characteristics. A perennial ryegrass sward on a free-draining soil was resilient to an intense treading event. Treading damage on a low-drainage soil resulted in a reduction of herbage mass accumulation of 14% to 49% depending on frequency and season. Spring damage was more detrimental than autumn damage, but two treading events had long lasting effects.

Other Observations:

- Betteridge *et al.* (2003), after treading with cattle, related that some pasture damage already occurred when hoof print depths were 3 cm or more, provided that the level of moisture in the soil was high. Similarly, Nie *et al.* (2001) reported 2.0, 3.6 and 4.3 cm depths for plots that were subjected to light, medium and heavy treading damage, respectively. In the present trial, hoof print depths in all treatments, at each of the TD(treading dates), were deeper than 3 cm
- Nevertheless, it is clear that the level of damage at Sites 1 and 2 (see pictures below) achieved after different residency times in each of the treatments, was sufficient and adequate to measure the impact of treading on herbage accumulation and tiller density.
- The plots damaged in autumn only had more time than the others to recover during the vegetative growth during the winter, *i.e.* tillering and natural reseeding on the bare ground (Nie *et al.*, 2001), in as much as that the trampling action bring seeds to the surface. A situation that may have improved the recovery of the plots damaged in autumn could have been the colder than average winter of 2010 (Table 1). The 'freeze thaw' action may have had positive effects on compacted soil, increasing permeability (Bowders and McClelland, 1994)
- Pande (2002) concluded that the main effect of treading damage was a reduction in the tiller populations. Nie *et al.* (2001) reported that total tiller

density was reduced by 32% and 46% for medium and heavy treading damage, respectively.

- Betteridge *et al.* (2003) reported that after moderate treading damage tiller density took 120 days to return to the level of the control
- **Figure 1** Experimental treatments (from left to right) control, barely damaged, intermediately damaged and badly damaged plots imposed to Site 1 (predominantly perennial ryegrass sward on a free-draining soil) and to Site 2 (temperate sward dominated by creeping bent on a heavy soil).

