

Treading Damage – the quickest way to stomp out production

One of the biggest issues facing hill country farmers is not soil erosion, but treading damage to vulnerable soils caused by heavy cattle. Treading damage or pugging, is considered an inevitable result of winter grazing for many, but have you counted the cost on farm production? Ultimately pugging is the result of unwise management combined with a lack of understanding of land resources.



Trials from AgResearch show that pasture and soil effects from treading can last several months depending on the soil type. In one study, soil treading damage after a single event depressed pasture production by 52% and pasture growth took two months to recover. Pasture production fell by 600 kg dry matter/ha.

Another study showed that pasture production and surface roughness took four months to return to the level of non pugged treatments. Tiller density and bare ground took five months to recover, and macroporosity (drainage) took 3-4 months to fully recover at 0-5 cm soil depth.

Research at Ruakura showed that one month after a treading event, clover N fixation was reduced by 60% where treading was moderate and over 80% where the treading was severe.

Its not all about cows - beef cattle on hill country pastures can also cause damage to your pasture production. It has been shown that from just one treading event, hill country pasture growth rates in the spring fell from 18 kg DM/ha/day to 11 kg DM/ha/day.

You do the sums. Lowered pasture production from 10-60%, over several months, where feed on farm is at a premium. Not only does this years production drop, but long-term several treading events in a soils history can reduce the soils ability to sustain a constant level of production.

So what is pugging, and how does it have such an impact?

At high moisture levels, some soils are easily penetrated and molded by animal hooves. This deformation is called pugging. With severe pugging hooves turn the topsoil into a slurry, and compaction may occur where the hoof penetration stops. When pugged, pasture plants may be damaged, buried or uprooted. This compaction also reduces the macro porosity of the soil. These macro pores provide air, water and nutrients that the plant root access's, and also help water drainage through the soil. The less macro pores there is, the longer water is held in the profile and less vigorous the pasture plant is.



Some suggestions to reduce pugging damage on your property include:

Identify different soil types and land management units on the farm

Utilise differences in the physical properties of soils (eg drainage, bearing strength), land slope, and aspect (eg sunny faces). Aim to protect those soils most susceptible to treading damage in vulnerable months. This requires a good understanding of the physical robustness of the soils, and necessitates the inclusion of soil management into the feed budgeting and stock management policy during vulnerable periods of the year.

If there are a limited number of robust soils on the property, consider a standing off area for critical periods or when a rain event is predicted.

Livestock policy

Consider farm livestock policy; the sheep to cattle ratio, the ratio of young to older cattle, and the livestock buying and selling policy, all impact on the amount of damage which can occur when soil moisture is high.

Other options –

Spreading the stock classes, most likely to cause treading damage, over the whole farm can reduce pugging events. However, this raises stock management issues such as, difficulty controlling intake at pinch periods which often coincide with the wettest parts of the year.

Restricting treading damage to a small part of the farm and using mechanical amelioration (aeration) methods to restore pasture. Long-term this option may not be suitable, given the need for the pastoral sector to be able to demonstrate their commitment to sustainable land use.

Paddock history should be considered and could be ranked on their previous treading damage and their inherent susceptibility to treading. This history combined with the feed budget, could enable stock management policy to spread the treading pressure at key periods over specific parts of the farm each year.



Remedial actions

Over-drilling or oversowing, cultivation and cropping, and aeration are practical methods to overcome damage to soil on some classes of land. Mob stocking with sheep in summer to restore the soil surface is another option. Protecting the area from further damage in the following years is likely to minimise the long-term problems. A useful tool is the AgResearch Penetrometer, which will indicate whether the soil is suitable for heavy cattle during wet periods to avoid pugging and treading damage. Contact your nearest AgResearch office for more details.

It is very hard to think about pugging damage at present, when areas of the country are currently in a drought situation. But, it is important to start thinking about grazing management for the winter, and how you are setting up the pasture for the spring. Those land management units that are vulnerable start preparing them early while soil moisture is low.

Consider your farms income, could it cope with a 10-50% drop in production? How much your stock policy and pasture management decisions are influenced by the soil types (&



characteristics) present on the property? What is this information worth to long-term survival of your farm business?

Need to know more, contact Sarah Dudin or Lachie Grant at LandVision Ltd on 0800 526384.