

Ground Cover Factsheet – February 2020 – Healthy Soils Project

Ground Cover – What is it and why is it important?

The definition of Ground Cover is any material on or near the soil surface that protects the soil against the erosive action of rain drops, overland flow and wind. The obvious and most vital ground cover that comes to mind is plants which can be either alive or dead, but ground cover is so much more, it can include leaf litter, loose stones, snow, manure and even bones (Lang & McDonald 2005; readers are encouraged to download and read the Agfact by these authors – see link below)

There is a direct relationship between ground cover and the reduction in rain infiltration rates, soil loss and erosion. Rain that falls directly onto bare earth can cause a break down in the soil structure leading to soil particles being moved and potentially forming a surface seal reducing the rain's infiltration ability and increasing run-off. Lower infiltration leads to reduced pasture growth and in a vicious cycle the reduced pasture and/or lower ground cover percentage means there is less protecting the soil. In low cover paddocks unprotected soil can mean up to 100 t/Ha/year of soil loss which means you are losing soil much quicker than it can form (Lang and McDonald 2005). Soil formation can be as low as 1.4 t/ha/year and up to 10 t/ha/year in some environments (Freebairn 2019).

To prevent unnecessary run-off and erosion research has proven that at least 70% ground cover is required. This research was conducted in Scone, NSW and the country was made up of a red clay soil with a slope of 10% and 625 mm (25-inch) rainfall. (Lang and McD2005). For the moderately sloping to flat lands of Southern NSW, ground cover of between 40-65% is recommended to minimise erosion caused by water (Bowman & Scott 2009).

The Importance of Knowing How Much Ground Cover You Have

The measurement and management of ground cover is vital in determining stocking rates and when to resort to drought lots, for rain runoff, soil management and health. Ground cover management is vital in the summer and autumn months as it is the storms with high intensity that will cause the most soil loss.

When paddocks are at critically low levels of cover there is only one short term management tool available to producers and this is to reduce stocking rates. Longer term, producers should look to establish perennial pastures as they provide greater levels of ground cover. A well fertilised perennial pasture will provide ground cover for longer than any other production system, even in low rainfall years (Ferguson & Virgona 2020)



Figure 1. Raindrop impact on the soil surface.

Photo: South Dakota State University.

(Bowman & Scott 2009)

How is Ground Cover Measured?

Visual estimation of ground cover is the best measurement tool as it allows producers to quickly establish the level of cover across numerous samples. Producers require brief training to be able to effectively estimate ground cover levels visually and this involves the examination of reference quadrats compared to industry standard photos. A range of different ground cover levels need to be covered by the reference quadrats so you can develop skill in accurately assessing ground cover and then applied to the area (paddock) being assessed. Using a quadrat focuses your attention to an area and makes for a quick and easy method for measuring many samples. Producers need to regularly calibrate their sampling method by regularly measuring actual ground cover to ensure they aren't over- or under- estimating (Ferguson & Virgona 2020).

Ground Cover in Southern NSW

Erosivity from rainfall is highest in Southern NSW over the summer months as a result of storm activity and lowest during the winter months. A paddock sown with annual pastures can achieve ground cover of >95% with dry matter production of approximately 500kg/ha but for Lucerne to reach the same ground cover the dry matter production is around 3000 kg/ha and about 5000 kg/ha for cereal crops (Bowman & Scott 2009).

Erosion risk is highest in early autumn when ground cover is at its lowest due to what happens over the summer months with the breakdown of plant material and before new growth from autumn rainfall. Despite the soil being most exposed during early autumn erosivity from rainfall tends to be lower. The window of time for erosion risk is lengthened by grazing to low ground cover levels over summer and into autumn, with this becoming more of a problem in dry times and drought years. Ploughing ground so it becomes cloddy and rough can help to limit erosion caused by wind (Bowman and Scott 2009).

Table 1. Estimates of minimum amount of ground cover (%) required to reduce excessive run off and erosion, and sustain productivity for a range of slope gradients and soil erodibility classes for the southern cropping areas of NSW (from Lang and McDonald 2005)

Erodibility class	Typical soil types	Paddock slope			
		Flat	Gentle	Moderate	Steep
		(<2%)	(2–10%)	(10–20%)	(>20%)
Low	Deep sands	60 (40)*	60	65	85
Low–moderate	Sandy loams, light clays	60 (40)	60	70	90
	Uniform clays (kraznozems and euchrozems (ferrosols))				
moderate–high	Loams	60 (40)	60	75	90
	Cracking clays (vertisols)				
High	Silts, fine sandy loams	60 (40)	65	80	95
	Red-brown earths (chromosols)				
	Red and yellow earths (kandosols)				
	Sodic duplex soils (sodosols)				
Low–high	Drainage lines (all types)	100	100	100	100

*Ground cover values given in parentheses apply to the western margin where low annual rainfall may limit ability to consistently sustain higher values under profitable grazing systems.

Healthy Soils Project Information

This factsheet was prepared following the first workshop of the Healthy Soils Project for TFS members in February 2020. The Healthy Soils Project is funded through Meat & Livestock Australia (MLA) and was established to support producers and advisors to investigate common soil issues and test solutions to improve their soil's condition. The program provides producers with access to the latest resources and technical experts which will develop the producer's skills and confidence in diagnosing and managing their soils health.

References

- Bowman A & Scott B, 'Managing Ground Cover in the Cropping Zone of Southern NSW' PrimeFact 957, Oct 2009, NSW Government Industry & Investment.
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- Lang D & McDonald W, 'Maintaining Ground Cover to Reduce Erosion and Sustain Production' Agfact P2.1.14, January 2005, NSW DPI.
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