

October, 2015

### Soil cover helps to build healthy soils

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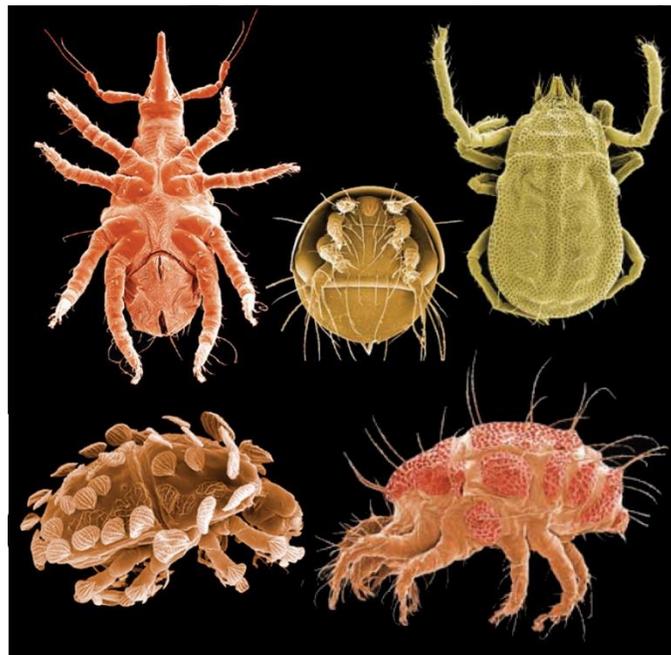
Keeping soil covered as much as possible with plant residues is a prerequisite for improving agricultural soil health. Whether cropped or grazed, soil surface residue helps prevent erosion, maintain moisture, moderate temperature extremes and provides an important food source for soil life.

Soil aggregates are the basic building block for good soil structure and are vulnerable to the forces of nature on exposed surfaces. Direct rainfall impact breaks down soil aggregates with the dislodged particles clogging natural soil pores, contributing to soil crusting and reducing water infiltration. Erosion by wind or water further damages soil, which is particularly destructive since our most nutrient and organic carbon rich material accumulates near the surface.

Surface residues help to reduce evaporative moisture loss and tends to buffer soil temperature extremes. That helps to keep plants actively growing and promotes soil biology that builds soil.

Good soil cover provides the necessary habitat and fuel source for soil organisms as they help to decompose and recycle nutrients back into crop available forms. This includes a range of organisms like earthworms and soil mites – tiny creatures living at or near the soil surface that mine residues making it easier for fungal and bacterial breakdown (Figure 1).

Figure 1. Mites of order Prostigmata are commonly present in soils.<sup>1</sup>



<sup>1</sup> European Atlas of Soil Biodiversity. 2010 [http://eusoils.jrc.ec.europa.eu/library/maps/biodiversity\\_atlas/](http://eusoils.jrc.ec.europa.eu/library/maps/biodiversity_atlas/)

Cropping practices with minimal or no-tillage will help maintain good surface residues. For annual crops, rotations should balance high and low residue crop types to maintain good surface cover, relying mainly on soil biology, grazing and occasional forage removal rather than tillage to deal with excess residues. Compared to broadleaf crops, cereals produce higher amounts of biomass with slower decomposition rates, partly because of the high carbon to nitrogen ratio in cereal residues. Pulse crops produce the least and most easily decomposed residue with oilseed crops intermediate.

Intercrops or post-harvest cover crops may be an option to maintain a living mulch for cover or grazing after annual forage or grain crops although growing season and moisture may limit opportunities for some areas. Swath grazing or cover crop grazing are systems that help to maintain cover and leave rather than export nutrients from the field.

Perennial hay stands have excellent below ground biomass but the soil surface may be relatively bare, depending on species mix and the cutting or grazing regime. Care should be taken to balance removals to maintain some soil surface cover on hay land.

Over grazing can also deplete surface cover, reducing pasture productivity and soil health. One of the basic parameters for assessing range health is the percent litter cover which affects erosion risk and the soils ability to retain moisture and recycle nutrients<sup>2</sup>.

In summary, good surface cover is one of the prerequisites for building productive, healthy soils. Cropping systems with minimal or no till, good rotation and occasional rather than frequent residue removal will maintain soil cover. Haying or grazing based systems should be managed to maintain good surface litter with practices that balance removals with forage growth.

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<sup>2</sup> Range Health Assessment: Field Worksheet for Tame Pasture. Government of Alberta. 2011.  
<http://esrd.alberta.ca/lands-forests/grazing-range-management/documents/RangeHealthWorksheet-TamePasture-2011.pdf>