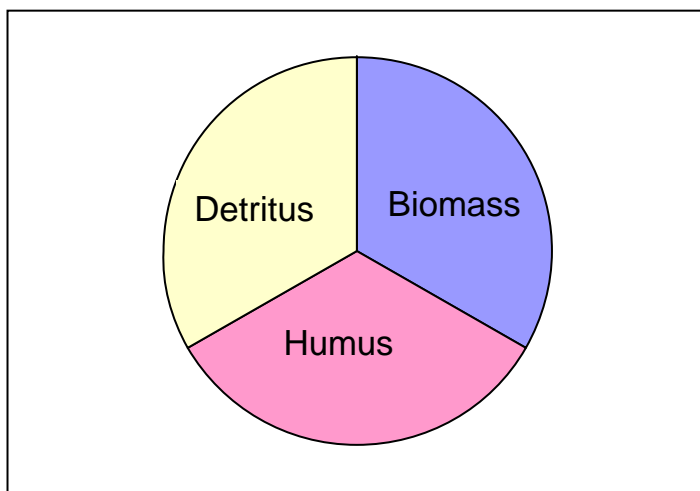


Understanding Soil Organic Matter

Soils comprise both inorganic and organic materials. “Soil Organic Matter” describes the various organic components present, which, in most NZ soils, typically comprise about 5-10% of a soil. Though minor compared to the amount of inorganic material present, organic matter is extremely important in the overall functioning of a soil. Organic matter can be partitioned as follows:



Living Biomass: Includes living and intact organisms (plant and animal tissue, micro-organisms).

Detritus: All non-living materials – dead roots and other plant tissues and residues which can still be identified.

Humus: Other non-living materials which are no longer recognizable as plant tissue etc.

Another useful and related way to view soil organic matter is in terms of the speed it breaks down or decomposes into smaller components in the soil. Using this approach,

soil organic matter can be partitioned as follows:

Active Fraction (10 -20%) – this small fraction includes the living biomass and some of the detritus. A significant amount of this material will decompose quickly i.e. few months to a few years. This fraction provides most of the food for soil organisms and most of the mineralisable nitrogen (N). This fraction can be increased or reduced relatively quickly. It is increased by the addition of plant and animal residues but lost when such additions decline or cultivation takes place.

Slow Fraction (variable %) – this fraction incorporates very fine detritus components which decompose slowly and are rather resistant to chemical attack, and which break down more slowly than the active fraction i.e. typically over decades. It is also a food source for microbes as well as yielding additional mineralisable N and other plant nutrients. It is essentially a transitional stage between the active and passive fractions.

Passive Fraction (60-90%) – this large fraction comprises extremely stable compounds which may remain in the soil for 100 -1000's of years. It includes most of the humus material. This fraction has an important role related to the cation exchange and water holding capacities of a soil.

Why is it important to understand soil organic matter? Organic matter is a key driver of soil fertility. Plants do not take up nutrients directly from the soil, nor do nutrients simply become available. Both nutrient storage and cycling are related to the living biomass (active fraction) component of the soil organic matter. Overall soil organic matter levels may remain relatively constant, but if farm management practices significantly reduce the active fraction, this can have a big bearing on soil properties and the way a soil functions. Consequently, if the objective is to enhance nutrient availability and improve the way a soil functions, then it is important to implement practices which will increase the level of the active fraction of the soil organic matter.