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Organic Nitrogen
Rules of thumb

USING THIS GUIDE

This rules of thumb poster has been developed to provide a general understanding of nitrogen (N) in soil and in the different organic inputs such as legume cover crops, compost, and manure. All numbers provided are approximate.

The fate of nitrogen in soil is influenced considerably by site-specific variables such as soil type, soil structure, growing region, weather conditions, soil biology, and rotations. The rules of thumb are general in nature. Growers should consider their unique situation when interpreting the organic nitrogen rules of thumb.

COMPOST AND MANURE ADD NITROGEN[3]

The amount of N added by compost and manure varies with the type, rate applied and method of application. Approximately:

1-2% N in green waste compost

2-4% N in manure

15-20% Of compost N is mineralised in the first year

SOIL ORGANIC MATTER (SOM) STORES NITROGEN

READ SOM POSTER

One tonne of SOM typically contains 10-30kg of nitrogen. About 2-5% of the nutrients stored in SOM become plant-available annually[2]. For example:

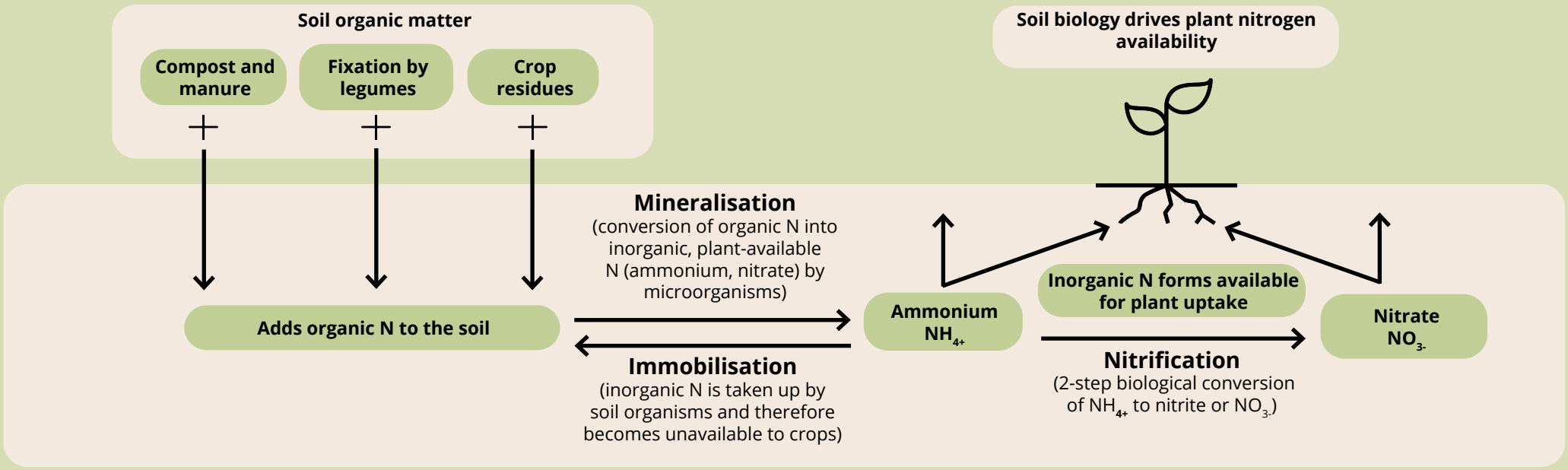
- A low SOM soil (1.5% OM) stores approx 3,140 kg N/ha, with 63 kg N/ha mineralised each year
- A high SOM soil (8% OM) stores approx 16,744 kg N/ha, with 837 kg N/ha mineralised each year

CALCULATE THE AMOUNT OF NITROGEN IN SOIL

Before adding N to the system, use soil test results to calculate the amount of plant-available N in the soil and the amount stored in SOM.

GET THE CALCULATOR

NITROGEN CYCLE



LEGUME COVER CROPS FIX NITROGEN[3]

Inoculation of legume seed with the correct strain of *rhizobium* can significantly improve N fixation. Different legume species fix and release N at different rates.

20-25 Kg N/ha fixed for every one tonne of dry matter of legume above-ground biomass

150-250 Kg N/ha fixed by a well grown legume crop.

30 % of N is mineralised in 100 days after incorporating[4]

Soil nitrate levels can limit legume N fixation:

>15 ppm soil nitrate-N (54kg N/ha) will start to decrease legume N fixation

>50 ppm soil nitrate-N (180kg N/ha), consider a non-legume cover crop to mop up nitrate

READ THE COVER CROP POSTER

TIMING OF NITROGEN RELEASE

READ SOM POSTER

Timely mineralisation of nitrogen by soil microbes into plant-available forms (NH_{4+} and NO_{3-}) is crucial. Matching N availability from organic sources with N demand of a succeeding crop can reduce synthetic fertiliser use. However:

- Slow mineralisation can lead to N deficiencies in succeeding crops
- Fast mineralisation can risk N loss, particularly under wet conditions

The rate of N availability for plant uptake is influenced by:

- Soil temperature
- Soil moisture
- C:N ratio of plant material
- Management practices
- pH optimal range 6 – 7.5

SOIL TEMPERATURE INFLUENCES MICROBIAL ACTIVITY[5]

Soil temperature influences microbial activity and subsequently the rate of organic N mineralisation.

>25°C	microbial activity and mineralisation are **rapid**
10-25°C	microbial activity and mineralisation rate **increases**
<10°C	microbial activity and mineralisation are **very slow**

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