

The World of Nitrogen Fixation Part 3

Growing quality organic legumes

There is more to growing legume pastures and grain crops than just being chemical-free. In the third of this series on nitrogen fixation, ADAM WILLSON looks at what practical steps an organic grower can take to increase legume yields and quality.



This crop of broccoli yielded an extra \$10,000/ha following a good legume rotation (lab lab) and a prescription compost. Note the evenness of the crop, indicating stable humus production. The heads were tight, the stems white and the taste superb. No wonder the wholesalers kept ringing him up.

One of the most common failings of organic growers is their inability to understand what it costs them to grow a pasture or legume grain crop. This is critical because growers need to compare different varieties and growing techniques. Simple records of time spent sowing, harvesting, nutrient costs, weed control, insect management, disease control and irrigation all need to be tabled for future comparisons. In short, benchmarking is simple to do and provides the grower with a wealth of useful information.

AUSTRALIA IS GEOLOGICALLY OLD

Australia is a geologically old continent with very few truly fertile soils. Compared to parts of Europe and some areas of North America, Australia really is a bit marginal. As a result, paddocks vary enormously in mineral nutrition, humus and subsequent healthy plant growth. You only have to walk

Your task as the grower is dead simple: minimise plant stress by building nutrient- and humus-rich soil.

around the farm to realise that you can't apply the same nutritional programs to the whole area.

UNDERSTANDING THE PARENT MATERIAL

One example of how parent materials affect legume production is in the availability of molybdenum.

Molybdenum is a trace element that is critical in nitrogen fixation. Many soil parent materials are very low in molybdenum and other trace elements. If these are not added to the nutritional program, legumes will not be able to fix nitrogen (nodules will not be pink).

WHAT DRIVES THE ENZYMES

The ability of a plant to capture nitrogen from the atmosphere and convert it into protein relies on diverse enzymic activity. Enzymes, as you are aware from the World of Nitrogen Fixation Part 1, are compounds that catalyse chemi-

cal reactions. They work like a lighter on a gas stove – they give the spark that starts the reaction. Enzyme activity depends on the amount of available trace elements and organic compounds absorbed by the plant through the roots. The best way to hold these nutrients is in stable soil humus.

THE FOUNDATION HAS NEVER CHANGED

No matter what, the foundation of organic farming will always be farming systems based around the production of stable soil humus. Humus is microbially broken down organic matter that holds up to 20 times its weight in water and increases the nutrient holding capacity of the soil by up to 70%. No wonder legumes thrive in it – especially when soil nutrition is both adequate and balanced.

BIBLICAL IT MAY BE

Not many farmers look seriously at long-term cropping rotations. The idea of spelling the ground every seven years is always looked upon as a hindrance rather than an asset. However, the facts can't be ignored. Diversity of crops and pastures helps build healthy soil communities free of disease. Legumes are no different to any other plant: they thrive on rotations and diversity.

KEY OBSERVATIONS IN THE FIELD

Comparing the best and worst areas of the paddock can give a grower the simplest and least expensive guide to how the farm is going. In organic pasture production, the emphasis is on the ratio of leaf to stem. Healthy legumes (high leaf-to-stem ratio) produce a lot of leaf that shades out the ground and minimises weeds. Poor legume pastures (low leaf-to-stem ratio) lack enough nutrient to produce enough leaf. Consequently, small leaves are common and weeds can often be a problem.

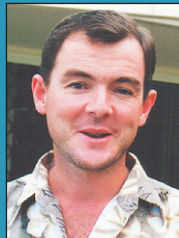
In legume grains, the difference between the number of

	Pasture	Crop
Key visual indicators	High ratio of leaf to stem	Fewer abortions of flowers
What to measure in the field	Size of leaf Weight of leaf and stem	Number of flowers and pods Calculate as percentage

flowers at flowering and the final pod numbers is a direct reflection of how much stress the crop has been under. By stress I mean both nutritional and moisture. The better the nutrition and humus development in your soil, the fewer flower abortions that will occur. Nature has perfected the reproductive process – if there is not enough nutrition for the plant it will simply abort flowers. Your task as the grower is dead simple: minimise plant stress by building nutrient and humus-rich soil.

WAKE UP AND SMELL THE COFFEE

The farmers' role in society is critically important. They are the providers of health through the production of nutritious food. Organic producers must wake up and realise that chemical-free farming is not good enough. Growing quality legumes requires careful planning based on the foundation of humus and nutrient rich soil.



About the author

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The emergence and healthy growth of high quality organic peas depends on balanced nutrition and stable humus production.