

## Inclusion of Legume Based Pastures in Rotations

Soil fertility decline, as indicated by reduced organic matter and nitrate Nitrogen affects large areas of cropping land in both NSW and Qld.

The use of legume based pastures in crop rotations can improve general soil health by improving soil Nitrogen and organic matter content. This can have a positive impact on soil structure, water infiltrations and water holding capacity. Ultimately a legume based pasture phase can reduce the rate of soil degradation, and reverse the decline in the productive capacity of soils. In addition, it is widely accepted that legume rotations will improve the yield and grain quality in subsequent cereal crops

Another benefit of the inclusion of a pasture phase is enterprise diversification. The inclusion of a livestock/pasture phase into a cropping operation will spread the risk for the farm enterprise over a number of markets which can reduce income fluctuations. Additionally, diversification will allow more rapid response to market signals, which can improve the sustainability of the overall operation.

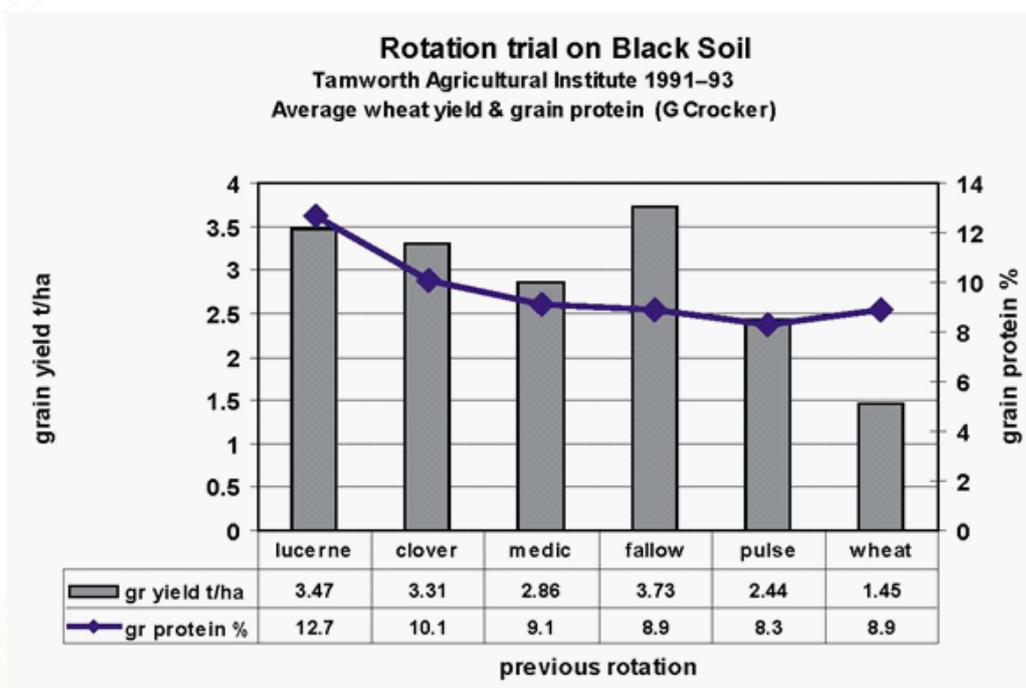
There is a huge range of pasture species available from Temperate Grass Species such as; Phalaris (*Phalaris aquatica*), Cocksfoot (*Dactylis glomerata*) or Fescue (*Festuca arundinacea*), Temperate Legume Species such as; Lucerne

(*Medicago sativa*), Sub clover (*Trifolium subterraneum*) or Serradella (*Ornithopus* spp.), Tropical Grass Species such as; Panic (*Panicum* spp.) or Lovegrass (*Eragrostis curvula*) and Tropical Legume Species such as; Annual or Perennial lablab (*Lablab purpureum*), and Cowpea (*Vigna unguiculata*).

Lucerne has for a long time been the legume of choice for mixed farming operations. It is well adapted to the soils of southern Qld and northern NSW and is ideally suited to both hay production and grazing. It can be planted in a pasture mix or as a pure stand.

As a legume, lucerne not only produces high protein forage, but also has the ability to fix Nitrogen and improve soil health. Lucerne is a deep rooted perennial legume and has been found to fix Nitrogen to depth, which slows the rate of mineralisation, and subsequent loss by leaching and denitrification. This reservoir of fixed nitrogen provides a relatively stable and long lasting source of soil Nitrogen.

As a grazing legume it produces all year and is extremely valuable in winter when other grazing options are of poorer quality. For mixed farming operations it is well suited to short term pasture rotations of two to four years, or for longer term more permanent plantings.

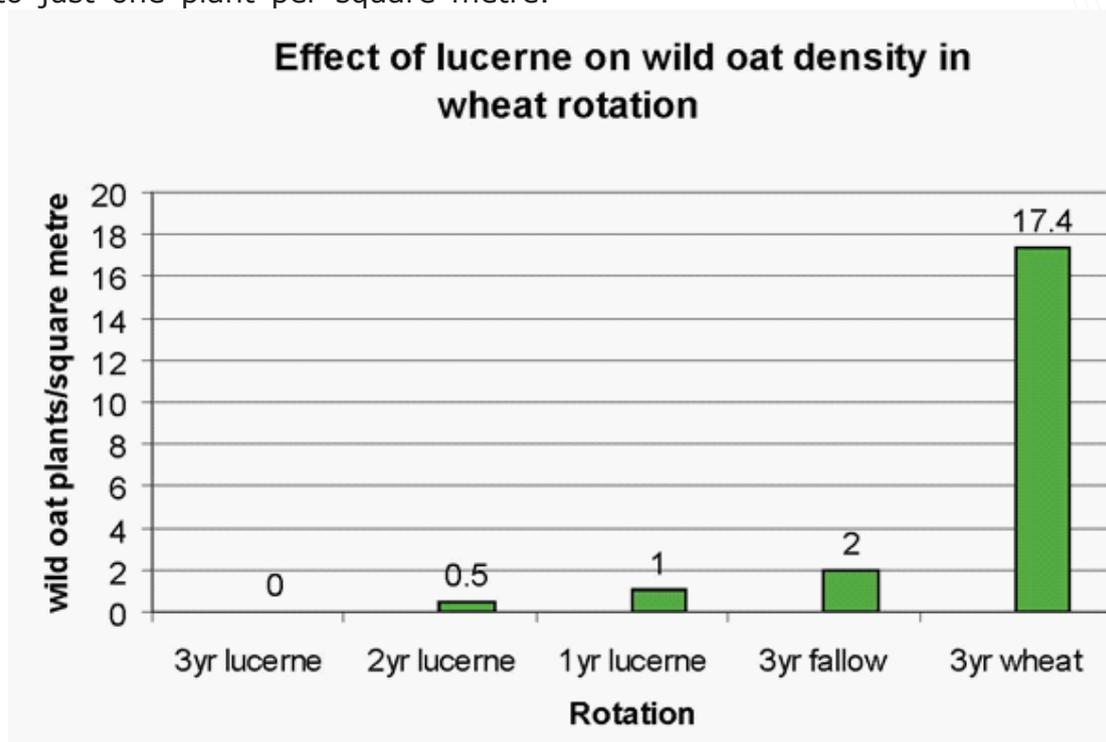


Lucerne phases can be used to break pest and disease cycles in cropping systems. They provide growers additional tools such as grazing pressure and alternative chemical modes of action, to assist in the management of herbicide resistance.

Strategic grazing which targets seed set in palatable weeds like wild oats, has been found to reduce weed populations. For example, in a long-term rotation experiment conducted by the NSW Department of Primary Industries' Tamworth Agricultural Institute, researchers found that three years of well managed lucerne pasture fully controlled wild oats in the following wheat crop and even one year of lucerne reduced wild oats to just one plant per square metre.

Three years' bare fallow also reduced the wild oats to two plants per square metre, but would not have had a positive impact on soil health. When three crops of wheat were produced the wild oat population increased to 17 plants per square metre in the third crop.

Cereal crop diseases such as crown rot and take-all, and pulse and oilseed crop diseases such as ascochyta and blackleg can be reduced by a pasture phase, as long as host weeds are controlled in the pasture. Lucerne and medics are alternative hosts for Phytophthora root rot. Growers should avoid planting susceptible crops such as chickpeas into paddocks directly after a pasture phase.



**References:**

Queensland Government, Department of Agriculture and Fisheries; Lucerne Production: <https://www.daf.qld.gov.au/plants/field-crops-and-pastures/broadacre-field-crops/lucerne/lucerne-marketing-hay,-crop-rotation>  
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