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# LENTIL

## SECTION 2

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## PLANNING AND PADDOCK PREPARATION

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KEY POINTS | LENTIL REQUIREMENTS | RAINFALL AND SOIL MOISTURE | SOIL  
TYPE | SEEDBED REQUIREMENTS | STUBBLE MANAGEMENT | ROTATION  
HISTORY | HERBICIDE RESIDUES IN SOIL | WEED STATUS OF PADDOCK |  
DISEASE STATUS OF PADDOCK | NUTRITION STATUS OF PADDOCK

# Planning and paddock preparation

## Key points:

- Lentil requires annual rainfall greater than 300 millimetres (mm)
- When annual rainfall is greater than 550 mm, delayed or spring seeding may be necessary.
- Lentil can grow on most soil types provided there is minimal salinity, sodicity and boron toxicity, and access to sufficient soil moisture later in the season.
- Soil needs to be friable and without surface crusting.
- A soil pH of 5.5 or above (in calcium chloride) is preferred for lentil.
- Lentil requires free-draining soil as it does not tolerate waterlogging.
- Lentil paddocks need to be free of surface stones and sticks and relatively flat.
- Plant-back periods and rainfall must be accounted for to avoid herbicide residue damage when growing lentil.
- Low weed burdens for broadleaf weeds and herbicide-resistant annual ryegrass are required for growing lentil.
- Lentil should be sown inter-row in standing cereal stubble.

## 2.1 Lentil requirements

### Checklist for lentil paddock selection:

- Is annual rainfall greater than 300 mm?
- If the annual rainfall is greater than 550 mm, is delayed or spring seeding possible?
- Is the soil of minimal salinity, sodicity and boron toxicity, with access to sufficient soil moisture later in the season?
- Is the soil friable and without surface crusting?
- Is the soil pH 5.5 or greater (in calcium chloride)?
- Is the soil free draining (no waterlogging)?
- Is the paddock free of surface stones and sticks and relatively flat?
- Are plant-back periods and rainfall accounted for to avoid herbicide residue impacts?
- Are the weeds burdens low for broadleaf weeds and herbicide-resistant annual ryegrass?
- Is the control of weeds possible?<sup>1</sup>

## 2.2 Rainfall and soil moisture

Lentil is best suited to locations that receive an annual rainfall of 350–500 mm. In drier or colder areas, lentil plants may not grow tall enough to be harvested efficiently.<sup>2</sup>

Lentil prefers the better, deeper wheat-growing soils with higher water-holding capacity and good drainage.<sup>3</sup>

Lentil is particularly sensitive to waterlogging. Spring seeding may be an option on some deeper, heavier soils in higher rainfall areas.

Some lentil varieties can be quite indeterminate in the environment with crop maturity being significantly affected by moisture supply.

Changes in soil type and moisture holding capacity across a paddock can lead to uneven crop maturation, delayed harvesting, and increased risk of weather damage or high harvest losses. Desiccation can mitigate these risks.

**Attention should be paid to the amount of stored soil moisture and received rainfall as this can have an impact on herbicide residues.**

1 Pulse Australia (2015) Best Management Guide – Lentil Production: Southern Region. Pulse Australia, <http://www.pulseaus.com.au/growing-pulses/bmp/lentil/southern-guide>

2 Grains Research and Development Corporation (2016) Lentil: The Ute Guide. Grains Research and Development Corporation, <https://grdc.com.au/resources-and-publications/all-publications/publications/2008/11/lentils-the-ute-guide>

3 W Hawthorne (2007) Residual Herbicides and Weed Control. Pulse Australia Southern Pulse Bulletin, PA 2007 #03, [http://www.pulseaus.com.au/storage/app/media/crops/2007\\_SPB-Pulses-residual-herbicides-weed-control.pdf](http://www.pulseaus.com.au/storage/app/media/crops/2007_SPB-Pulses-residual-herbicides-weed-control.pdf)

## 2.3 Soil type

Paddocks that have an even soil type are easier to manage and are preferred for lentil.<sup>4</sup> Changes in soil type across a paddock can lead to uneven crop maturation, which has implications for harvest. Implications include delayed harvesting, grain losses and increased risk of weather damage (all which can be alleviated with desiccation).

Soil tests and paddock records should be examined, with particular attention paid to the following soil characteristics:

- pH 5.5 to 8 (CaCl<sub>2</sub>);
- soil type – ideally sandy loams and heavier;
- low sodicity;
- low salinity/chloride;
- no soil compaction and low bulk density.<sup>5</sup>

### pH

Lentil is well suited to neutral to alkaline soils, preferring soils with a pH range of 5.5 to 8 (CaCl<sub>2</sub>).

Lentil performs poorly on acidic, aluminium soils, irrespective of whether the acidity is at the surface or subsurface. Acid soils (pH <5 CaCl<sub>2</sub>) delay and limit nodulation and nitrogen fixation and, hence reduce yields. Lentil rhizobia prefer pH 5.5 to 8 (CaCl<sub>2</sub>).<sup>6</sup>

They can also cause growth and yield variation within a paddock. Reasonable yields can be achieved on paddocks with pH as low as 5.0 where aluminium levels are low (aluminium < 4 µg/g).<sup>7</sup>

Soils with extremely low or high pH should be avoided.

### Soil type

Lentil is best adapted to soil types of high fertility (especially phosphorus and potassium), which is usually sandy loams to heavy clays. However, in optimum conditions, with good fertility, lentil can grow well in lighter soils. Lentil grows particularly well in self-mulching clays.

Lentil will cope in soils of low fertility. However, the effects of other soil management and seasonal constraints are likely to be exasperated and growth and yields adversely affected.

### Sodicity and boron toxicity

Lentil is very intolerant to boron toxicity and poor soil stability commonly associated with sodicity. Excessive boron or sodicity within the crop root zone (topsoil and/or subsurface soil) can cause plant death and severely limit lentil yields.

Sodic soils are those with an exchangeable sodium percentage (ESP) of 6 or greater. Factors other than ESP (electrical conductivity/salt concentration, organic matter and soil texture) also affect soil stability so a sodic soil is not always unstable, especially lighter, sandy soils. Lentil tolerance to sodicity in the root zone (to 90 cm) is generally similar or less than chickpea.

4 Grains Research and Development Corporation (2016) Lentil: The Ute Guide. Grains Research and Development Corporation, <https://grdc.com.au/resources-and-publications/all-publications/publications/2008/11/lentils-the-ute-guide>

5 Pulse Australia (2015) Best Management Guide – Lentil Production: Southern Region. Pulse Australia, <http://www.pulseaus.com.au/growing-pulses/bmp/lentil/southern-guide>

6 E Drew *et al.* (2012) Inoculating Legumes: A Practical Guide. Grains Research and Development Corporation, <https://grdc.com.au/GRDC-Booklet-InoculatingLegumes>

7 Agriculture Victoria (2005) Acid Soils. Agriculture Victoria AgNote Number: AG1182, <http://agriculture.vic.gov.au/agriculture/farm-management/soil-and-water/soils/acid-soils>

## Salinity

### Lentil is very susceptible to salinity.

Saline soils are defined as those with electrical conductivity (EC) of the saturated soil extract greater than 4 dS/m. This equates to about 0.32 dS/m water extract EC for sandy soil, 0.34 for loamy sand, 0.37 for sandy loam, 0.45 for loam and 0.65 for medium clay.

Lentil is particularly salt-sensitive compared to cereal crops and other pulses. Yield reduction has been reported in lentil at about 20% at an EC of 2 dS/m and 90–100% at an EC of 3 dS/m.<sup>8</sup>

There are small differences between varieties (moderately intolerant versus intolerant) that can be of practical significance, particularly in combination with boron sensitivity (see variety agronomic tables for red lentil – see [Table 3](#), and green lentil – see [Table 7](#)).

## Waterlogging

Effective drainage is essential as lentil does not tolerate flooding or waterlogged soils. Lentil plants will die if exposed to even short periods of waterlogging or flooding. Free-draining soils are a must when growing lentil.

### Lentil does not tolerate flooding or waterlogged soils.

## Compaction

The root system of lentil is not as vigorous and extensive as that of other plants such as canola. Growth, especially through drier periods and later in the season, will be hindered if the subsoil is tight and impenetrable to roots because of subsoil compaction or sodicity or contains rock layers such as coffee rock.

## 2.4 Seedbed requirements

Surface condition, including stubble, along with uniformity of soil type and topography, are important criteria in assessing whether a paddock is suitable for growing and harvesting lentil.

Lentil plants are short (15–80 cm) and can lodge at maturity resulting in harvesting near ground level. This means paddocks must be flat to allow harvesters to operate at a low cutting height. This is particularly an issue in dry seasons when crop height is low.

Heavily contoured and ‘crab-hole’ country should be avoided when selecting paddocks for growing lentil.

Furthermore, with the increasing width of harvester fronts, small variations in paddock topography can lead to big variations in cutting height. This results in increases in harvest losses.

The soil surface of paddocks selected for lentil should be levelled as much as possible, either prior to, or at, seeding.

**Cloddy, gravelly or badly ridged paddocks** are likely to cause soil contamination in the lentil sample during harvest.

**Stones and sticks** in paddocks are an issue for growing lentil. Harvest losses increase dramatically if the harvester front needs to be raised, to avoid serious mechanical damage to the harvester, due to sticks and stones. Small stones (like gravel) and wood fragments can also contaminate the grain sample and downgrade quality.

Foreign material must not exceed three per cent by weight, of which no more than 0.3 % must be unmillable material (soil, stones and on-vegetable matter). Lentil that

8 Pulse Australia (2015) Best Management Guide – Lentil Production: Southern Region. Pulse Australia, <http://www.pulseaus.com.au/growing-pulses/bmp/lentil/southern-guide>

FEEDBACK

**i MORE INFORMATION**

For more information on rolling go to [Section 5: Post-planting](#).

does not meet this export standard needs to be graded at a cost to the grower of around \$25/t.<sup>9</sup>

The use of a roller after seeding is a common practice when growing lentil as it is a valuable aid for efficient harvesting. The purpose of rolling is to level out ridges in the soil caused by seeding, and push clods of soil and small stones and sticks down, level with the soil surface.



**Photo 1:** A roller in a lentil crop.

Source: M. Raynes, formerly Pulse Australia



**Photo 2:** Ridges in a lentil crop, prior to rolling.

Source: M. Raynes, formerly Pulse Australia

<sup>9</sup> M Peoples (2015) Break crops should be a profitable choice. Grains Research and Development Corporation, <https://grdc.com.au/Media-Centre/Ground-Cover-Supplements/Ground-Cover-Issue-115-Profitable-pulses-and-pastures/Break-crops-should-be-a-profitable-choice>

FEEDBACK



**Photo 3:** Clods can be a harvest hazard in lentil. Soil can contaminate the sample if the paddock is not rolled after seeding.

Source: W. Hawthorne, formerly Pulse Australia



**Photo 4:** Stones can be a harvest hazard in lentil paddocks, unless the ground is rolled after seeding.

Source: W. Hawthorne formerly Pulse Australia

## IN FOCUS

**Stubble bunching or clumping can occur when seeding lentil into retained stubble if inter-row seeding techniques are not utilised.** The process of seeding can result in blockages of stubble that are left in clumps in the paddock which, in turn, becomes problematic at harvest. These mounds of stubble are often picked up in the harvester front, causing mechanical blockages and contamination of the sample if they contain excessive amounts of soil.

Options for dealing with stubble clumping include:

- using a zero-till (disc) seeder, or other seeder capable of handling heavy stubble;
- modifying existing air-seeders (tyne shape and lifting some tynes);
- seeding before soil and stubble becomes too wet;
- using rotary harrows to spread and level stubble; and
- burning or slashing standing stubble if seeding equipment with good trash flow is not available.



**Photo 5:** *Flat paddocks assist with harvesting efficiency.*

Source: T. Bray, formerly Pulse Australia



## 2.5 Stubble management

Stubble retention is when the stubble of the previous crop is left standing on the soil surface of the paddock.

Lentil is best inter-row sown into standing cereal stubble.<sup>10</sup>

Lentil fits well into stubble-retention systems such as minimum-tillage, direct drilling, no-tillage or zero-tillage. This is provided the physical seeding process is not affected by blockages of stubble in the seeder at seeding.

Yield increases of 10% and higher can be expected when lentil is sown into standing stubble utilising inter-row seeding.

Using GPS-guidance and auto-steer systems means lentil can be sown inter-row, between standing stubble rows. This aids in stubble clearance during seeding, often reduces herbicide throw and damage, and the lentil plant grows taller and more erect, achieving greater harvest efficiency.<sup>11</sup>

### Reducing the stubble load with livestock

Stubble can be grazed over the summer to benefit livestock and, importantly, reduce the stubble load in preparation for growing lentil.

It is important to note that stubble, which grazing animals have trampled, or is lodged, or brittle from summer rainfall, can present difficulties at seeding, even when seeding inter-row.<sup>12</sup>

### Rolling lentil

Rolling lentil after seeding, for harvest efficiency or herbicide safety reasons, partially flattens standing stubble. Partially flattened standing stubble still provides trellising support for the growing plant.

### Erosion

On sandy and light soils, stubble retention lessens the risk of wind erosion. Stubble loads are often low on these soils and do not usually present a barrier to minimum-tillage seeding or direct drilling. Stubble retention and reduced tillage also provide protection from water erosion on hills and steep slopes, especially during summer rainfall or storms.

### Slugs and snails

Stubble retention is often not possible in areas where slugs and snails are a major problem at establishment, or where snails are a concern at harvest, particularly in higher rainfall zones.

Late burning of high stubble loads, just before seeding can assist with seeding (by reducing likelihood of blockages due to excess stubble), and the control of pests such as slugs and snails.

After a late stubble burn the soil surface is exposed, which increases the risk of erosion. It also allows weeds to establish more readily, compared to retained stubble.<sup>13</sup>

<sup>10</sup> Pulse Australia (2016) Southern Lentil: Best Management Practices Training Course. Pulse Australia.

<sup>11</sup> J Lamb, A Poddar (2008) Grain Legume Handbook for the Pulse Industry. Grain Legume Hand Book Committee, <https://grdc.com.au/grainlegumehandbook>

<sup>12</sup> Pulse Australia (2016) Southern Lentil: Best Management Practices Training Course. Pulse Australia.

<sup>13</sup> Pulse Australia (2015) Best Management Guide – Lentil Production: Southern Region. Pulse Australia, <http://www.pulseaus.com.au/growing-pulses/bmp/lentil/southern-guide>

### Stubble from drought-affected cereal or hay

Lentil crops that follow a drought-affected cereal or hay may not benefit from the limited amount of stubble retained. This is particularly so when seeding is aggressive, causing a high level of soil disturbance and incorporation of the remaining stubble.<sup>14</sup>

## 2.6 Rotation history

Pulses, such as lentil, have an important, complementary role in crop rotations, by enabling better management of weeds, diseases, herbicide residues and soil nitrogen.<sup>15</sup>

While the most suitable rotation requires careful planning, there are no set rules and a separate rotation should be devised for each cropping paddock. The main aims should be maximum profitability and longer-term sustainability.

To achieve this, the rotation must be flexible enough to cope with key strategies such as maintaining soil fertility and structure, controlling crop diseases, and controlling weeds and their seedset.

Recent research in Victoria and southern New South Wales showed that canola and pulse crops were frequently as profitable, and in some cases, considerably more profitable, than wheat. Furthermore, wheat following break crops (including pulses) was consistently more profitable than a wheat-on-wheat rotation.<sup>16</sup>

Some growers have adopted a pulse–wheat–barley sequence as a basic rotation.

However, where a pulse can be grown with other crops, growers are increasingly adopting a continuous pulse–cereal–oilseed–cereal rotation.<sup>17</sup>

Successive cropping with the same pulse is likely to result in rapid build-up of root and foliar diseases and weeds.

**Extreme care must be taken if growing the same crop in the same paddock without a break of at least 3 years.**

Where possible, different pulse crops should be alternated when in a continuous rotation with cereals.

## 2.7 Herbicide residues in soil

Lentil is extremely sensitive to some residual herbicides.

Residues from herbicides, used in the previous crop (sometimes previous two crops), can cause damage to the lentil plant. This is particularly so when summer rainfall has been minimal, as adequate rainfall and time is required to break down herbicide residues in the soil profile.<sup>18</sup>

It is very important to know the chemical history of the paddock for at least two seasons. This includes:

- the chemical used;
- the group with which the chemical belongs;
- the plant-back periods;
- the soil pH (which affects the half-life and longevity of herbicides);
- rainfall; and
- other requirements for herbicide breakdown.<sup>19</sup>

### MORE INFORMATION

Please see [Section 4.6 Herbicide residues](#) and [Section 8.7 Herbicide residues](#) for more information

14 Pulse Australia (2016) Southern Lentil: Best Management Practices Training Course. Pulse Australia.

15 J Lamb, A Poddar (2008) Grain Legume Handbook for the Pulse Industry. Grain Legume Hand Book Committee, <https://grdc.com.au/grainlegumehandbook>

16 C Mullen (2004) The right pulse in the right paddock at the right time. NSW DPI AgNote 446, <http://www.dpi.nsw.gov.au/agriculture/broadacre-crops/winter-crops/general-information/right-pulse>

17 Pulse Australia (2016) Southern Lentil: Best Management Practices Training Course. Pulse Australia

18 W Hawthorne (2007) Residual Herbicides and Weed Control. Pulse Australia Southern Pulse Bulletin, PA 2007 #03, [http://www.pulseaus.com.au/storage/app/media/crops/2007\\_SPB-Pulses-residual-herbicides-weed-control.pdf](http://www.pulseaus.com.au/storage/app/media/crops/2007_SPB-Pulses-residual-herbicides-weed-control.pdf)

19 Pulse Australia (2015) Best Management Guide – Lentil Production: Southern Region. Pulse Australia, <http://www.pulseaus.com.au/growing-pulses/bmp/lentil/southern-guide>

FEEDBACK

### MORE INFORMATION

For detailed information on 'Herbicide residues and weed control' go to: [http://www.pulseaus.com.au/storage/app/media/crops/2007\\_SPB-Pulses-residual-herbicides-weed-control.pdf](http://www.pulseaus.com.au/storage/app/media/crops/2007_SPB-Pulses-residual-herbicides-weed-control.pdf)

### MORE INFORMATION

For detailed information go to [Section 8 Weed control](#).

Herbicides applied two seasons ago can still have an impact, as can the presence of cereal stubble containing herbicides like Lontrel®. In some situations, some herbicides from more than two seasons ago can still have an impact.

**Reading the herbicide label is critical to ensure adherence of plant-back periods.**

The plant-back period is the period of time required from spraying a herbicide to when it is safe to grow a new crop. It is deemed safe because the herbicide residues have broken down in the soil and can no longer damage the new crop.

Pulses and other crop types differ in their sensitivity to residual herbicides, meaning plant-back periods vary for crop types and also within varieties.

Most lentil varieties are particularly sensitive to soil carryover residues of Group B herbicides and Group I herbicides. Group B herbicides include sulfonylurea (SU) and imidazolinone (IMI). Examples of sulfonylurea herbicides include Ally®. Imidazolinone herbicides include OnDuty® and Spinnaker®. Clopyralid and picloram are examples of Group I herbicides.

The recently released varieties PBA Hurricane XT<sup>®</sup> and PBA Herald XT<sup>®</sup> varieties show less sensitivity to sulfonylurea and imidazolinone (Group B) herbicide carryover residues.

**Not all chemical labels include lentil in the plant-back information. Extra caution and advice, from the manufacturer and an experienced agronomist, are recommended when planning rotations for lentil.**

## 2.8 Weed status of paddock

**Lentil is a poor competitor against weeds** and paddocks with high weed burdens should be avoided for growing lentil. This particularly refers to broadleaf weeds, which cannot be controlled by herbicides post-emergence and for high levels of herbicide-resistant ryegrass.<sup>20</sup>

### Problem weeds

Some weeds are often more difficult to control in lentil than in other pulse crops. It is important to control these problem weeds in the years prior to growing lentil. These weeds include:

- vetches;
- tares;
- medics;
- self-sown peas;
- herbicide-resistant ryegrass;
- wild radish;
- beans;
- soursob; and
- marshmallow.<sup>21</sup>

Attention must be given to preventing seedset of weeds in paddocks in the years prior to growing lentil.

### Contamination

To avoid seed contamination at harvest, **lentil should not be grown in paddocks with a history of vetch.**

Cereal grains are not easily cleaned from lentil grain so self-sown cereals must be removed from lentil crops using grass herbicides.

<sup>20</sup> Grains Research and Development Corporation (2016) Lentil: The Ute Guide. Grains Research and Development Corporation, <https://grdc.com.au/resources-and-publications/all-publications/publications/2008/11/lentils-the-ute-guide>

<sup>21</sup> Pulse Australia (2015) Best Management Guide – Lentil Production: Southern Region. Pulse Australia, <http://www.pulseaus.com.au/growing-pulses/bmp/lentil/southern-guide>



### Control

It is rarely possible to select a paddock with a weed-free status. Consequently, there are a range of herbicides available to provide effective weed control in lentil.

It is important to note that herbicides can affect lentil yield. Furthermore, there are differing degrees of sensitivity to specific herbicides in lentil varieties.

Close attention must be paid to weed control during the cropping season as weed numbers are likely to increase, resulting in reduced yields and potentially affecting future crops.



**Photo 6:** *Weed-infested paddocks are difficult to control in lentil.*

Source: M. Raynes, formerly Pulse Australia

### MORE INFORMATION

See [Section 10 Diseases](#) for further information.

## 2.9 Disease status of paddock

### Foliar diseases

**To minimise foliar disease, it is recommended lentil crops should be separated from the previous year's lentil stubbles (and other pulse stubbles) by at least 500 metres**, and up to one kilometre in areas where old stubble is prone to movement (e.g. down slope and on flood plains).<sup>22</sup> The practicalities of achieving this are difficult. Current practice is not seeding into a previous pulse stubble. However, seeding next to a paddock with a previous pulse stubble is considered acceptable.

This helps to reduce the spread of *Botrytis* grey mould and *Ascochyta* blight, both foliar and stubble-borne diseases.

### Root diseases

#### *Cereal cyst nematode (CCN)*

Cereal cyst nematode (CCN) is a potentially serious root disease in some areas. CCN requires a cereal or grass host to develop. Therefore, a pulse crop (a grass-free crop) following a cereal crop results in a significant reduction in the severity of the disease.

Pulses are one of the key factors in an overall long-term management strategy to control or avoid CCN.

<sup>22</sup> Grains Research and Development Corporation (2016) Lentil: The Ute Guide. Grains Research and Development Corporation, <https://grdc.com.au/resources-and-publications/all-publications/publications/2008/11/lentils-the-ute-guide>

FEEDBACK

### *Take-all (haydie)*

Take-all, like CCN, must have a cereal or grass host to develop. Pulses, being a non-host, can be used very effectively as a one-year disease break-crop in a cereal rotation.

### *Rhizoctonia*

Rhizoctonia has a very wide host range and so, unlike CCN or take-all, attempting to reduce the problem through crop rotation is not as effective. However, seeding and tillage practices can be very effective.

Another key factor in controlling Rhizoctonia is the availability of nitrogen in the soil. Including a pulse in a cereal rotation increases the amount of available nitrogen to the following crop. It is this increase in nitrogen that both masks some of the effects of the disease and helps the crop in recovering after an attack of Rhizoctonia.

### *Root-lesion nematode (Pratylenchus spp.)*

Either of the two species of root-lesion nematode (*Pratylenchus neglectus* or *P. thornei*) can reduce cereal crop yields. Growing a pulse crop that is resistant to root-lesion nematode can increase cereal yields by reducing the nematode numbers.

## Disease combinations

In a normal cropping rotation, it is unusual for cereal root diseases to occur independently. Consequently, the ability of a pulse crop to reduce the severity of most major cereal root diseases is considerable.

The effectiveness in controlling cereal root diseases is dependent on grass weed control in non-cereal phases. In other words, **the success of the pulse in the rotation hinges on the control of all grassy weeds and volunteer cereals during the pulse phase.** Grassy weeds and volunteer cereals that survive in the pulse phase can carry over cereal root diseases.

For take-all, one year of a grass-free break crop is enough to gain maximum benefit. With CCN, several years of a break are required. Hence, maximum benefit is achieved through a crop rotation that includes pulses in combination with resistant cereal varieties, grass-free pastures, and canola.

FEEDBACK

**i MORE INFORMATION**

For information on nitrogen fixation go to the following GRDC Factsheets:

Nitrogen fixation of crop legumes: basic principles and practical management  
<https://www.grdc.com.au/GRDC-FS-NFixation-Legumes>

Nitrogen fixation benefits of pulse crops  
<https://grdc.com.au/Research-and-Development/GRDC-Update-Papers/2009/09/NITROGEN-FIXATION-BENEFITS-OF-PULSE-CROPS>

**i MORE INFORMATION**

For detailed information on nutrition requirements for lentil go to [Section 7 Nutrition and fertiliser](#).

## 2.10 Nutrition status of paddock

### Soil fertility

Using pulses in the rotation assists in maintaining soil fertility, especially nitrogen. Pulses have the ability to make or 'fix' their own nitrogen from the air when effectively nodulated with rhizobium bacteria ([Table 1](#)).

A trial in South Australia aimed to determine the effects of rotation on soil nitrogen ([Table 1](#)). After 10 years of continuous cereal and pulse cropping soil fertility was maintained in terms of both total soil nitrogen and organic matter.

**Table 1:** Effect of rotation on total soil nitrogen (%) and organic carbon (%) in the surface soil (0–10 cm),

Rotation	Total soil nitrogen (%)		Organic carbon (%)	
	At start	5 years later	At start	5 years later
Continuous wheat	0.087	0.079	0.93	0.88
Wheat/field pea	0.090	0.088	0.99	0.95
Wheat/lupin	0.089	0.102	0.95	0.92
Wheat/faba bean	0.094	0.095	0.98	0.95
Wheat/volunteer pasture	0.087	0.088	0.95	1.01
Wheat/sown pasture	0.092	0.099	0.98	1.12
Wheat/fallow	0.090	0.086	0.98	0.88

Source: Grain Legume Handbook, (2008)

Additional nutritional requirements can be met with the application of fertiliser.