

# CLIMATE AND SOILS

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## SUMMARY

- Wide variation in climate occurs over the Australian continent with annual rainfall ranging from 325 mm to 700 mm in canola growing areas.
- The risk of drought is ever present, especially in lower rainfall areas that are now growing canola.
- The soils of Australia are old and low in phosphorus, nitrogen, potassium and some trace elements.

## CLIMATE

Much of Australia receives too little annual rainfall to successfully grow canola (Table 1). In particular, about 87% of South Australia and 73% of Western Australia receive less than 300 mm rainfall per year.

Table 1. Area distribution of median annual rainfall in Australia (%)

Median annual rainfall	New South Wales	Victoria	Queensland	South Australia	Western Australia	Tasmania	Northern Territory	Australia
Less than 200 mm	8.0	-	10.2	74.2	43.5	-	15.5	29.6
200-300 mm	20.3	6.3	13.0	13.5	29.6	-	35.6	22.9
300-400 mm	19.0	19.2	12.3	6.8	10.5	-	9.0	11.2
400-500 mm	12.4	11.8	13.5	3.2	4.3	-	6.6	7.6
500-600 mm	11.3	14.1	11.6	1.8	3.1	12.2	5.8	6.6
600-800 mm	15.1	24.5	20.5	0.5	4.6	18.2	11.6	10.7
Above 800 mm	13.9	24.1	18.9	-	4.4	69.6	15.9	11.4
Total	100	100	100	100	100	100	100	100

The climate in Australia is predominantly continental with the inland areas relatively dry. During winter, southern Australia experiences cool, moist, westerly winds which cause rainy periods. Therefore the rainfall distribution peaks sharply in mid winter, with 65-75% of annual rainfall received between May and October. Most canola is sown in late autumn or early winter (April to June) with harvest in late spring and early summer (November and December). The growing season ranges from about 150 to 210 days, depending on latitude, rainfall and temperature and sowing date. Summer is very dry with northerly to easterly winds which result in high temperature and evaporation. In northern Australia, rainfall is summer incident and generally not suited to canola production.

In canola production areas, daily temperatures during winter often range from minima of about 4-5° C to maxima of 14-18° C. Flowering generally occurs in August and September when temperatures are rising. Grain fill in October and November often occurs under high temperature and low rainfall which can result in low yields and oil content. Rare frosts after flowering have sometimes aborted seeds and reduced yield.

Australia has one of the most variable rainfall climates in the world. Long term, Australia has about three good years and three bad years out of ten. These fluctuations have many causes, but the strongest is the climate phenomenon called the Southern Oscillation. This is a major air pressure shift between the Asian and east Pacific regions - its best-known extreme is El Niño. For Australian conditions, drought frequency is crucial. Research indicates that severe drought affects some part of Australia on average once every 18 years, with intervals between severe droughts varying from 4 to 38 years. Drought is an ever present threat to Australian agriculture and is only now being better understood. Further information about Australian weather is available on the Bureau of Meteorology web page ([www.bom.gov.au](http://www.bom.gov.au))

## **SOILS**

The soils of Australia are old, severely weathered and leached. This results in low levels of soil nutrients, particularly phosphorus. Widespread low phosphorus levels have severely retarded biological activity in many soils; as a consequence, the shallow top soil over large areas, is low in organic matter and has poor structure. In addition many of the subsoils have high clay contents, coarse structure and low permeability, and many contain appreciable amounts of sodium salts. Historically, Australian soils are deficient in phosphorus, nitrogen, potassium and some trace elements.

The wide distribution of canola across Australia indicates that it is adapted to a wide range of soil types. Soils that grow the best canola are easily identifiable as they also grow the best wheat. Therefore, the best soils for canola are red-brown earths and clay soils. However, other soils including sands and sand over clay, are now successfully cropped to canola.

## **SOIL CONSTRAINTS TO CANOLA PRODUCTION**

Canola is sensitive to waterlogging and paddocks with this problem should be avoided. Sodic and dispersing soils which surface seal will significantly reduce emergence of canola seedlings. On light, sandy soils, canola seedlings are vulnerable to wind blasting. Soil pH has little effect on canola production except on very acid soils where manganese and aluminium toxicity may affect yield. On these soils, liming is now used before sowing canola to alleviate the situation. Gypsum is often applied to sodic soils to improve soil structure and also to alleviate sulphur deficiencies that are now being identified.

## **AREA**

The current area of canola in Australia is about 1.6 million hectares. Canola is grown in most cropping areas of southern Australia. However, the potential size of the canola industry could reach 2.5 to 3.5 million hectares, with likely increases in area in all states that currently grow canola. Recent increases in production have occurred in lower rainfall areas and this is likely to increase.

## **FUTURE DIRECTIONS**

A great deal of effort is being expended to better understand the Southern Oscillation, in particular to be able to predict the El Niño which has its greatest effects on the eastern coast of Australia. This may enable more timely information to farmers, at sowing time, about the likely total seasonal rainfall, which may then allow better decisions about the mix of crops in the rotation.