



NSW Agriculture



# Colour banding on cereal seedlings

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Colour banding is a mostly-benign natural phenomena occurring in some cereal crops on the first and second leaves. It is due mostly to cold nights and sunny mornings in the developmental phase of these crops.

## SYMPTOMS

The symptoms of this condition include pale bands that appear on the first and second leaves of wheat and some other cereals. These bands usually occur on most of the seedlings in an affected paddock. They appear in a similar position on each seedling, so that, when the crop is viewed from a low angle, these bands all line up. Single and multiple bands can occur.

Colour banding — sometimes called ‘rugby stocking’ — is more common in deeply-sown crops that experience bright, sunny mornings following cold nights. The banding can sometimes be more severe than just a pale colour and dead patches on the plant can also develop.

Affected seedlings, however, usually grow normally with the colour banding not affecting the productivity of the plant.

## THE CAUSE

### Cold nights — sunny mornings

Colour banding occurs when bright, early morning sunlight destroys the chemical that is the precursor to chlorophyll faster than the plant can transform this precursor into chlorophyll. This bleaching, though, only occurs under certain circumstances. To understand the process, wheat seedlings grown on wet cotton wool in the dark appear white, but quickly turn green when they

### Disclaimer

The information contained in this publication is based on knowledge and understanding at the time of writing (July 2003). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up-to-date and to check the currency of the information with the appropriate officer of New South Wales Department of Agriculture or the user's independent adviser.

are exposed to light. This green colour is due to chlorophyll, the pigment that captures the energy in sunlight and uses this energy for the growth of the plant.

### Development of green pigment (chlorophyll)

Plant cells develop chlorophyll through a series of stages. The immediate precursor to this development is a chemical called pro-chlorophyll which is colourless. Plants convert pro-chlorophyll into chlorophyll in the presence of sunlight. However, the rate that this reaction occurs depends on temperature. Generally, the process is slower in cold weather and speeds-up as plants warm during the day.

Although sunlight is necessary for this reaction, sunlight can also destroy pro-chlorophyll. The level of this destruction depends on the amount of sunlight available. Therefore, in cold, sunny weather, there is generally greater destruction of pro-chlorophyll and less formation of chlorophyll with the result that plant tissue can turn pale or yellow. This damage can be severe with red plant pigments forming that create brighter-coloured bands on the seedling. In more extreme cases, part of the leaf can be killed.

## Why colour bands develop

When the seed is sown deeply, as when chasing moisture, the shoot (coleoptile) can often be very long. The first true leaf can then form inside the shoot and may need to push through to the soil surface. Leaves grow from a base and, in seedlings, the growing point remains below ground level for some time, particularly when seeds are sown deeply.

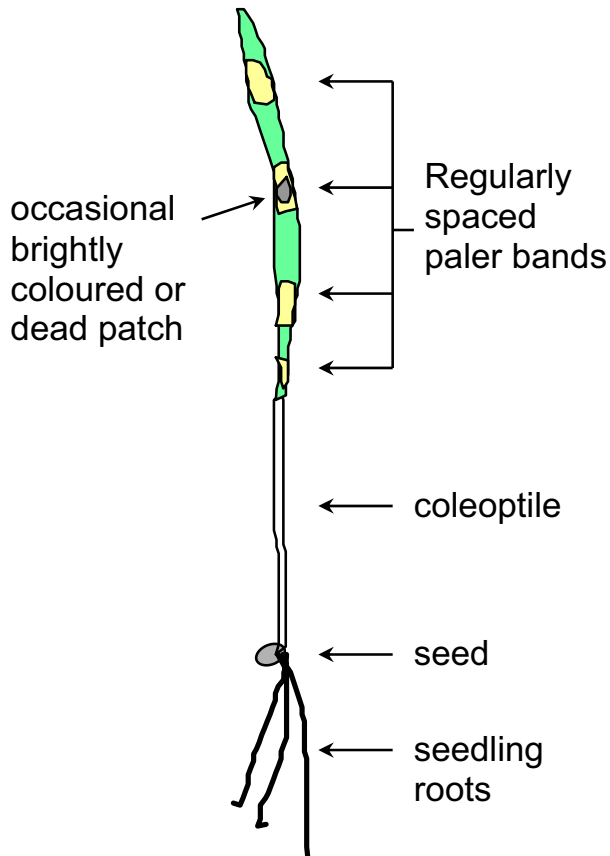
The parts of a leaf that emerges overnight remains white before dawn. On cold, bright, sunny mornings, the pro-chlorophyll in newly-emerged parts of the leaf can be destroyed by sunlight before they can be converted to chlorophyll. These colour bands therefore occur mostly when seeds are sown deeply when there is clear weather in the days just after the seedlings begin to emerge. These clear and cold mornings can occur over several consecutive days giving rise to a series of bands. The intensity of this banding is determined by the brightness of the early morning sunlight and the temperature. Colour bands stop developing once the growing point has reached the soil surface. Damage is usually slight with no effect on yield.

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Leaf collapse following severe damage from colour banding.