

# Control of powdery mildew on irrigated soybeans in southern NSW 2015–16

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## Key findings

- Powdery mildew infection was observed during the 2015–16 season, although less severe than in previous seasons.
- Powdery mildew infection was found on all soybean varieties except Djakal, demonstrating its known resistance.
- Fungicide applications had no effect on the grain yield of Djakal, N005A-80 or P176-2 varieties, however, the Snowy<sup>®</sup> variety had a significant increase in grain yield when treated with tebuconazole in a split application regime.

## Introduction

Powdery mildew is a disease in soybeans caused by the fungal pathogen *Erysiphe diffusa* (*Microsphaera diffusa* syn.). It thrives during periods of low temperature and high humidity with the potential to cause major production losses in Australia's tropical and subtropical soybean producing areas. It first appeared in the Riverina's (NSW) soybean crops during the 2011–12 season and has since consistently infected susceptible crops throughout the region.

A field experiment was conducted in the summer of 2015–16 at the NSW DPI Leeton Field Station to investigate the effect of powdery mildew and four fungicide treatments on the grain yield of two commercial soybean varieties (Djakal and Snowy<sup>®</sup>) and two unreleased breeding lines (N005A-80 and P176-2).

## Site details

Location	Leeton Field Station, Yanco NSW
Soil type	Grey, self-mulching clay (vertisol)
Previous crop	Barley
Fertiliser	125 kg/ha legume starter (N=13.3%, P=14.3%, S=9%, Zn=0.81%)
Inoculation method	Peat slurry in-furrow injection
Paddock layout	Raised beds (1.83 m centres) with furrow irrigation
Plant population	Target: 35 plants/m <sup>2</sup>
Sowing date	2 December 2015
Harvest date	20 April 2016

## Treatments

### Varieties

Djakal, Snowy<sup>®</sup>, N005A-80 and P176-2

### Fungicide

Control, no fungicide applied

Tebuconazole 430 g/L (Folicur<sup>®</sup> SC) + 1 % Hasten<sup>™</sup>

Product A + 1% Hasten<sup>™</sup>

### Fungicide application regime

Tebuconazole, 100% rate at full flower (R2)

Tebuconazole, 80% rate at full flower (R2) and 80% rate 2 weeks later

Product A, 100% rate at full flower (R2)

Product A, 50% rate at full flower (R2) and 50% rate 2 weeks later

## Results and discussion

### Powdery mildew infection

Overall the severity of powdery mildew in the 2015–16 season was low compared with previous seasons. The highest recorded severity in this season was 58% compared with >90% recorded for multiple treatments in the 2013–14 and 2014–15 seasons.

While all four fungicide treatments effectively reduced the powdery mildew severity in susceptible varieties, some treatments had more effect than others (Figure 1). The single and split application of Product A, as well as the split application of tebuconazole, were highly effective at reducing disease severity, while the single application of tebuconazole was not as effective.

Snowy<sup>db</sup>, N005A-80 and P176-2 all had received similar levels of powdery mildew infection for each treatment. Djakal demonstrated its known resistance to powdery mildew with no infection detected.

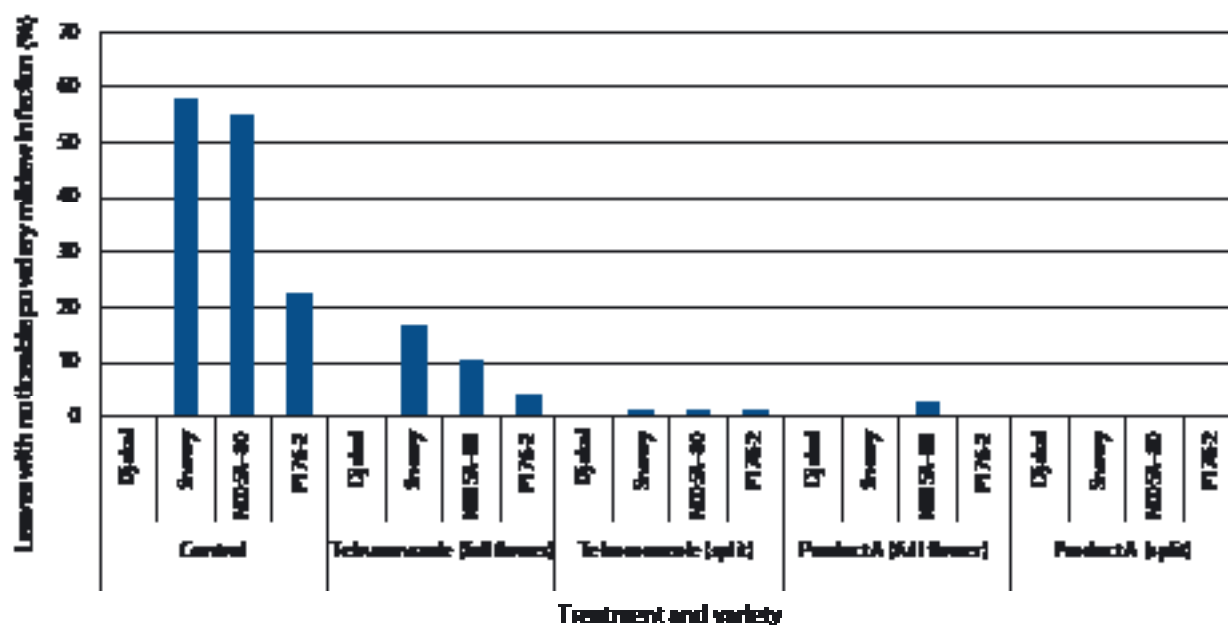


Figure 1. Fungicide efficacy on powdery mildew in four soybean varieties.

### Yield

The grain yield of Djakal, N005A-80 and 176-2 did not vary significantly between fungicide treatments (Figure 2). This is likely due to low levels of powdery mildew infection, as well as the late onset of infection during the 2015–16 growing season. However, the split application of tebuconazole did result in a significant (14%) increase in grain yield for Snowy<sup>db</sup>. This effect was unique to the ‘split application of tebuconazole’ treatment and did not occur with the other fungicide treatments for Snowy<sup>db</sup>.

Tebuconazole has a permit for use (PER82518, expiry 31/03/22) in soybeans to control powdery mildew. Product A is not currently permitted in Australia for use on soybeans.

The powdery mildew infection that occurred during the 2015–16 season had no significant impact on seed size, protein or oil. However, the severity of powdery mildew infection was considered low compared with the northern growing regions where powdery mildew can cause significant leaf defoliation.

The results confirm that Djakal has a strong level of resistance to powdery mildew.

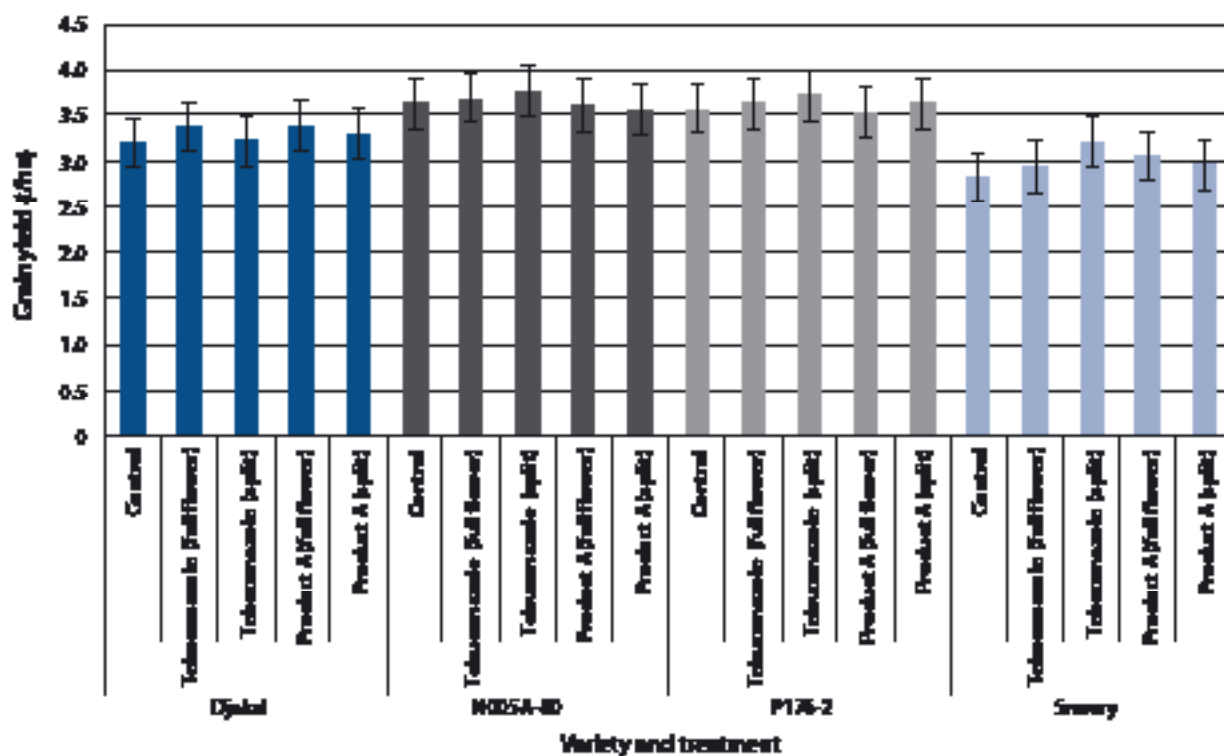


Figure 2. Effect of fungicide rate and timing on the grain yield of four soybean varieties. Bars denote 1 s.d. ( $P = 0.05$ ) = 0.27 t/ha.

## Summary

Powdery mildew is a major disease affecting soybeans in the tropical and subtropical regions of northern Australia. In the past five seasons, the disease has appeared in the Riverina at varying levels of severity. While all fungicide treatments reduced the disease's severity in the 2015–16 season, its late onset, combined with the relatively low severity of powdery mildew, resulted in few significant yield responses.

NSW DPI will continue to research new breeding lines with powdery mildew resistance.

## Acknowledgements

This experiment was part of the 'Southern NSW Soybean Agronomy Project', DAN00192, 2014–18, with joint investment by GRDC and NSW DPI.

Thank you to John Dando, Paul Morris and Gabby Napier for their operational support.