

# Reduced Harvest Losses Using PodGuard Canola

Timothy Davey, David Pike, David Peake, Bayer Australia

## Key messages

- Bayer has developed canola varieties with the PodGuard™ trait that are less prone to shattering and suitable for direct heading or windrowing.
- Grower's using these varieties will have greater flexibility in managing harvest operations and a reduced risk of shattering losses at windrowing and harvest.
- The PodGuard varieties showed reduced losses under extreme conditions, although there were some losses when harvest was delayed under these conditions. Avoid delaying canola harvest for unnecessarily long periods as pod shatter is not the only mechanism causing yield losses.

## Aims

Pod shatter is a major problem in canola production worldwide. Shattering is a natural process in the plant. The ancestors of canola had evolved to release their seed on the ground so that it would be ready to germinate when conditions were favourable.

One of the challenges with pod shatter is that the weather events that trigger shattering are difficult to predict and don't occur every year.

To mitigate the risk of shattering, most farmers windrow their canola. Many farmers also give canola harvest high priority within their farming operations to reduce the chance of a shattering event occurring while the canola is at the susceptible stage. These management strategies add costs to canola production and reduce the farmer's flexibility at harvest time.

For over ten years, Bayer has been undertaking research globally to develop varieties of canola with reduced risk of shattering. Bayer has developed the PodGuard trait that reduces the shattering risk. The first PodGuard varieties for Australia have been developed and these were tested in 2014 and 2015 under Australian conditions.

The aims of this research were to evaluate the PodGuard trait and PodGuard varieties under Australian production conditions.

## Method

### *Harvest losses delayed harvest and high winds*

In 2015, trials were established at Longerenong in Victoria to measure the extent of losses of canola varieties from shattering events. Two PodGuard varieties containing the PodGuard trait were sown and compared with Hyola 404 RR. The trial was harvested at three timings.

### *Harvest losses hail*

A trial including two PodGuard varieties and two commercial checks was conducted at Meckering in 2014. The trial was established as a split plot design. There were two windrowing timings. A small but significant hail event occurred between the first and second windrowing timings.

## Results

### Harvest losses delayed harvest and high winds

The trial at Longerenong was harvested at three different times. Table 1 shows the dates of harvest. Figure 1 shows the seed yield at each harvest, along with wind and temperature conditions.

Table 1 Dates of three different harvest times at Longerenong in 2015.

Harvest Timing	Date
Harvest Time 1 – Optimal timing	10 <sup>th</sup> November
Harvest Time 2 – Delayed harvest	24 <sup>th</sup> November
Harvest Time 3 – Delayed harvest	1 <sup>st</sup> December

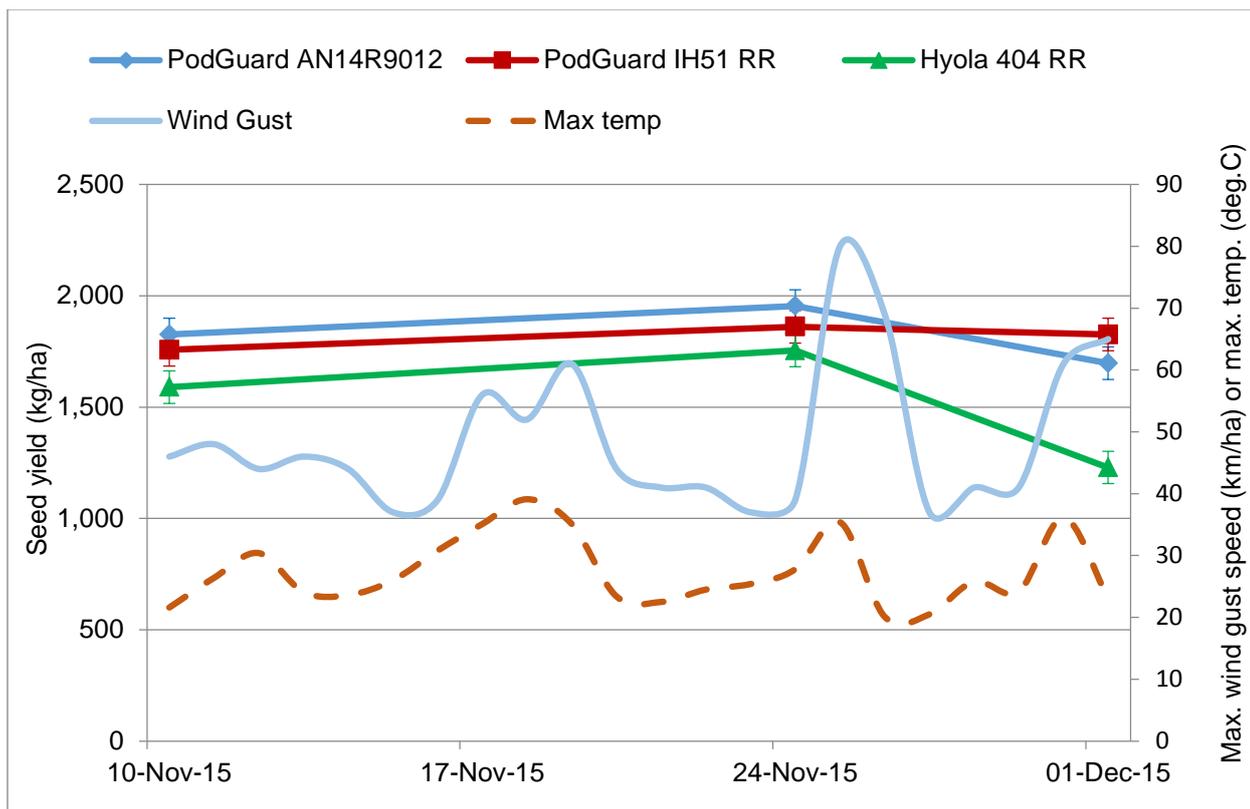


Figure 1 Harvested seed yield of three canola varieties at Longerenong in 2015, at three harvest timings, with corresponding weather data.

The two PodGuard varieties showed similar yields across the three harvest timings. Hyola 404 RR showed a significant reduction in yield at the third harvest timing.

The losses in Hyola 404 RR correspond with periods of strong hot northerly winds that occurred in November.

These results are similar to results found by Mark Seymour in trials conducted by Department of Agriculture and Food, Western Australia at Esperance in 2015. Mark evaluated one PodGuard line and three commercial varieties at three different harvest timings. Table 2 shows the date of the Esperance harvests.

Table 2 Dates of three different harvest times at Esperance in 2015.

Harvest Timing	Date
Harvest Time 1 – Optimal timing	4 <sup>th</sup> November
Harvest Time 2 – Delayed harvest	25 <sup>th</sup> November
Harvest Time 3 – Delayed harvest	16 <sup>th</sup> December

Yield results for the Esperance trials are shown in figure 2, along with wind, temperature and rainfall data. Like the Longerenong results, the PodGuard line evaluated was the highest yielding and over the course of delayed harvesting showed considerably less seed loss than the commercial canola lines.

Esperance experienced extreme weather conditions on the 17th of November; high temperatures and wind gusts over 80km/hr caused catastrophic fires in the region. A key observation from the research at Esperance was that under these extreme conditions some yield losses could be attributed to mechanisms other than shattering. In particular, all varieties lost whole pods. In total the PodGuard line lost 636 kg/hectare, mostly from unopened pods. Similar observations have been made in Canada under very high wind conditions.

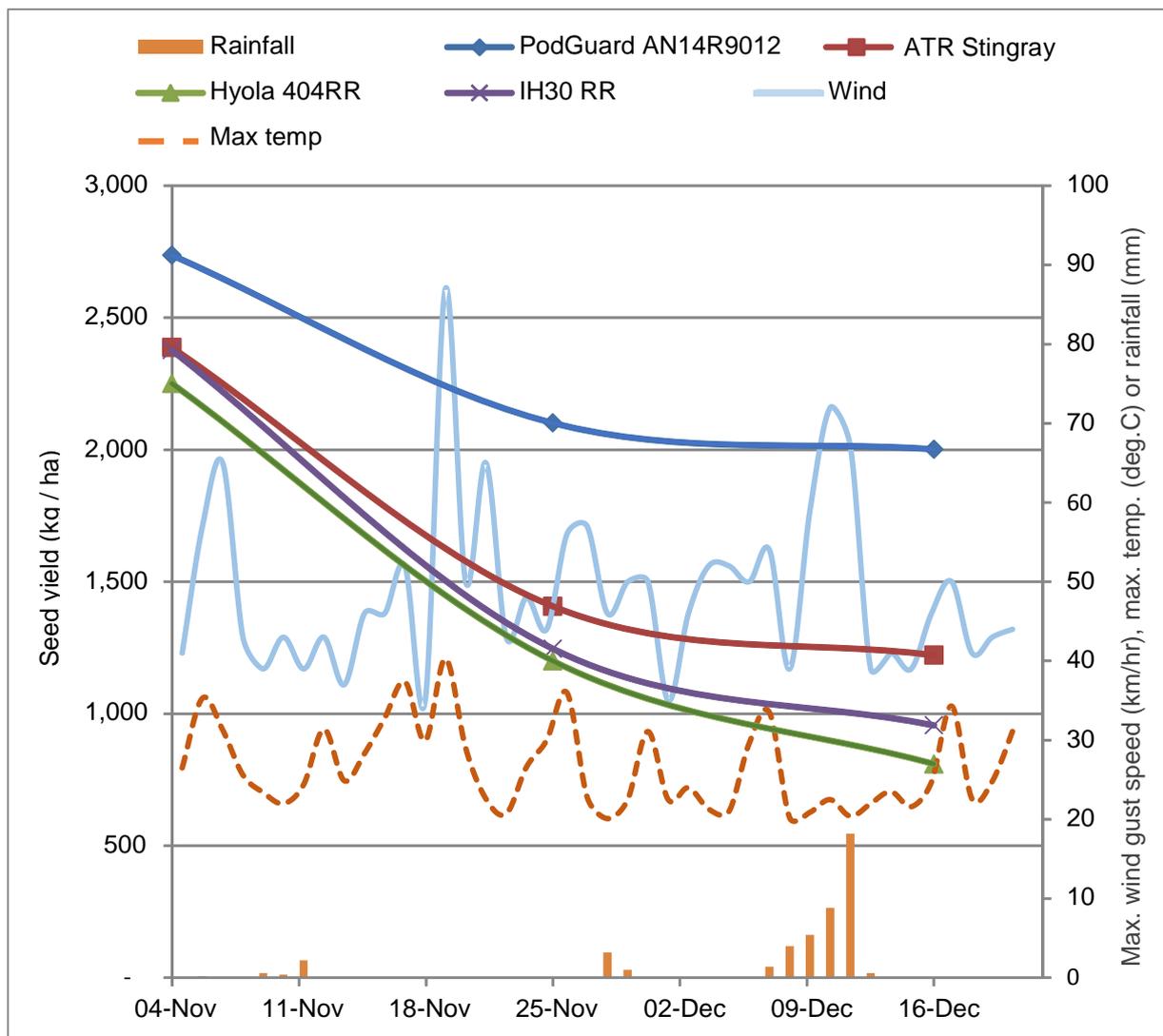


Figure 2 Harvested seed yield of four canola varieties near Esperance in 2015, at three harvest timings, with corresponding weather data (Source: M Seymour, DAFWA).

### Harvest losses hail

Environmental events, like hail, can also cause shattering losses. Table 3 shows the percentage seed colour change at two different windrowing timings.

The Meckering trial site experienced a small hailstorm between completion of the first windrowing and prior to the second windrowing. The commercial crop surrounding the trial site was still standing at the time of the hail storm and the farmer estimated losses of fifteen percent. Losses from the windrowed canola were minor as the top layer of canola protected the windrow. For the standing canola, the damage to the commercial lines without the PodGuard trait was clearly visible while there was only minor damage to the PodGuard lines.

Figure 3 shows the yields for the two windrowing timings. For the material windrowed before the hail, the commercial lines were the highest yielding. After the hail event, the two commercial lines had considerably lower yields, while the two PodGuard lines showed slight increases in yield.

Table 3 Percentage seed colour change at two different windrow timings near Meckering in 2014.

Windrowing Timing	Seed Colour Change
Windrow Time 1 – Industry standard	40-60%
Windrow Time 2 – Delayed	90-100%

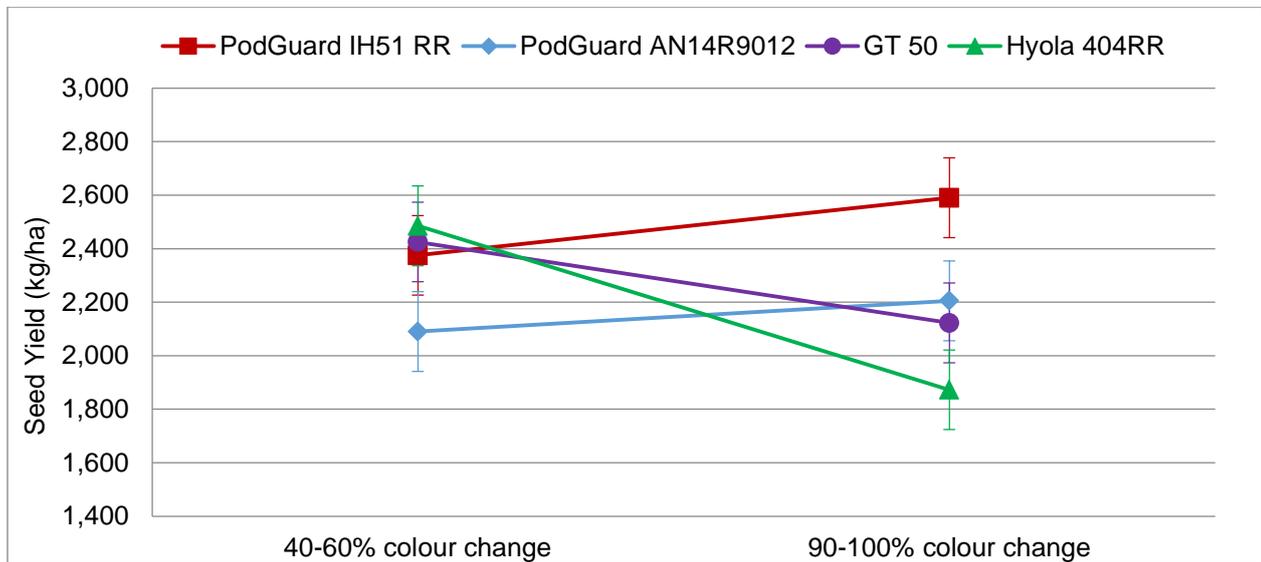


Figure 3 Harvested seed yield of four canola varieties near Meckering in 2014, at two windrowing timings.

**Conclusion**

The risk of shattering losses of canola is a concern for Australian farmers. Losses from shattering can be high and the environmental conditions that can cause shattering are difficult to predict. Farmers currently manage the risk of shattering losses by windrowing and prioritising the timing of harvest of their canola within their overall farming operation.

The PodGuard lines developed by Bayer show smaller yield losses than commercial alternatives under environmental conditions that promote shattering.

Using PodGuard varieties will give farmers greater flexibility and reduce risk at harvest time. Farmers will have the option of choosing to not windrow but direct harvest their canola. Farmers who still choose to windrow can do so later and have reduced shattering risks compared with current commercial varieties. Farmers will have greater flexibility at harvest time to manage the priorities of other farm operations.

Trials conducted at Esperance and in Canada show that harvest losses of PodGuard lines will occur under some conditions. In the trial at Meckering in 2014, the PodGuard technology was able to withstand small hail. However, it is unlikely that PodGuard varieties would withstand more severe hail events. While PodGuard lines offer greater flexibility in the timing of harvest, harvesting as early as practical is still recommended as losses will occur in some situations.

**Key words**

Canola, harvest, shattering

**Acknowledgments**

Thanks to Mark Seymour for providing the data from the trial at Esperance. The trial at Esperance was completed as part of GRDC DAW00227.

**GRDC Project Number: NA**