

# Seed dressings to control loose smut in Hindmarsh barley

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## Key messages

- Loose smut was significantly reduced with *all* seed dressings trialled, but the most effective treatments were from EverGol Prime, Jockey+Raxil and Vibrance.
- Applying the seed dressing over *every* seed is the critical step in getting effective control.
- Select the seed dressing to be used based on more than just smut control, eg your risk of scald, powdery mildew, root disease etc.
- Regular use of a registered seed dressing will significantly reduce the occurrence of loose smut in barley crops.

## Background

Hindmarsh has been the most rapidly adopted barley variety in Western Australia's history. However, in 2012 many Hindmarsh crops showed high levels of loose smut (*Ustilago nuda*) questioning whether growers were required to source new seed. Efficacy of some new products was compared to other established treatments on the market to control loose smut.

## Aim

To test a range of seed dressings registered for the control of barley loose smut to identify the most effective treatments, using Hindmarsh seed known to be infected with loose smut.

## Method

Two small plot trials were conducted by the Department of Agriculture and Food (DAFWA) at Gibson (Esperance Downs Research Station) and Wongan Hills Research Station using cone seeders to sow 1.7 x 10m plots. On behalf of Bayer, Living Farm sowed two small plot trials at Regan's Ford and west Wubin using a cone seeder to sow 2.5 x 20 m long plots. Both DAFWA and Bayer trials used a randomised block design with three replicates. Trials were harvested using a small plot harvester and grain samples were taken for quality testing - screenings, grain weight, hectolitre, protein content and grain brightness.

For DAFWA trials, the 2012 Hindmarsh seed used had a field infection level of 4.5% and embryo testing by AGWEST Plant Labs subsequently showed a seed infection level of 4.7%. The Hindmarsh seed sown by Bayer had a 2012 head infection level of 2.8%. Not all seed treatments were present in all trials.

As only small quantities of Hindmarsh seed were required for sowing, DAFWA seed was pickled using a cement mixer with the seed dressing and water added and agitated until even coverage over the seed was achieved. Bayer had their seed prepared in bulk batches by Living Farm.

The amount of loose smut present in each trial plot was determined at early grain filling when all heads had emerged. Either the number of smutted heads or smutted plants per plot were counted and based on the overall plant density of plots, the level of smut control relative to the nil seed treatment was calculated. Foliar fungicides were used during the season to control foliar diseases as required.

**Table 1 Seed dressing treatments and their fungicides used in DAFWA and Bayer smut trials in 2013 with the recommended rate for control of loose smut (L/t seed) and an approximate price per dose for treating 70 kg/ha of seed (\$).**

Product name	Fungicide	Rate applied /tonne seed	Cost to treat 70 kg/ha seed (\$)
Baytan® T	150 g/L flutriafol	1 L	1.46
EverGol® Prime	240 g/L penflufen	400 - 800 mL	4.01
Jockey®	167 g/L fluquinconazole	3 L	9.45
Jockey® + Raxil T®	167 g/L fluquinconazole + 25g/L tebuconazole	3 L + 1 L	10.75
Rancona®	20 g/L ipconazole	1 L	2.17
Raxil T®	25 g/L tebuconazole	1 L	1.3
Tri-Power®	6.25 g/L flutriafol + 180 g/L metalaxyl	4 L	6.72
Vibrance®	13.8 g/L sedaxane, 66.2 g/L difenoconazole, 16.5 g/L metalaxyl-m	1.8 L	3.74
Vitaflo-C®	400 g/L carboxin	2.5 L	4.2
Zorro®	56 g/L triadimenol	4 L	6.93

## Results and discussion

Across the four trial sites, the level of smut expressed in 2013 varied from quite high (4.1% at Gibson and 4% at Regan's Ford) to moderate levels at Wongan Hills and Wubin (2.5% and 2.8%). This is not unusual in smut trials, even when using a common seed source and it results from seasonal differences in plant growth and flowering conditions.

All seed dressings significantly reduced loose smut levels, although some seed dressing treatments were more effective than others. Across all four trials the consistently most effective treatment was EverGol Prime at a rate of 40 mL/100 kg seed, which reduced smut levels close to zero. Jockey + Raxil T was equally effective as EverGol Prime at Gibson and Wongan Hills, while Vibrance performed as well as EverGol Prime when compared at Regan's Ford and Wubin.

Even the least effective treatments were better than sowing undressed seed.

**Table 2. The amount of loose smut controlled (%) in DAFWA trials at Gibson and Wongan Hills where the average smut level at the sites in 2013 was 4.1% and 2.5% respectively.** All treatments were significantly better than nil and different letters indicate a statistically different level of effectiveness between seed dressings.

Product name	Gibson	Wongan Hills
	Loose smut (% controlled)	Loose smut (% controlled)
EverGol Prime	100% a	100% a
Jockey + Raxil T	99% a	99% a
Raxil T	93% b	83% b
Vitaflo-C	93% b	99% a
Zorro	87% c	88% b
Rancona C	85% c	84% b
Jockey	76% d	66% c

**Table 3. The amount of loose smut controlled (%) in Bayer trials at Regan's Ford and Wubin where the average smut level at the sites in 2013 was 4% and 2.8% respectively.** All treatments were significantly better than nil and different letters indicate a statistically different level of effectiveness between seed dressings.

Product name	Regans Ford	Wubin
	Loose smut (% controlled)	Loose smut (% controlled)
EverGol Prime	100% a	97% a
Vibrance	97% a	86% a
Baytan T	75% b	64% b
Tri-Power	51% c	44% c

Using a seed dressing tended to increase grain yield at all four sites, although this was not statistically significant. The grain quality of Hindmarsh (2.5 mm screening, hectolitre, grain weight and grain brightness) was unaffected by the seed treatments.

## Conclusion

Even relatively high levels of loose smut of barley can be successfully controlled using seed treatments, providing that the dressing is applied properly. The application technique to ensure even coverage over all seeds is a critical step in controlling loose smut. Many companies have excellent Technotes for farmers to download from the internet. There are also professional seed cleaners available for on farm treatment of grain. It is important to control loose smut as if left untreated, the inevitable buildup in loose smut will contribute to grain yield loss.

Previously it has been recommended that growers replace seed that has an infection level of 5%, however these results suggest that farmers can retain and treat their own seed rather than replace it. Not replacing seed is a cost saving and more importantly, avoids the biosecurity risk of introducing new weeds or weeds with herbicide resistance onto their farm.

Growers need to consider what other foliar or root diseases they may also need to control in addition to loose smut when making a final seed dressing selection as all the seed dressing tested controlled loose smut to some degree. Insecticides with seed dressings are also not considered here but also offer protection against storage pests or early season aphid infestations.

## Key words

Barley, loose smut, *Ustilago nuda*, seed dressings

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