

BARLEY LOOSE SMUT

CONTROL, VARIETY SUSCEPTIBILITY, YIELD IMPACT



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Department of
Primary Industries and
Regional Development

Barley loose smut

Control, yield impact,
variety susceptibility, etc

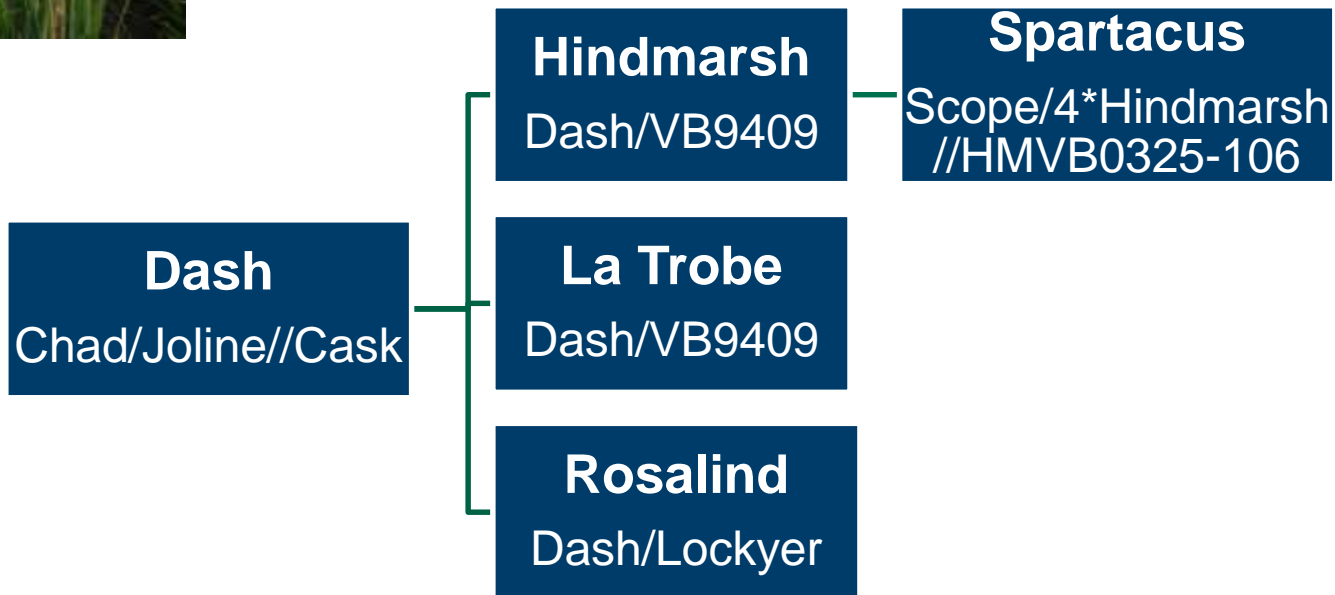


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An ongoing issue



- Unightly, even at low levels (1%)
- Hindmarsh (Dash) family is particularly susceptible – and tillers prolifically



Barley loose smut

Heads fully smutted



Partially smutted heads



**1-2 heads escape
& healthy**

Loose smut life cycle



Sowing



Infected seed



Harvest

Seed embryo infected



Grain filling

Barley flowers infected



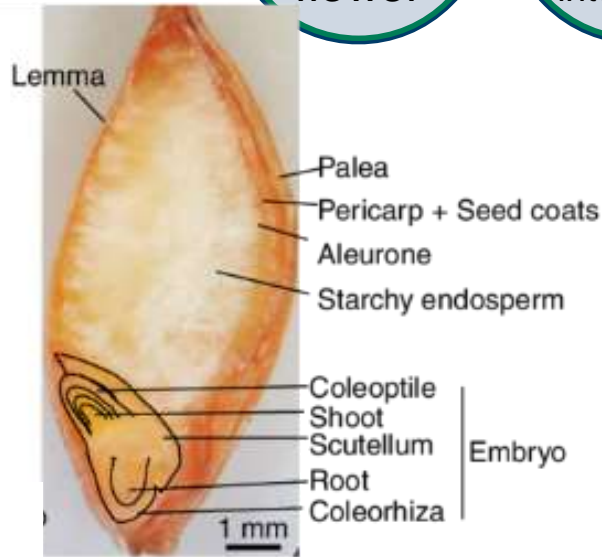
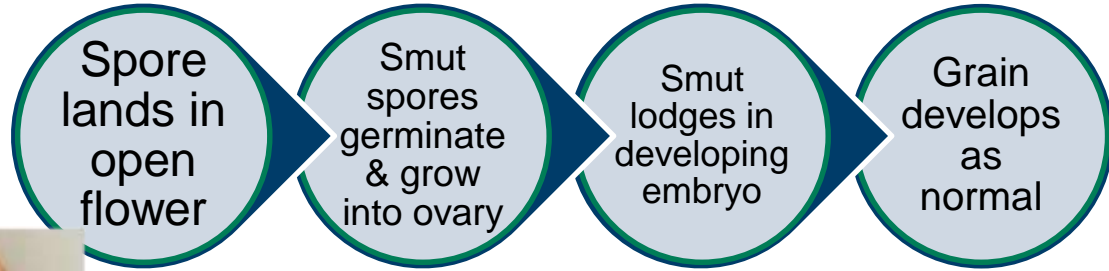
Wind spread



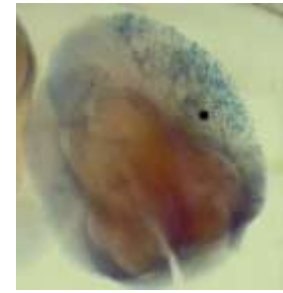
Smuted heads (spores)



Flower & embryo infection



Healthy embryo

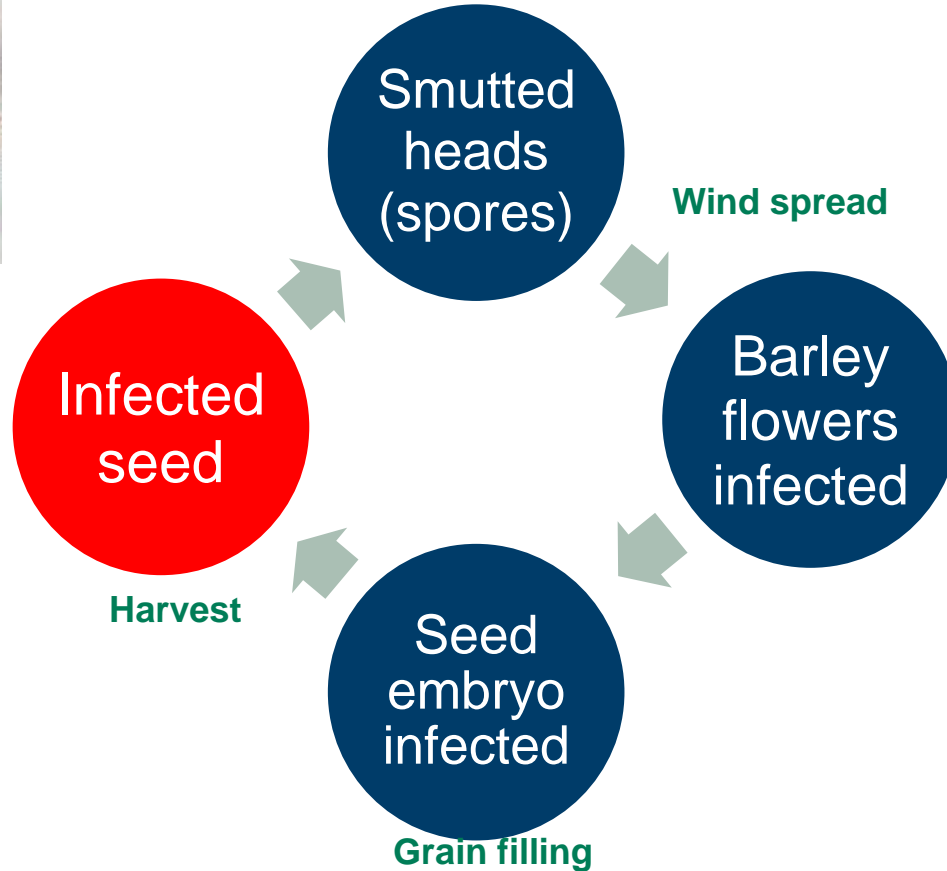


Infected Embryo

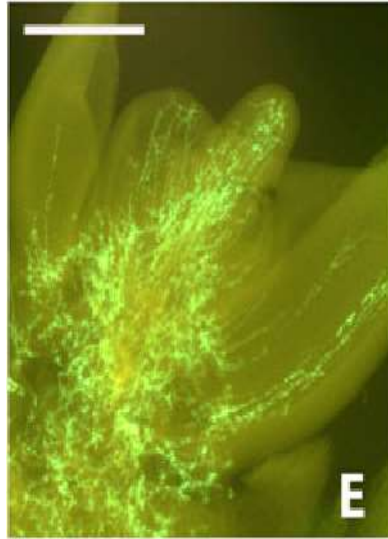
Break the life cycle



Sowing



Seed dressings – systemic defence



10-14 DAS



30 DAS

Seed dressings – efficacy trials

No.	Seed dressing	Fungicide active ingredient	L/t seed
1	Untreated	-	-
2	Baytan T	triadimenol	1.0
3	EverGol Energy	prothioconazole + penflufen + metalaxyl	1.3
4	Rancona Dimension	ipconazole + metalaxyl	0.8
5	Raxil T	tebuconazole	1.0
6	Systiva	fluxapyroxad	1.5
7	Vibrance	difenoconazole, metalaxyl, sedaxane	1.8
8	Vitaflo C	carboxin	2.5

- Hindmarsh with 6.2% embryo seed infection
- Sown to establish 150 plants/m² (~72 kg/ha)

Seed dressings

– a high pressure scenario

	Untreated smut levels	
Site	Plants/m ²	Tillers/m ²
Gibson	12	66
Wongan Hills	17	67
Katanning	4	5



Seed dressing efficacy trials

- All significantly reduce smut expression
...but some are much better at it

Seed dressing	% Control
EverGol Energy	100 ^a
Vibrance	96 ^a
Systema	96 ^a
VitaFlo C	96 ^a
Raxil T	74 ^b
Baytan T	68 ^c
Rancona Dimension	60 ^d

- Esperance
- Katanning
- Wongan Hills

p-value	<.001
lsd (0.05)	5.4

Factors affecting variety susceptibility

- duration of flowering
- flower open aperture
- resistance to ovary infection, and/or
- infected but express lower smut levels



Variety susceptibility

Most susceptible



Least susceptible

Variety	Infected plants (%)
Hindmarsh	12.9 ^d
LaTrobe	12.2 ^d
Spartacus	9.1 ^c
Rosalind	5.2 ^b
Bass	4.6 ^b
Maltstar	2.3 ^a
Compass	2.1 ^a
Granger	1.6 ^a
Baudin	1.4 ^a
Planet	1.0 ^a
Fathom	1.0 ^a
Flinders	0.9 ^a

Variety susceptibility

Most susceptible

**Hindmarsh, La Trobe,
Spartacus**



“The rest”

Least susceptible

Planet, Fathom, Flinders

- Banks not tested but pedigree suggests a lower risk variety

Factors affecting infection

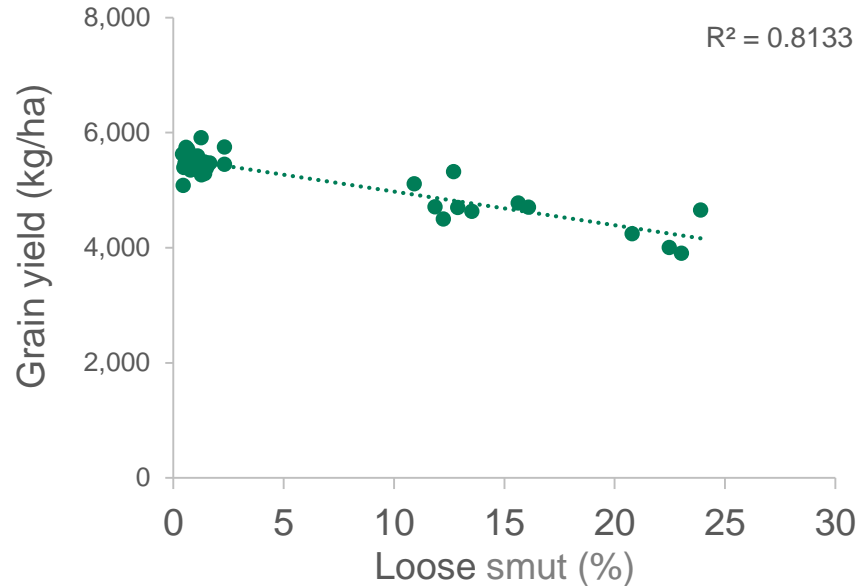
- **Variety**
- **Conditions at flowering**

Factors affecting expression

- **Seed dressing choice & application**
- **Growing season conditions**

Grain yield impact of loose smut

- Yield penalty is proportional to the % plants infected
- 5/7 trials had a relationship between yield & smut ($p=0.05$)



Can management reduce smut?

- Infected plants are already under stress



Can management reduce smut?

- Infected plants are already under stress

Tiller numbers are consistently lower in infected plants

Tillers/plant	
Healthy plants	Smutted plants
3.6	2.9

Can management reduce smut?

- **Plot and row trials**

- **Grading for larger seed size (3)**
- **Sowing rate (2)**
- **N application timing (1)**
- **Foliar fungicide (3)**

- **Baudin, Compass & Hindmarsh**

Can grading hard reduce smut?

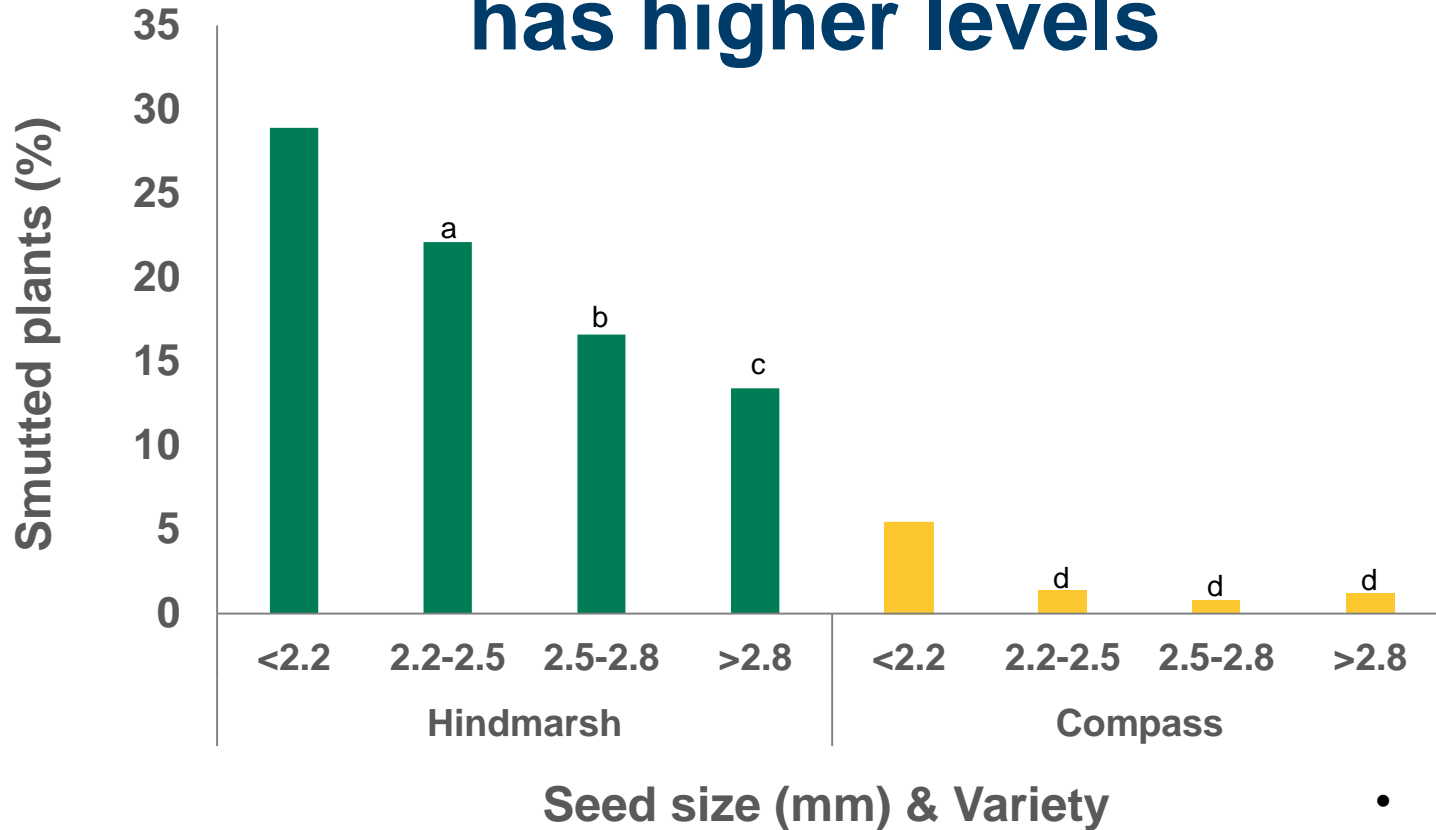
- In heavily infected Hindmarsh <2.5 mm seed produced more infected plants

	% Infected plants		
Seed size (mm)	Baudin	Compass	Hindmarsh
2.5 - 2.8	0.6 ^a	2 ^a	32 ^a
2.2 - 2.5	0.4 ^a	4 ^a	52^b
< 2.2	4 ^a	6 ^a	48^b

ANOVA	Significance
Variety	<.001
Seed size	<.001
Var.Size	n.s.

- South Peth

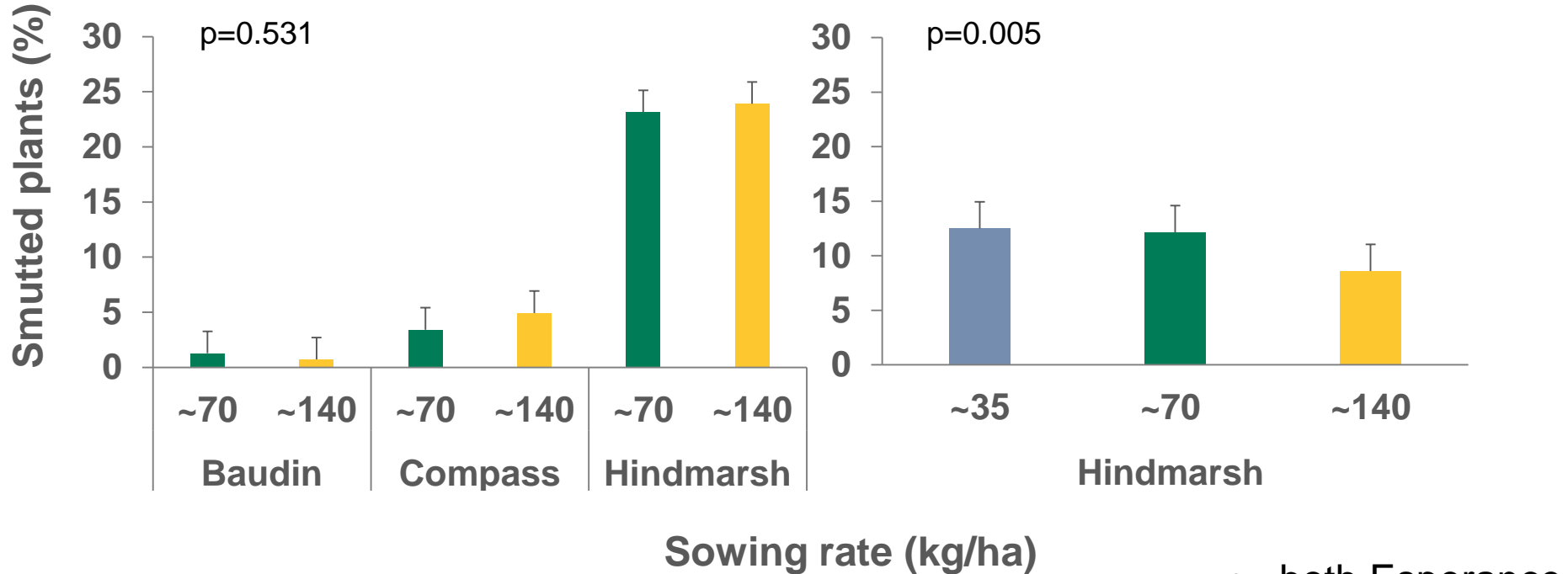
- In heavily infected crops, <2.5 mm seed has higher levels



- Esperance

Do higher sowing rates reduce smut?

– perhaps



- both Esperance

Does delaying N reduce smut?

- No? Not in 2018 anyway

N timing	Sowing	4,8,12WAS	8WAS	12WAS
Smuted plants (%)	10.8	10.7	10	12.8

ANOVA	p-value	Isd (0.05)
N_Timing	n.s.	2.83

- Esperance

Change of approach: can we prevent infection?

- A fungicide at head emergence reduced smut infection (2017)

Treatments	Smut (%)
Untreated	4.3 ^a
Fung. at Z59	0.7 ^b

- Repeated 2018 at Esperance, Katanning, Wongan Hills
- results pending (but have potential)

Change of approach: can we prevent infection?

- **Protection for seed crops only**

- in line with fungicide application for control of other diseases, as it is not registered for this specific use.

- **Doesn't replace seed dressing!**

Loose smut: looks worse than it is

- Count plants
- Smut is a numbers game
 - expect escapes to occur
 - conditions at seeding play a part (uptake)
- Treat seed of the Hindmarsh family varieties every year
- Keep seeding rates high

Thank you

Visit dpird.wa.gov.au

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#ProtectWACrops

Important disclaimer

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