



Late Blight: attitudes to control & the potential for spore detection to inform decision making

Alison Lees



The James
Hutton
Institute

Changing behaviour

- Recognise problem
- Recognise solution
- Ability and willingness
- Trial and assess
- Adopt



Late Blight control

– is there a problem to recognise?

- Fungicides are effective if applied correctly
- Routine applications are convenient
- Fungicide insensitivity is relatively rare
- Anti-resistance strategies are in place - FRAG
- Active ingredients are available
- Costs are high, but risk is higher

no problem = no need to change anything



Possibilities ...

- New fungicide insensitive genotypes
- Increasingly aggressive genotypes of *P. infestans*
- Fewer actives approved
- Loss of current actives
- More blight conducive weather

Be prepared or benefit of hindsight?

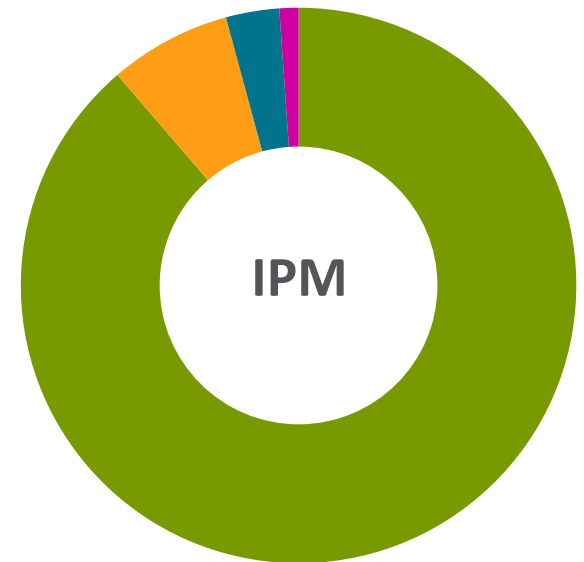
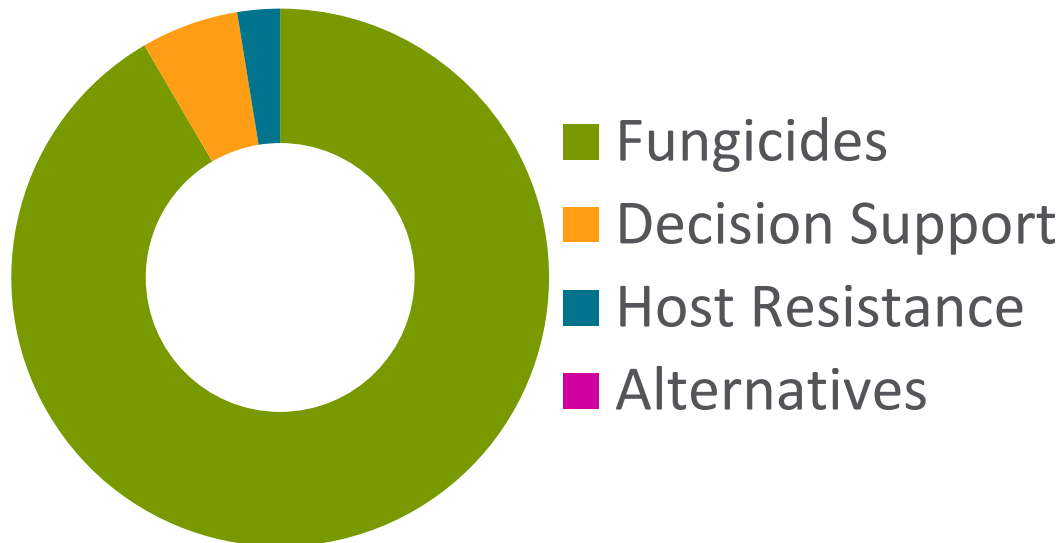
- Meeting IPM targets
- Economic and environmental costs
- Reducing reliance on pesticides



Recognising solutions

What's in the late blight IPM toolbox?

- What do we already know?
- How can we use the information?
- How can we improve the tools?

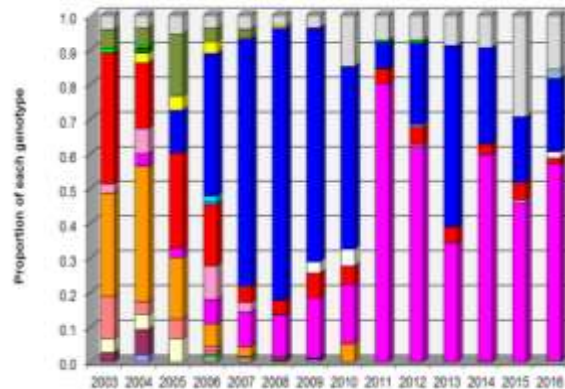


Recognising solutions



What do we already know?

- **Fight Against Blight** = know the pathogen
- **Euroblight** = know your neighbour's pathogen/be prepared
- **C-IPM** = understand the implications of population changes
- **Blightwatch** = communicating risk of an outbreak
- **Blight Alerts** = outbreaks in your area now?

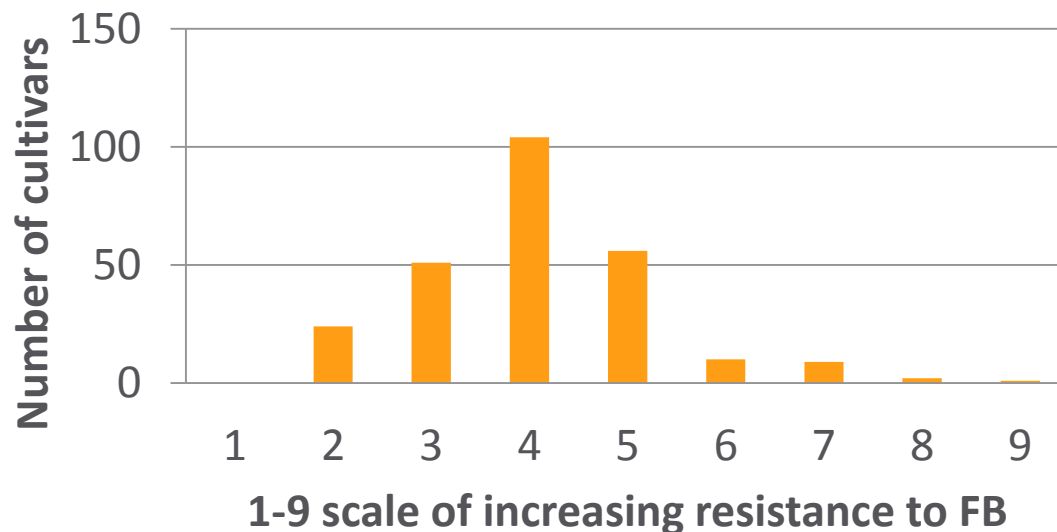


Recognising solutions



Host resistance

- Level of host resistance in varieties is known – informed by latest population information
- Understand value of combining host resistance and fungicides
- Use of host resistance reduces inoculum levels overall



Recognising solutions

Host resistance

- Stewardship of host resistance and fungicides (BBSRC HAPI)
 - fungicide protects the longevity of host resistance
- partially blight resistant varieties in combination with fungicides slow the evolution of virulence
- moderate blight resistance protects the longevity of fungicides
- use of resistant varieties to slow epidemics also slows the rate of development of fungicide insensitivity.



Recognising & improving solutions

- Hutton Criteria and other DSS
- CropForecast (Soil Essentials KORE) = in-field risk

Improving on weather based forecasting

Are P. infestans sporangia present?

Theory: no sporangia = no risk of infection

Accurate and timely detection of spores in conjunction with Hutton criteria (or other) would therefore improve blight risk predictions

Benefits: fungicide applications could be reduced/better targeted

Is this realistic? Would you trust this?!



Trial and Assess



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- Host Resistance/Hutton Criteria/(spore detection)
- Hutton criteria (Blightwatch alerts) used to inform ‘sustainable’ fungicide strategy 2017

Hutton CSC long-term rotation



‘Conventional’ ‘Sustainable’

Maris Piper (FB rating = 4)	Vales Sovereign (FB rating = 5)	Mayan Gold (FB rating = 7)	Maris Piper	Vales Sovereign	Mayan Gold
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Conventional = robust 7 day fungicide programme starting on a set date
Sustainable = robust programme triggered only by Blightwatch (Hutton period)

Monthly Detail of Hutton Criteria and Periods

Daily record of Hutton Criteria days and Hutton Periods for your chosen postcode regions. Click any day to see full weather details.

Choose postcode regions from the tabs below as required.

DD2	DD2	DE4	KA6	KY16	NR35	PH2	SA4	TF10		
←							June 2017		→	
Mon	Tue	Wed	Thu	Fri	Sat	Sun				
			1	2	3	4				
5	6	7	8	9	10	11				
12	13	14	15	16	17	18				
19	20	21	22	23	24	25				
26	27	28	29	30						

Key:  Clear  Hutton Criteria  Full Hutton Period



Hutton Period:

Two consecutive days where:

1. Each day has a **minimum temperature of 10°C**
2. Each day has at least **six hours** with **relative humidity $\geq 90\%$**

Hutton period

Sustainable

Conventional

12/06/2017

19/06/2017

26/06/2017

03/07/2017

10/07/2017

17/07/2017

24/07/2017

31/07/2017

07/08/2017

14/08/2017

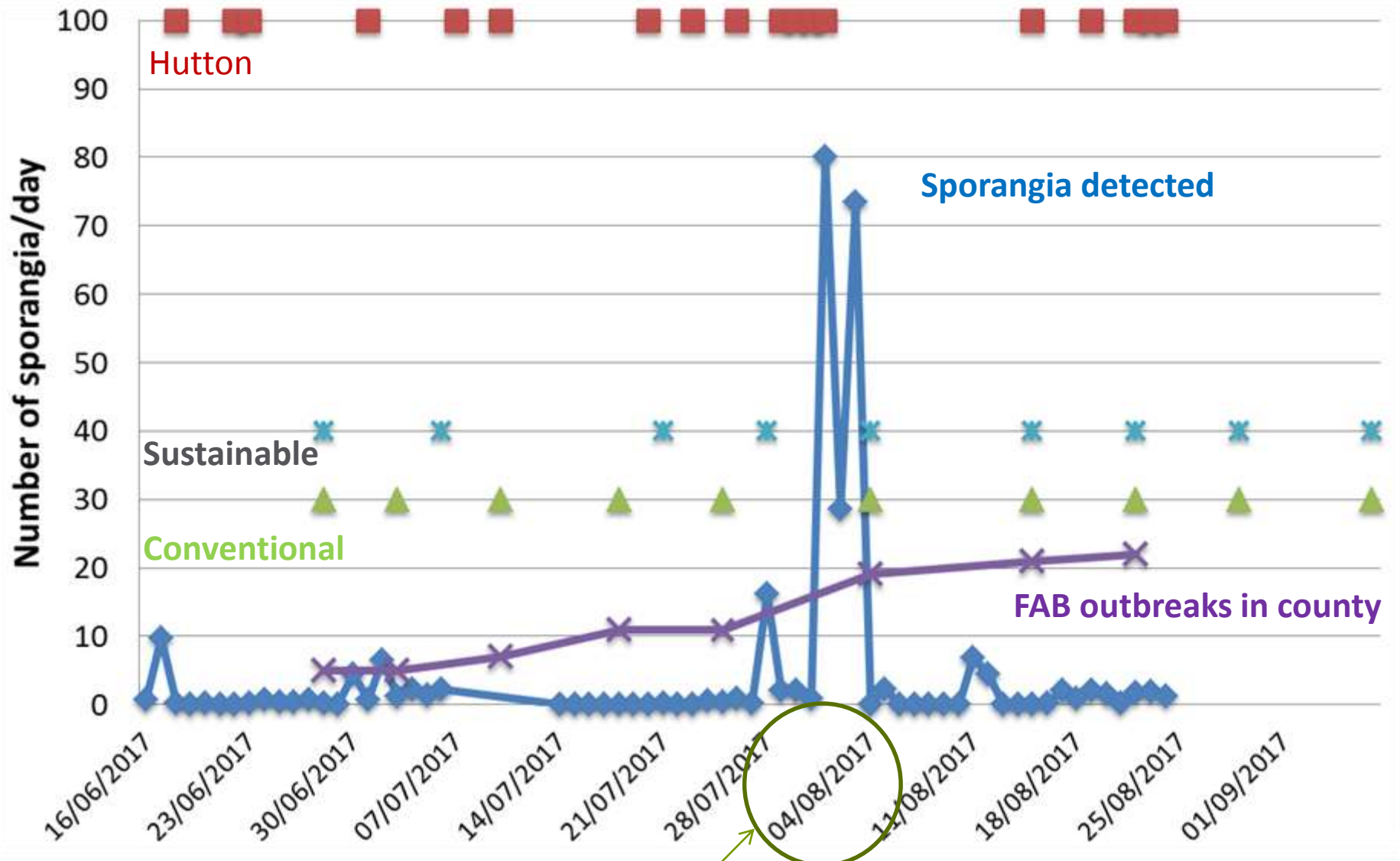
21/08/2017

28/08/2017

04/09/2017

11/09/2017





1st blight observed in DD2 postcode in untreated plot

Results 2017 'conventional v. sustainable'

DD2 postcode

- Frequent alerts
- One spray saved at beginning of season
- **No blight** recorded in either of trials
- Blight recorded in other untreated plots in DD2 on 4 Aug

£32 per Ha

£149 per 4.69Ha

£1,681 per farmer @53Ha average

£3,679,520 across all 120,000 Ha planted area

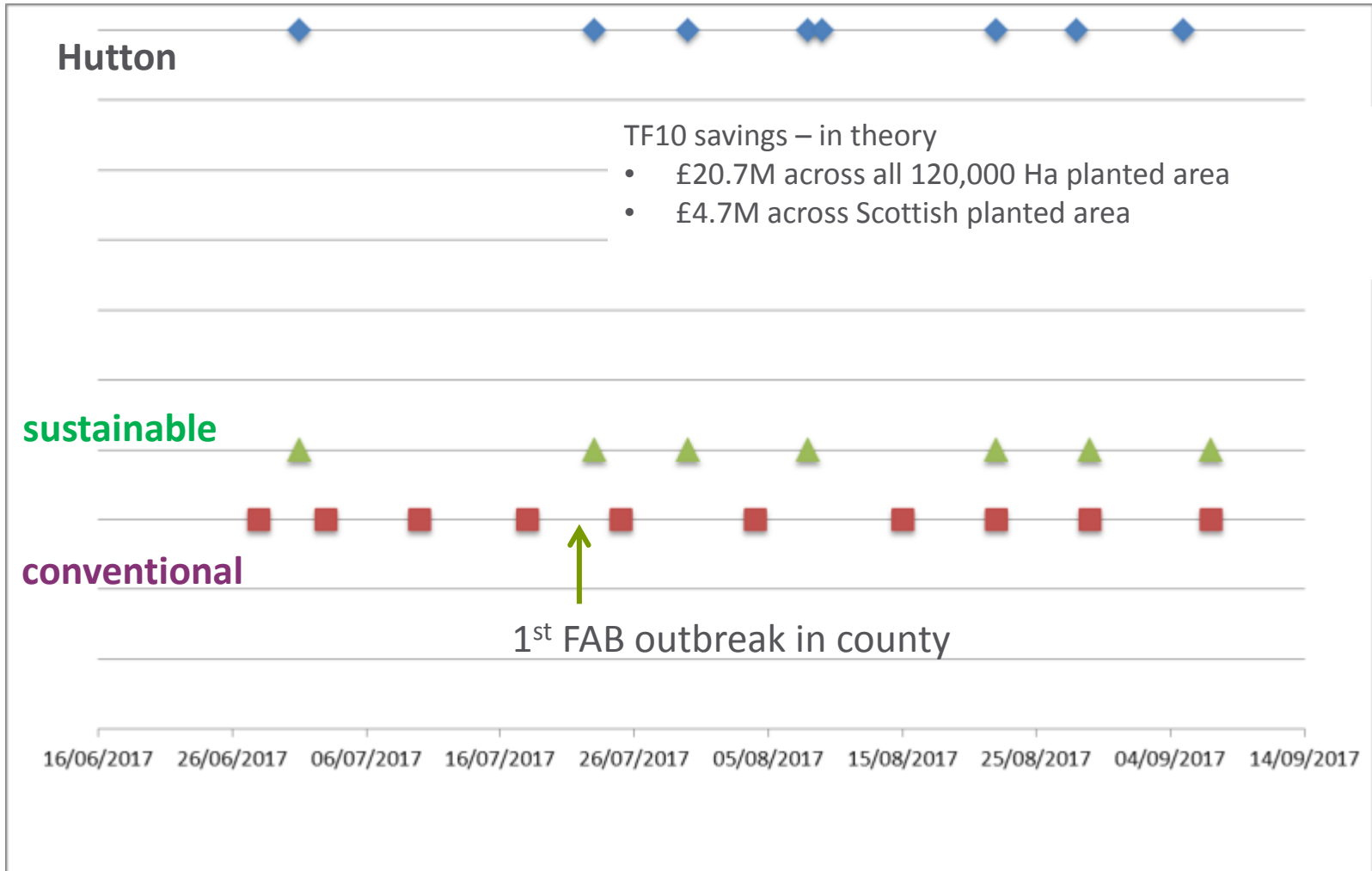
£835,187 across Scottish planted area



TF10 – in theory

Fewer alerts = 7/10 applications

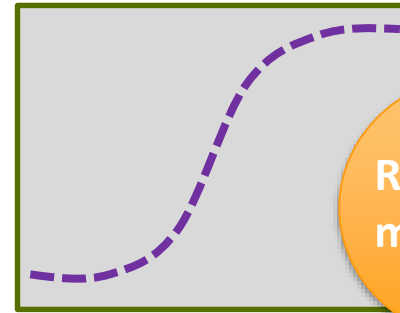
= reduced costs or higher risks?



Next steps...

Automated in-field detection

Innovate UK



Risk alert message

Air sampling

DNA release and amplification

Detection of *P. infestans*

On-board weather station

Instant reporting of positive detection to user

Data combined with risk model – informs infection risk & decisions



Further information: sales@burkard.co.uk

Changing behaviour

- Recognise problem
 - recognise potential problem
 - recognise potential for improvement
- Recognise solution
 - provide sound evidence
 - build on existing knowledge
 - integration
- Ability and willingness
 - ?
- Trial and assess
 - ongoing
 - feed in your knowledge
- Adopt...



Acknowledgements

Andrew Christie
James Lynott
David Cooke
Siobhan Dancey
Peter Skelsey



Andy Steven



Scottish Government
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