



Priming Trees For Self-Defence

BIFoR Annual Conference
30th January, 2019



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UNIVERSITY OF
BIRMINGHAM

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 **BBSRC**
bioscience for the future



Career in Plant Pathology

Timeline



Filamentous pathogens

Late blight

Phytophthora infestans



Panama disease



Fusarium oxysporum

Liberato et al 2006,
via Wikimedia Commons

Grey mould



Botrytis cinerea

Between **10-23%** of
global agricultural loss
can be attributed to
fungi and oomycetes

Ash Dieback



Hymenoscyphus fraxineus

Food and Environment Research Agency,
via Wikimedia Commons

Powdery mildew



Erysiphe alphitoides

Sudden Oak Death



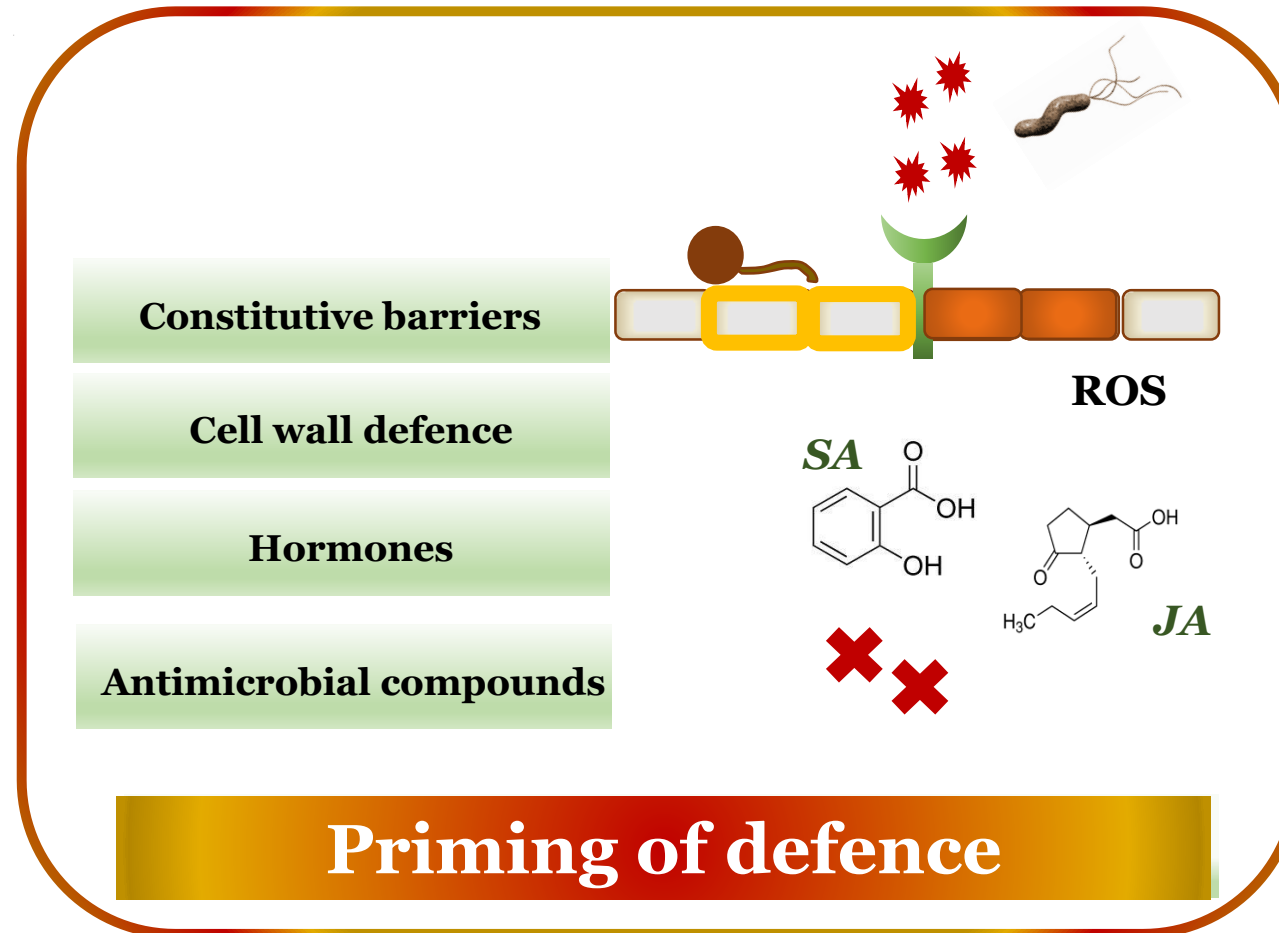
Phytophthora ramorum

Joseph O'Brien, USDA Forest Service
via Wikimedia Commons

The Plant Immune System: A Powerful Control Strategy



Plants defend themselves extraordinarily

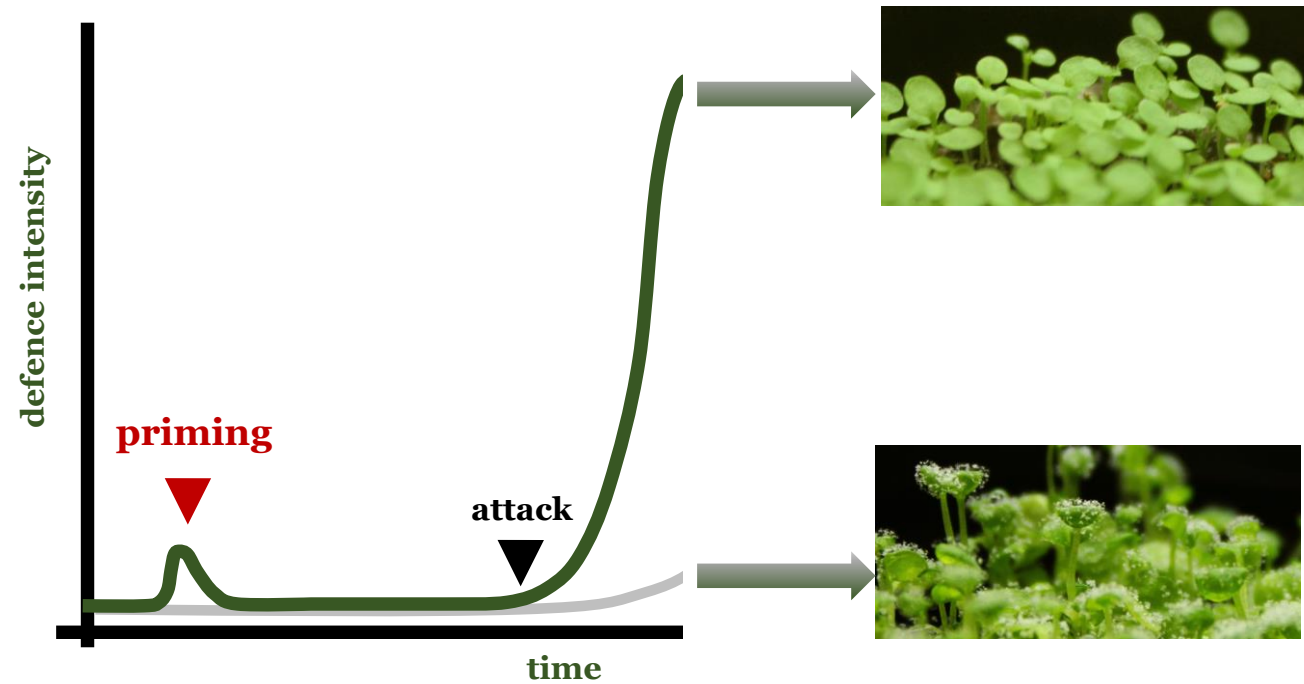


Priming of defence



Plants defend themselves extraordinarily

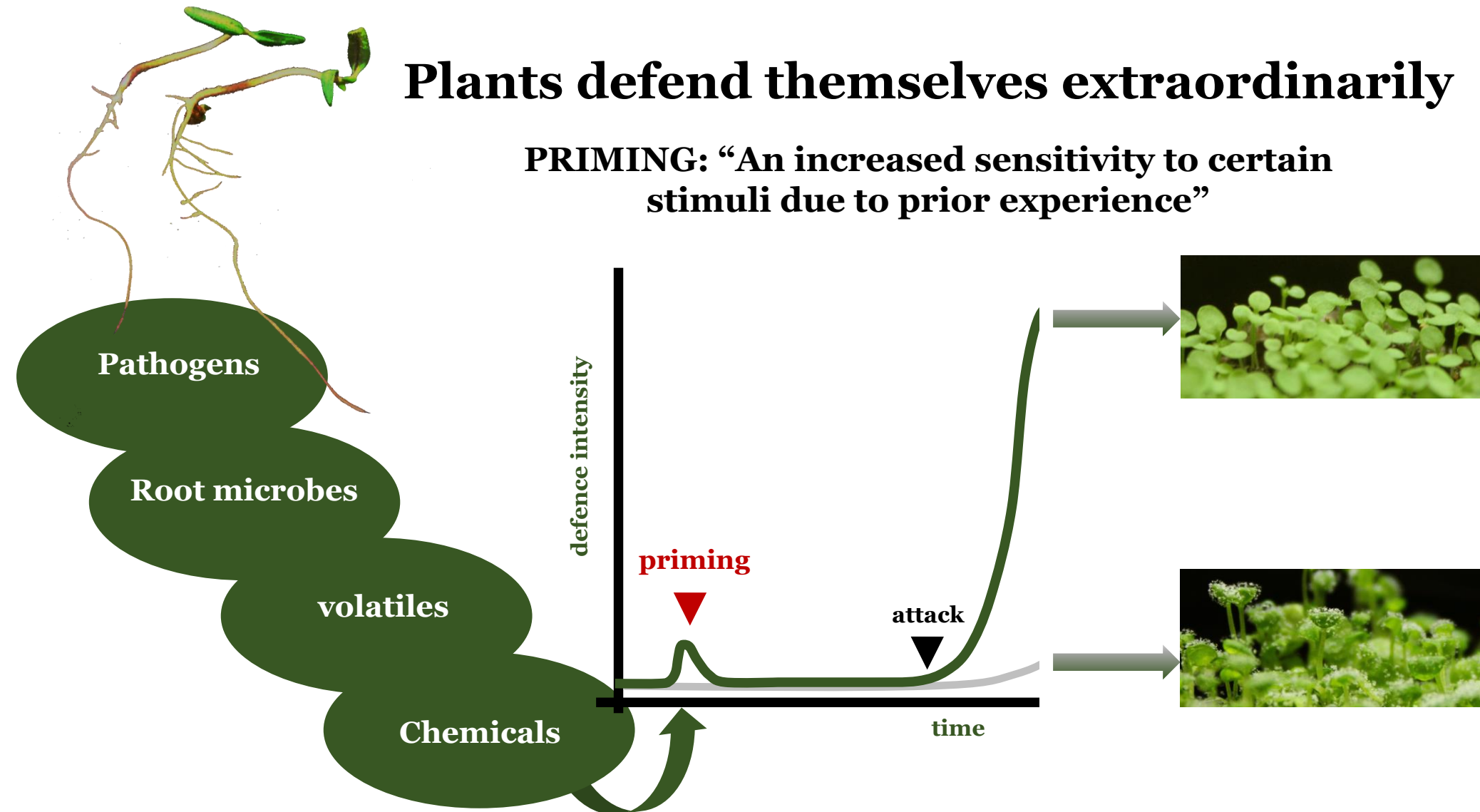
PRIMING: “An increased sensitivity to certain stimuli due to prior experience”



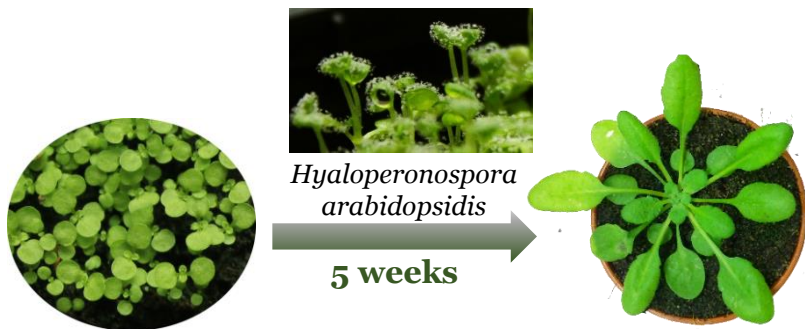
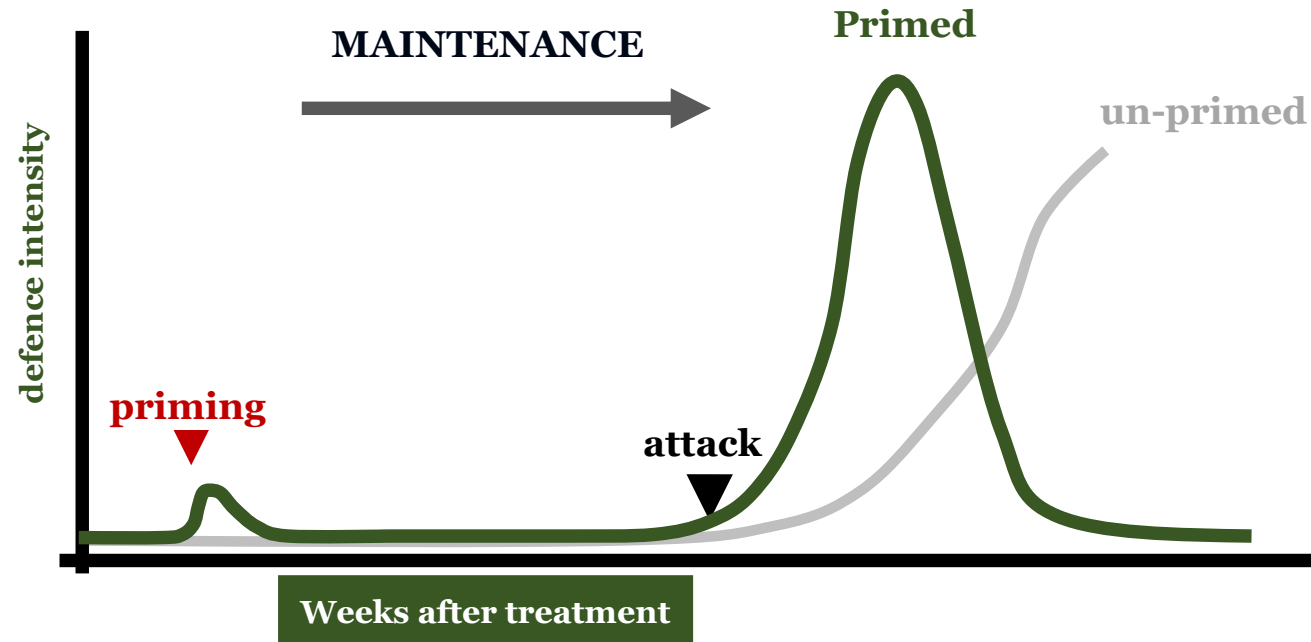
Stimuli of priming

Plants defend themselves extraordinarily

PRIMING: “An increased sensitivity to certain stimuli due to prior experience”



How durable is defence priming?



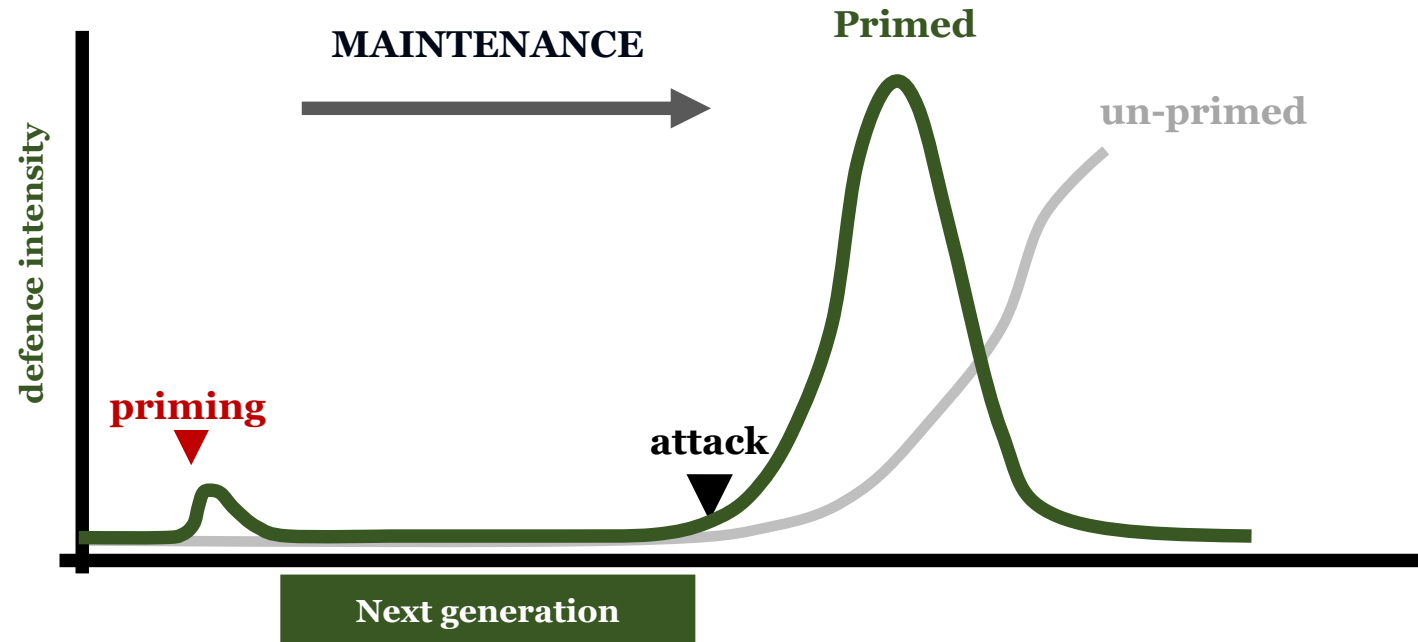
Luna et al (2014) *Frontiers in Plant Science*
Luna et al (2014), *Nature Chemical Biology*



Luna et al (2016) *Plant Disease*
Bruce et al (2017) *Crop Protection*

Wilkinson et al (2018) *Plant Pathology*

How durable is defence priming?



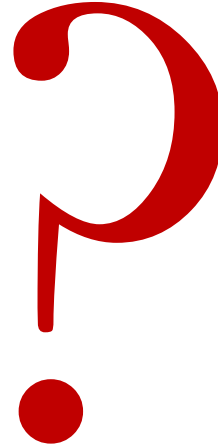
Epigenetic mechanisms



Pseudomonas syringae

Priming in forest trees

Can trees be primed?



Is the resistance maintained for long periods of time?

Epigenetics?

Transgenerational resistance?

What are the mechanisms?

New ones?

Hormones,
cell-wall defence?

How does CO₂ impact priming?

Is there genetic variability?

Tolerance?

Neighbouring effects?

“Thinking Higher”

International symposium in Forest Pathology:

Towards biosecurity of forest trees

Confirmed speakers:

- Prof Dawn Arnold
- Prof Sarah Gurr
- Prof Sandra Denman
- Prof Luis Sampedro
- Dr Alejandro Solla
- Dr Victoria Pastor

11th July, 2019
Edgbaston Campus
University of Birmingham



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Food and Environment Research Agency,
via Wikimedia Commons

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