

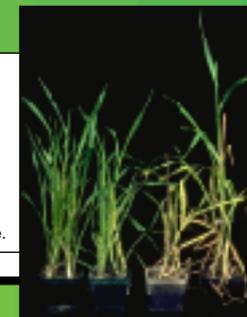
Resistance elicitors as crop protectants

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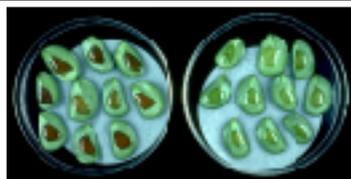
1 Introduction

- Induction of plant resistance mechanisms by application of elicitors is becoming a realistic component of integrated crop protection strategies.
- Whilst resistance elicitors are active on a wide range of crops, optimum control may be achieved by targeting specific host-pathogen interactions with particular molecules.
- We are developing approaches for targeting broad protection and specific diseases to achieve optimum disease control and yield benefit.

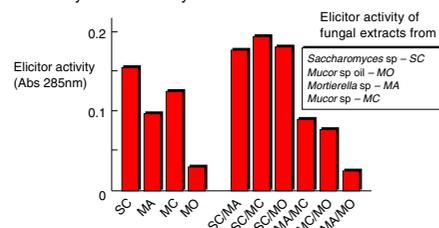
Mildew on elicitor treated (left) and untreated (right) barley cv. Golden Promise.



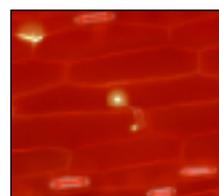
2 Elicitor activity



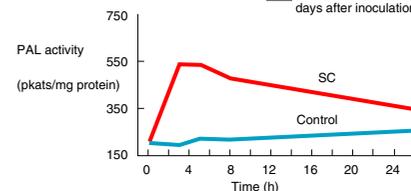
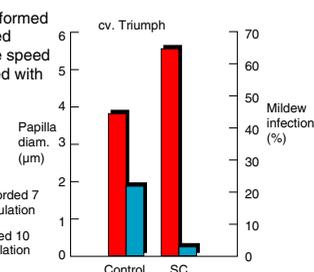
Phytoalexin elicitor activity is measured using a soybean bioassay.



3 Mechanisms Barley response to mildew challenge

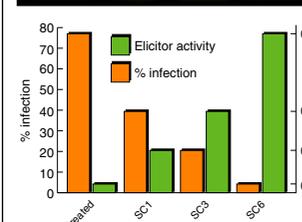
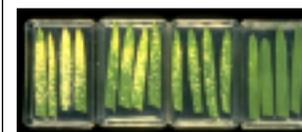


Papillae are structures formed in response to attempted pathogen infection. The speed of response is correlated with resistance.



Phenylalanine ammonia-lyase (PAL) is a key enzyme involved in synthesis of resistance components and is stimulated by SC.

4 Application

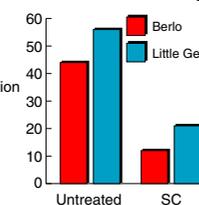


Botrytis fabae infection on cv. The Sutton 11 days after inoculation with, from left to right, approximately 625, 1250, 2500 and 5000 spores per leaf disc. MO (0.8%) was applied top row) 24 hours before inoculation.

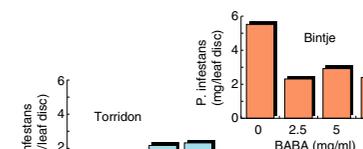
Erysiphe graminis infection on detached barley leaves cv. Golden Promise sprayed with water and with yeast extracts differing in elicitor activity, SC1, SC3 and SC6 (left to right) 24 hours before inoculation. Disease was assessed after 20 days.



Botrytis cinerea infection on lettuce cv. Patricia 21 days after inoculation. SC extract was applied to the box on the left 24 hours before inoculation and then again after 7 days.

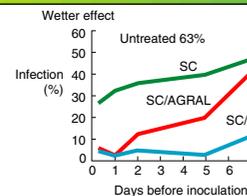


Disease levels on lettuce in the glasshouse 21 days after infection with Botrytis cinerea and Rhizoctonia solani. SC was applied 24 hours before inoculation and then again after 7 days and 14 days.



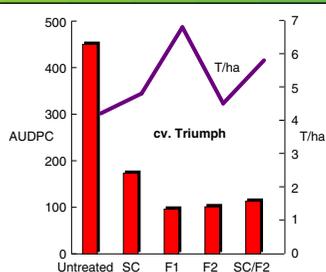
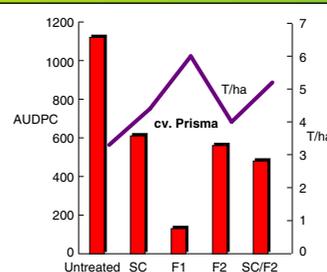
Induction of resistance to Phytophthora infestans with DL- -amino-n-butyric acid (BABA) in potato.

5 Formulation



Detached barley leaves cv. Golden Promise all inoculated at the same time but treated with yeast extracts in different wetters (AGRAL & L1700) at various times before inoculation.

6 Field trials



Effect of resistance elicitors and combined elicitors/reduced rate fungicide on yield and area under the disease (mildew) progress curve (AUDPC) on spring barley cultivars Prisma and Triumph in 1992 and 1993.

F1 = full rate fungicide
 F2 = reduced dose fungicide

7 Conclusions

- Broad range elicitors control a range of diseases including mildew in barley, *B. cinerea* and *R. solani* on lettuce, *B. fabae* on faba beans.
- Targeted elicitors are more effective than broad range elicitors for controlling *P. infestans* on potato.
- Some evidence of differences in host genotype (cultivar) response to both broad range and targeted resistance elicitors.
- These elicitors stimulated PAL production.
- Broad range elicitors increased speed of papilla response in barley when challenged with mildew.
- Broad range elicitors are effective with reduced rate fungicides.
- There is great potential for improvement in efficacy with appropriate formulation.

Acknowledgements

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 Web site: <http://www.scri.sari.ac.uk/fbpb/yeast2.htm> Email: a.newton@scri.sari.ac.uk or g.lyon@scri.sari.ac.uk

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