About factors influencing grape resistance to pathogens

Les liens de la vigne

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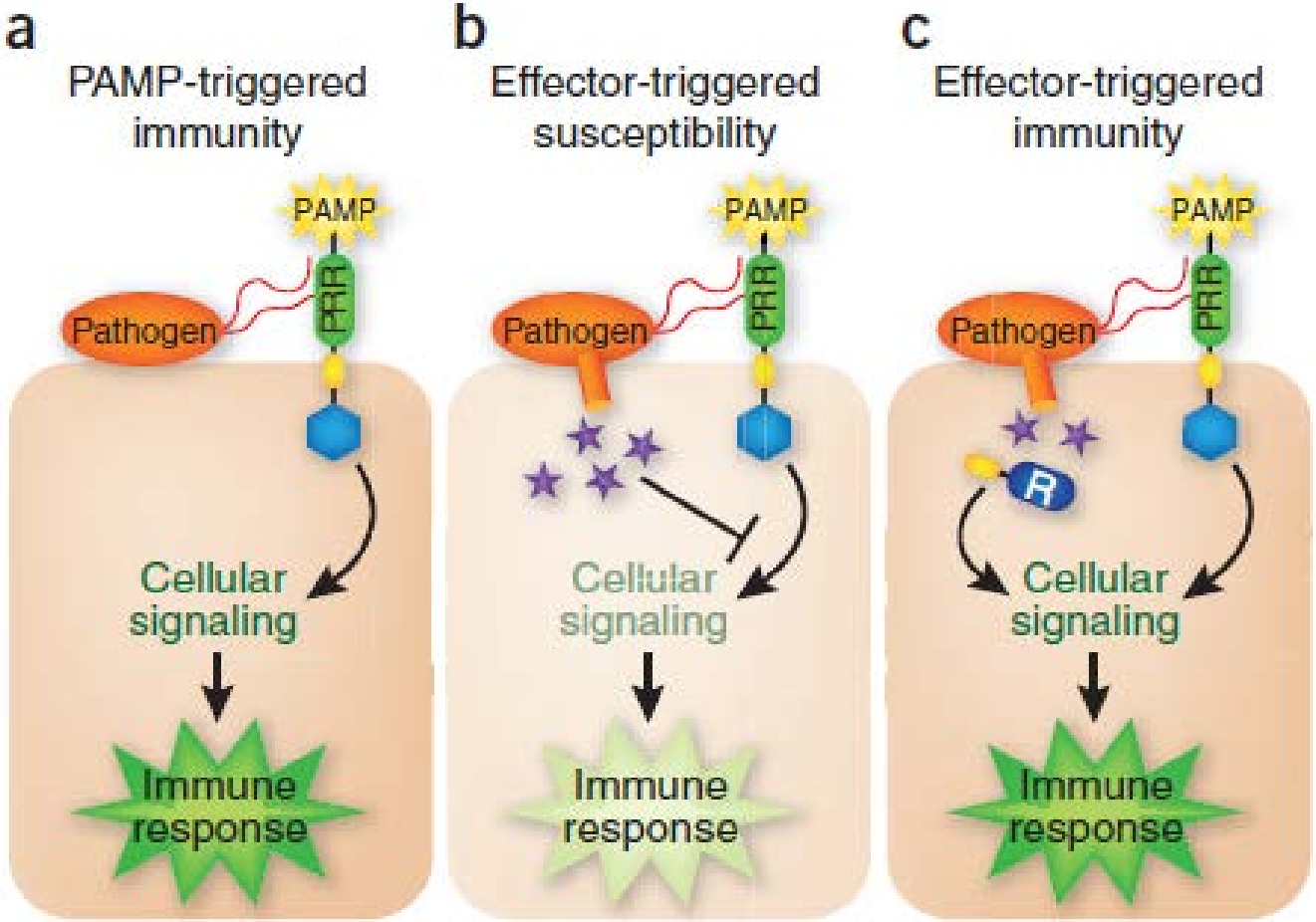
The plant immune system

Pieterse *et al.* 2011



PTI

ETI

Factors known to influence plant resistance to disease

Biotic factors

- plant genotype (resistance gene)
- pathogen genotype (effectors)
- beneficial microorganisms (rhizobacteria, mycorhyza)
- plant development (ontogenic resistance)
- disease pressure
- …

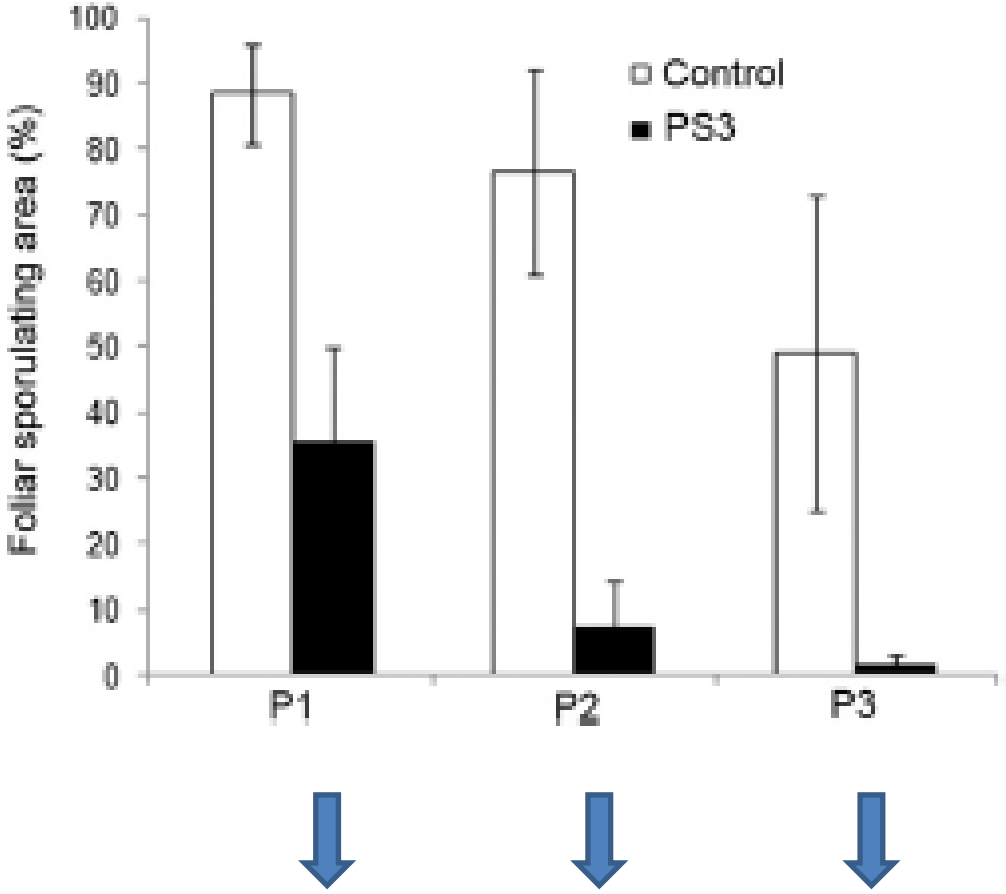
Abiotic factors

- mineral nutrition (N, …)
- abiotic stress (T°, …)
- light (irradiance,UV)

Influence of organ age on induced resistance to *Plasmopara viticola* using inducers

Induced resistance to *P. viticola* with sulfated laminarine (PS3)

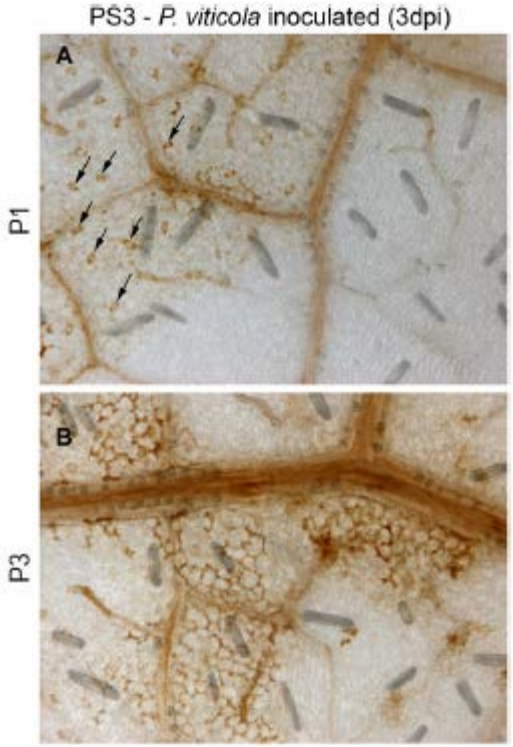
Steimetz *et al*. 2012

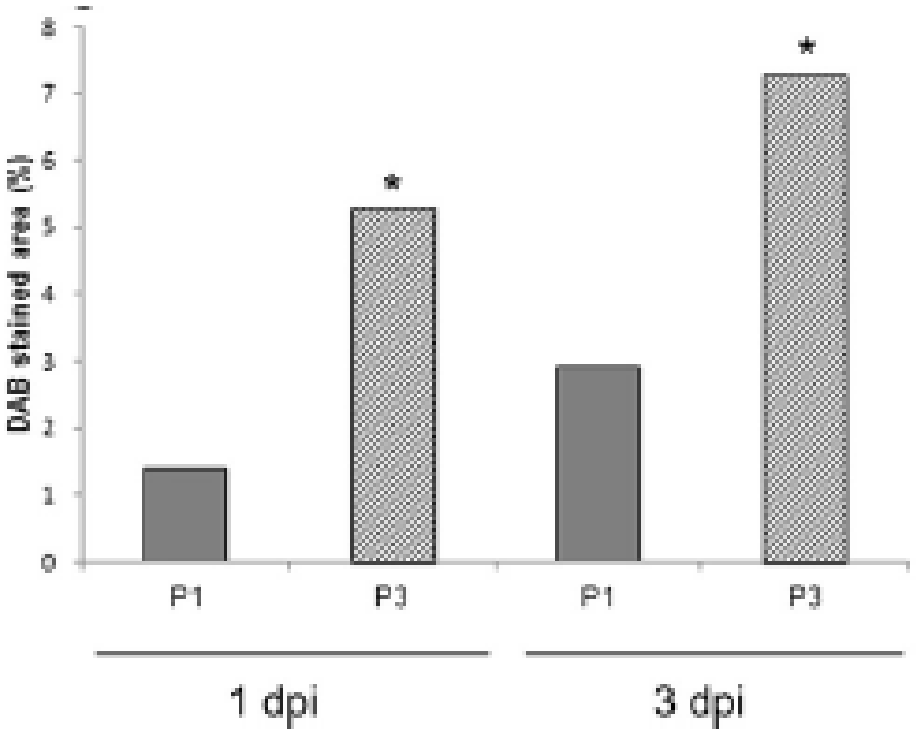


Disease reduction :	50%	80%	90%

Sulfated laminarin induced resistance

Comparison of H_2O_2 production primed in young (P1) and adult (P3) leaf

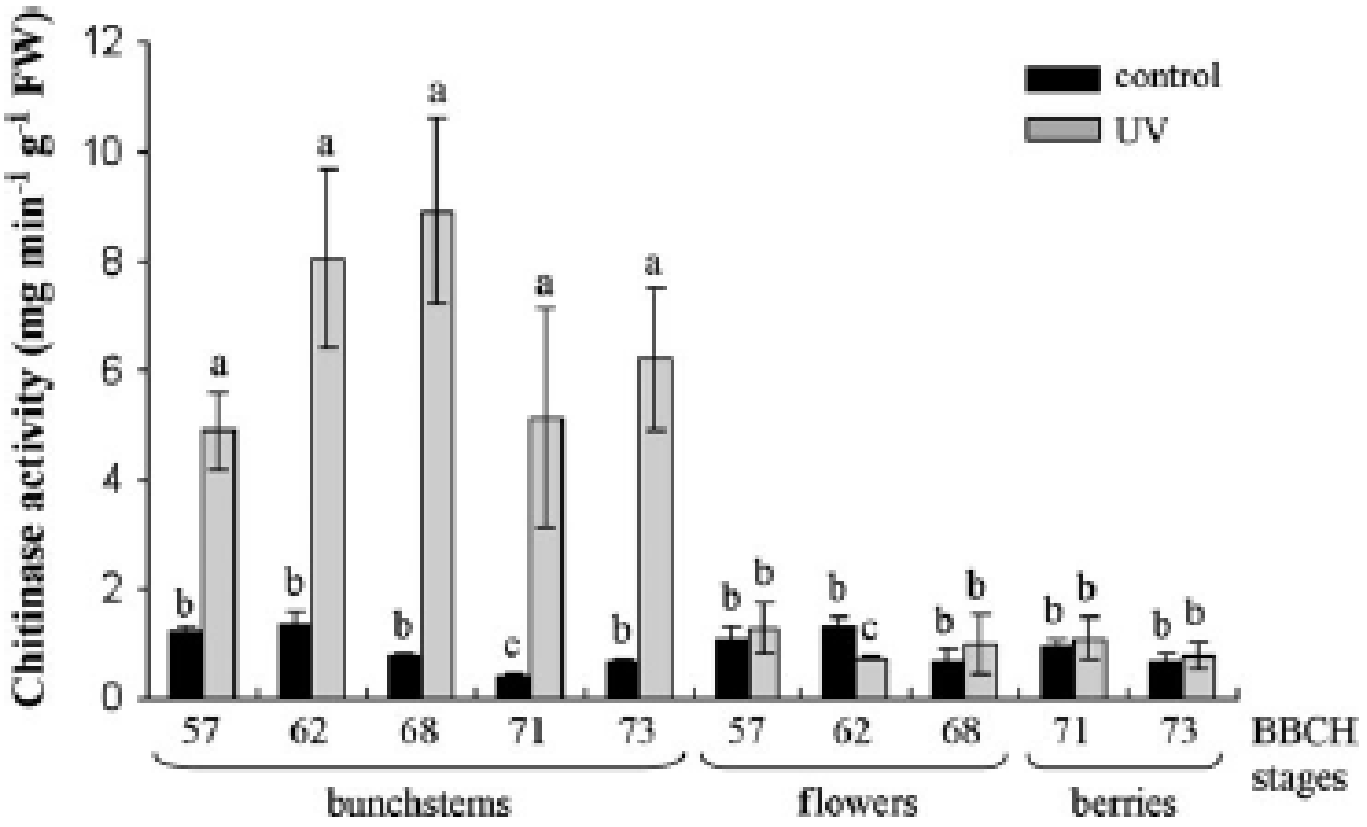




Steimetz et al. 2012

Effect of developmental stage and organ on elicitation by UV irradiation

Petit et al. 2010



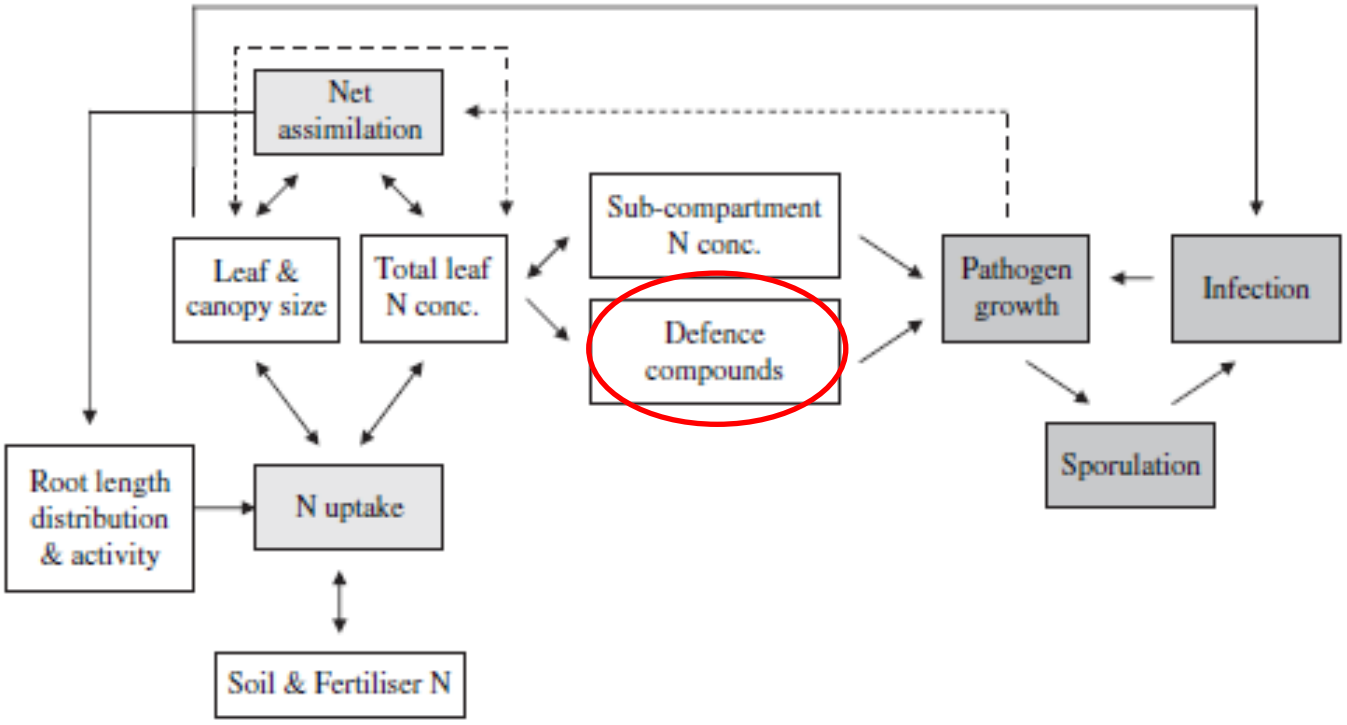
Chitinase activity in different reproductive organs

Impact on N nutrition on resistance and induced resistance

Grey mould incidence is correlated with compactness and assimilable N content of tissues

Valdes-Gomeza, H., M. Fermaud, J. Roudet, A. Calonnec, and C. Gary. 2008.
Grey mould incidence is reduced on grapevines with lower vegetative and reproductive growth.
Crop Protection 27 (8):1174-1186.

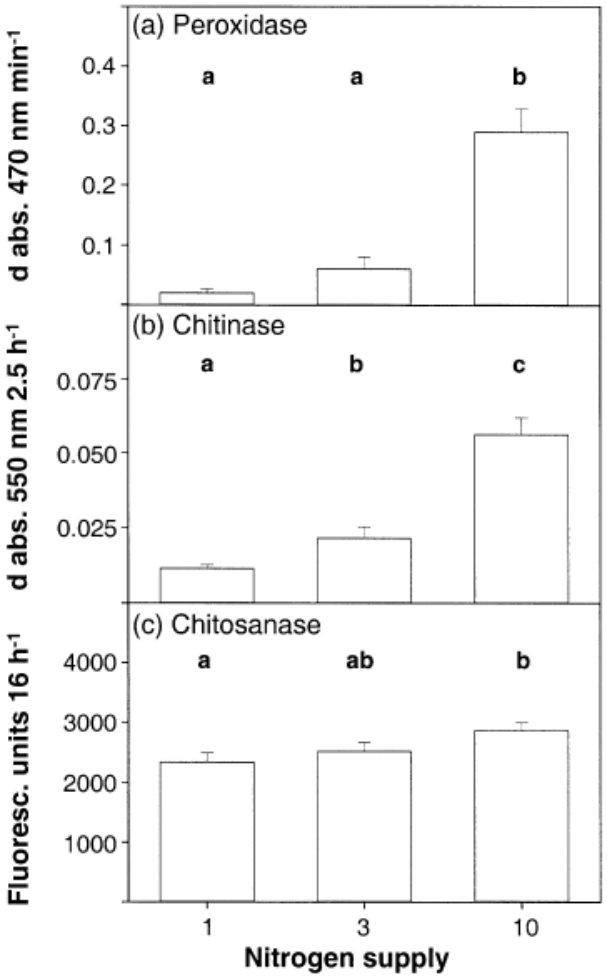
Linkages between N supply, plant growth and foliar disease



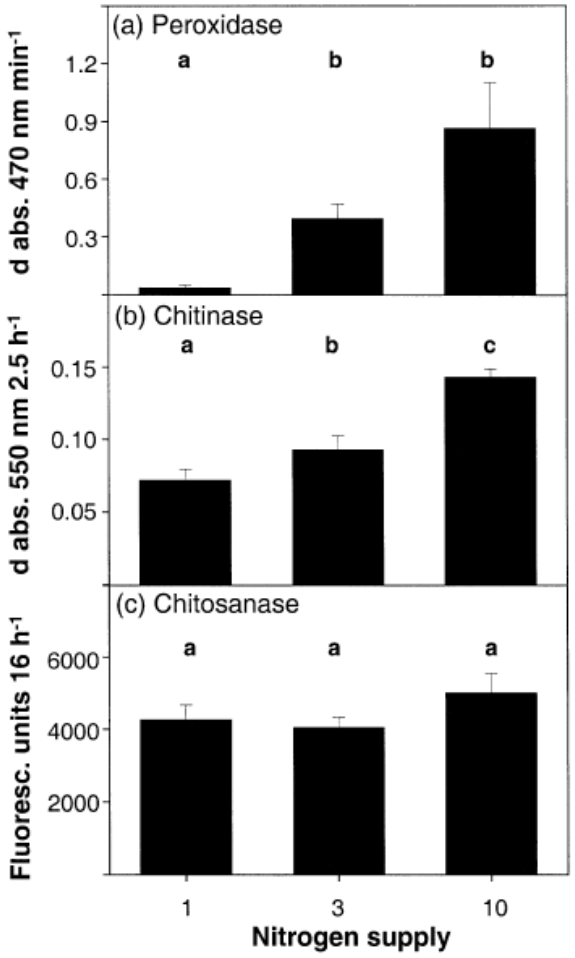
Walters and Bingham. 2007

Impact of N nutrition on constitutive and induced defense reactions in arabidopsis

Dietrich *et al*. 2004



Constitutive enzymatic activities

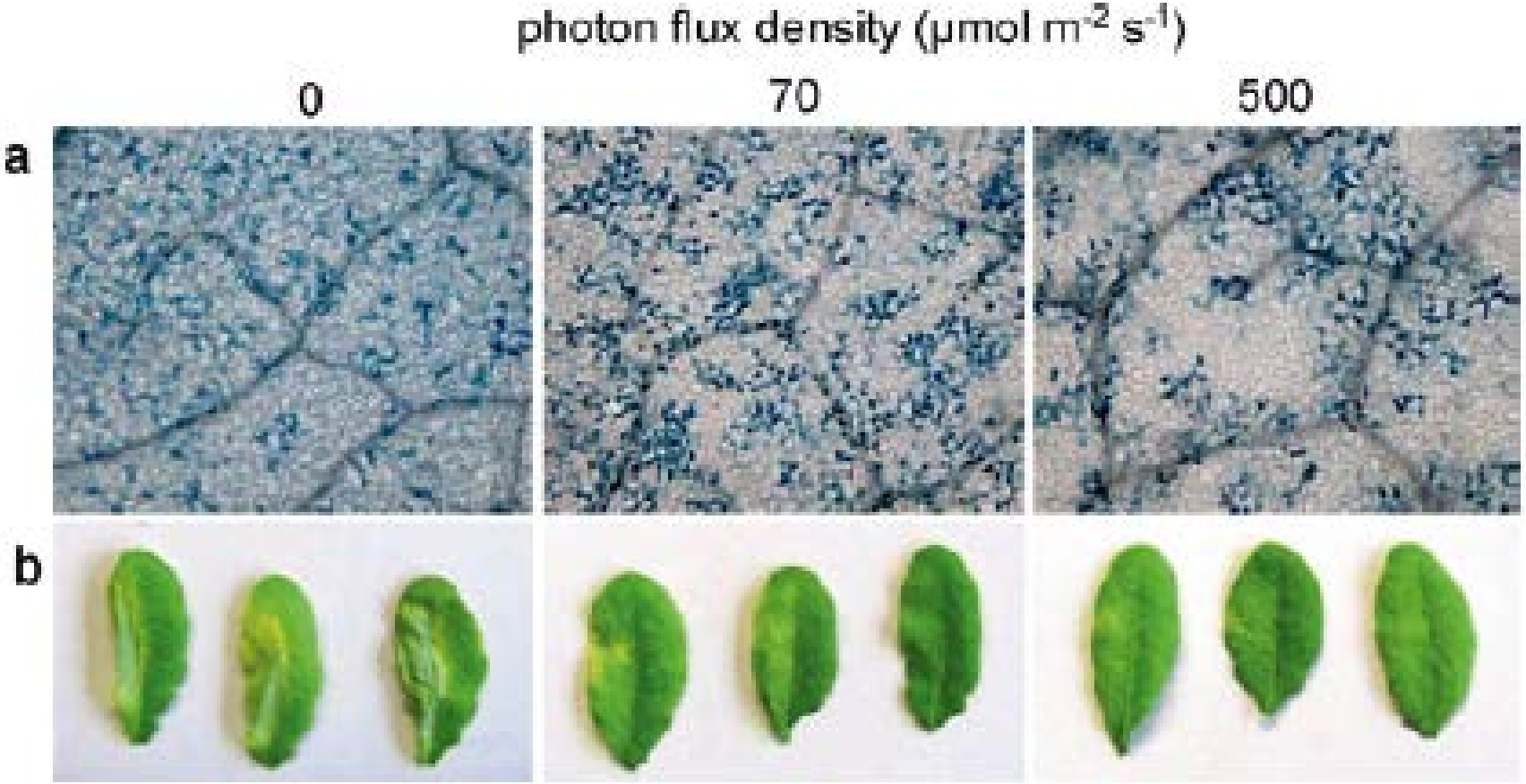


Induced (Bion) enzymatic activities

Influence of light on plant resistance

Hypersensitive response execution in arabidopsis depends on light conditions

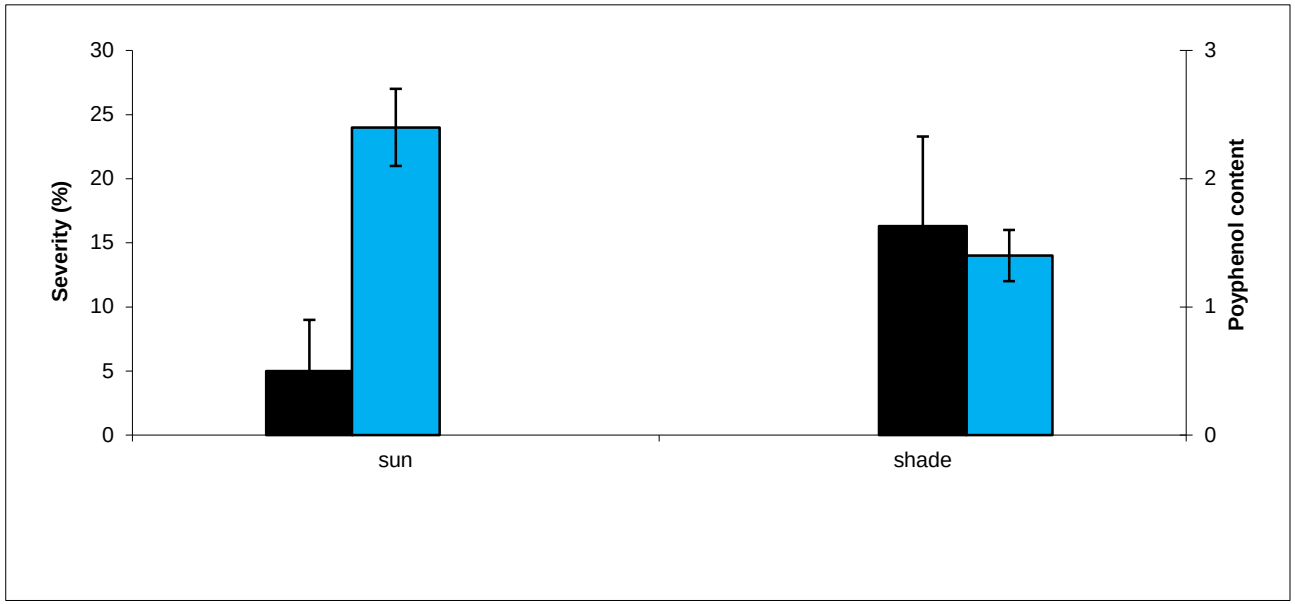
Zeier *et al*. 2004



So does Systemic Acquired Resistance…

Influence of light on grape resistance to *P. viticola*

Della marta *et al*. 2008



Disease severity

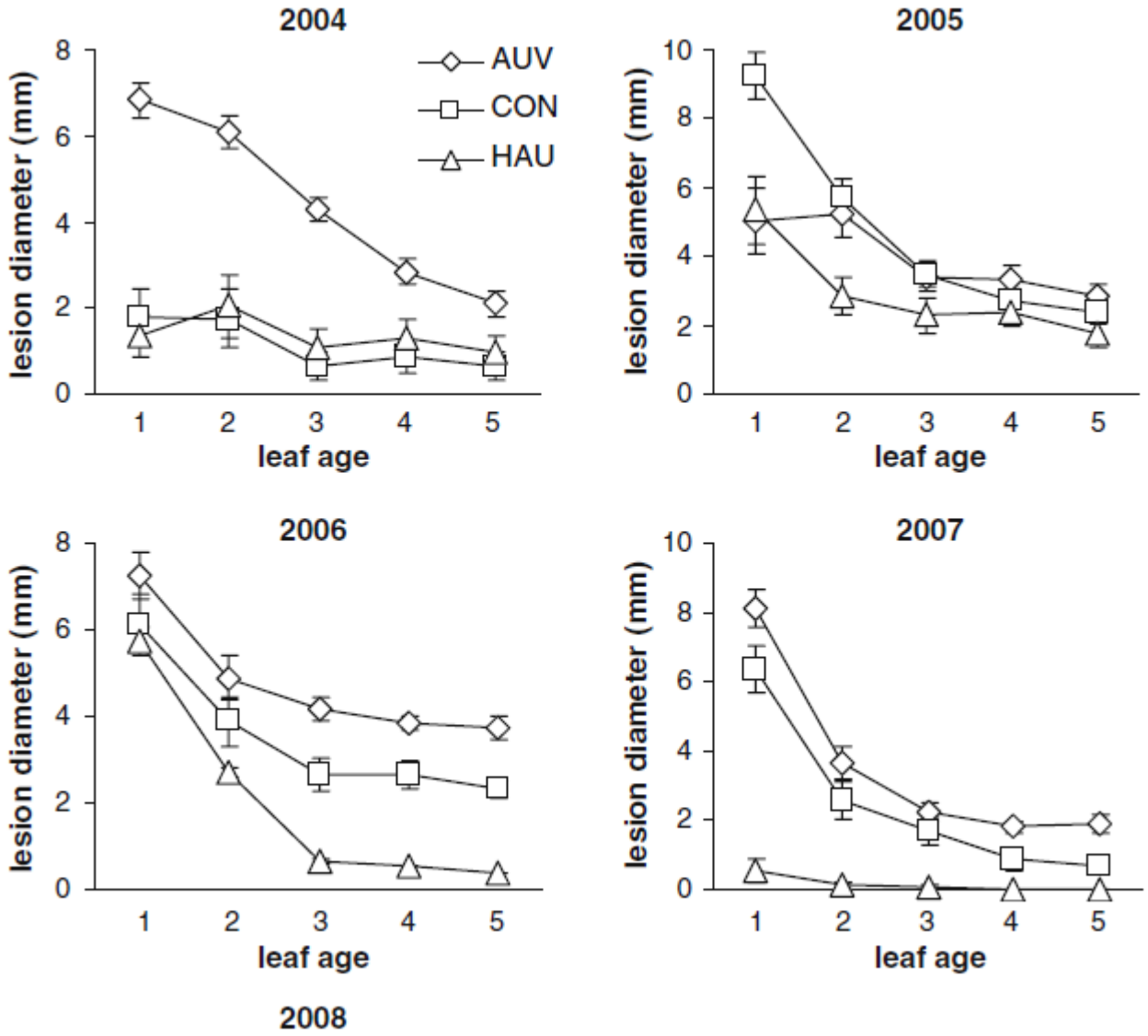
Leaves polyphenol content

Shade = 35% of full light

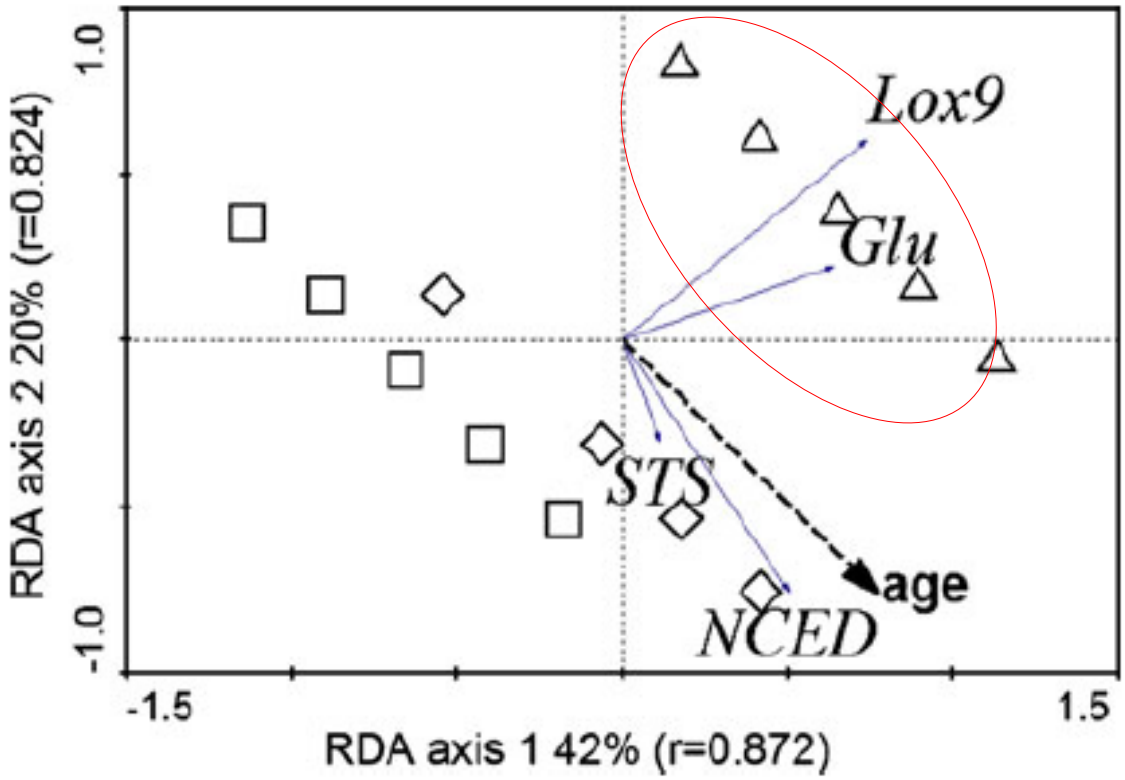
Site (location) effect

Site-specific field resistance to *P. viticola*

Thürig et al. 2009



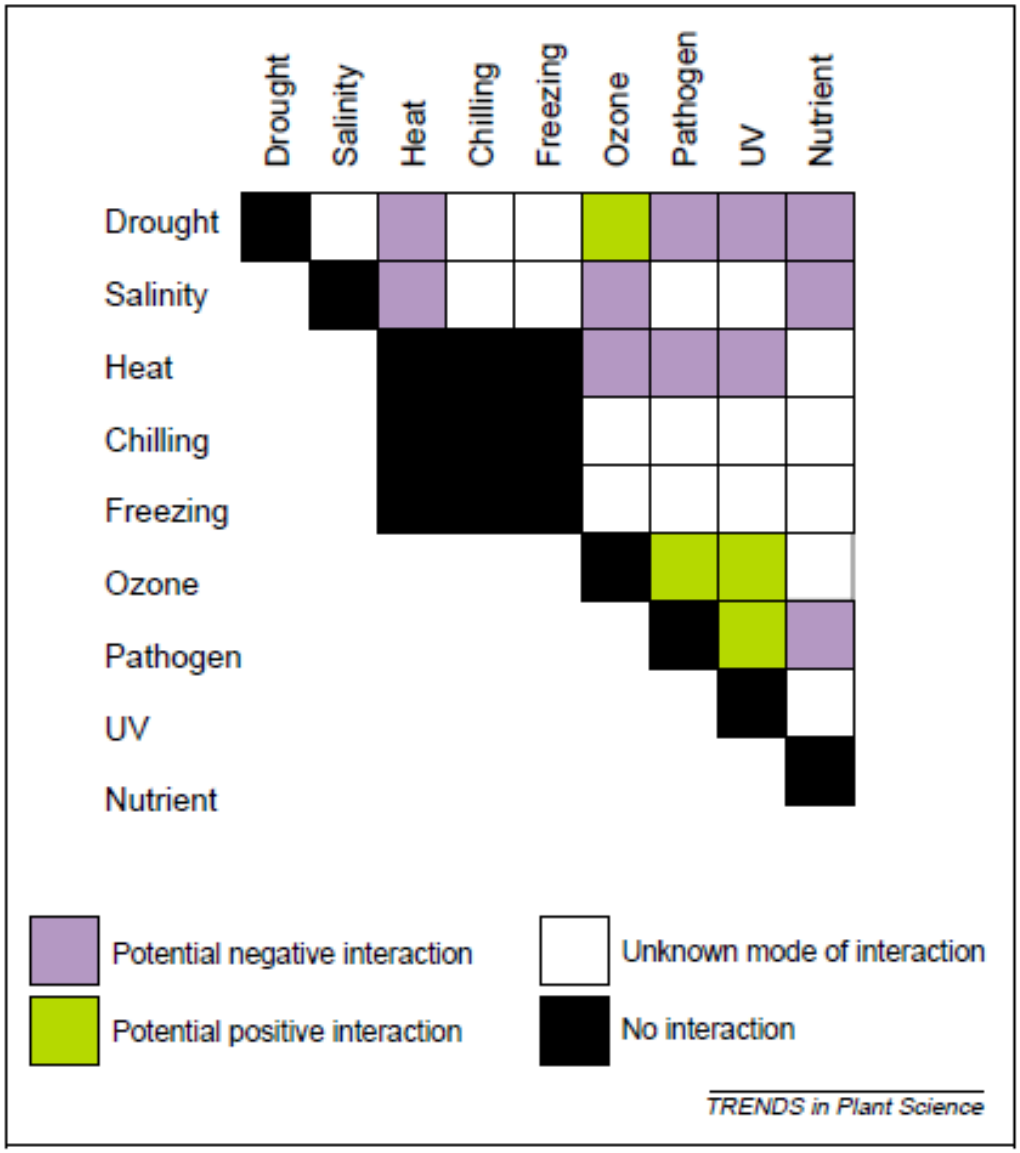
Correlation of constitutive expression of defense genes and resistance



Thürig et al. 2009

Effect of stress combination on plant health

Mittler *et al*. 2005

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