Tomato cultivars vary in BABA-induced resistance against *Phytophthora infestans*

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Introduction

The potential for use of resistance induction in plant protection can be greatly increased by breeding for inducibility. However, to make use of this trait there is a need to determine if there is genetic variation within species for inducibility; and if inducibility is affected by isolate * host * leaf age interactions. Tomatoes (*Lycopersicon lycopersicon* L.) and *Phytophthora infestans* were chosen as model system.

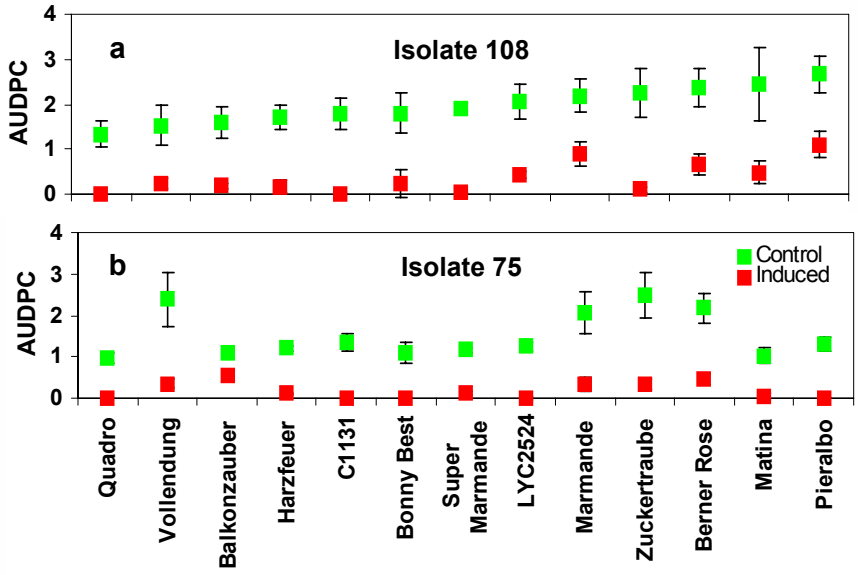

Fig.1. Area under disease progress curve (AUDPC) for 13 tomato cultivars when not induced (green) or induced with BABA (red) tested with 2 isolates of *P. infestans* on detached leaf disks of the youngest inoculated leaf. Variety by isolate by treatment interactions were highly significant (F=17.65, P<0.01). Effects of BABA were all significant with all isolates (Linear contrast, P<0.001).

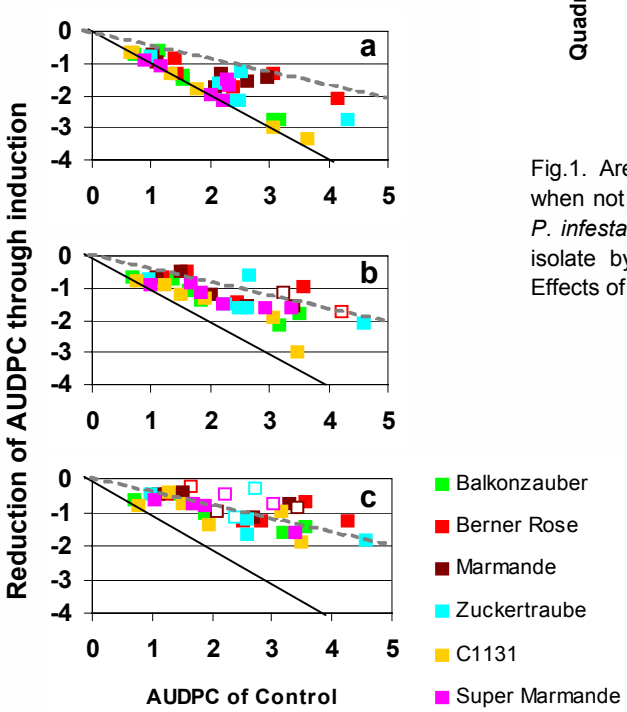

Fig. 2. Redution of AUDPC through BABA compared to the control on 6 tomato cultivars challenged with 6 isolates. Blank squares on fig. b and c indicate non-significant effect of BABA (Linear contrast, P<0.001). The solid diagonal line indicates 100%, the dashed line 50% disease reduction, respectively.

Results

There was a significant variety * isolate * leaf age * inducibility interaction (F=36.75, P<0.0001). Disease reductions through BABA were not the same on cultivars of the same level of susceptibility (Fig.1. a & b). The Range of protection by BABA on the first, second, and third leaf was 43-100% (Fig.2.a), 22-100% (Fig.2.b) and 15-100% (Fig. 2.c), respectively. Isolate effects were also very strong (Fig. 3).

Methods

In a leaf disk assay, up to thirteen tomato cultivars were tested to determine variation in inducibility of resistance by BABA (DL-3-amino butyric acid). Six isolates of *P. infestans* were used to determine isolate*variety*leaf-age*treatment interactions on six varieties.

Inoculation was done with 20 µl ($5*10^4$ sporangia ml^{-1} concentration) on the lower side of the leaf disk (Fig. 3).

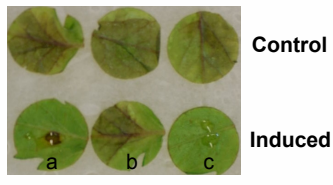

Fig. 3. Variation in resistance induction by BABA on tomato cultivar Berner Rose against isolate 108 (Fig. a), 101 (Fig. b), and 75 (Fig. c), on the second leaf respectively.

Conclusion

Variation for inducibility of resistance exists among tomato cultivars and the level of induction seems not to be related to the degree of susceptibility of a cultivar. Isolate by cultivar interactions may play an important role and need to be taken into account in further experiments and histological studies.