



Induced resistance against *Phytophthora infestans* – synergy with fungicides?

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Introduction

Late blight caused by the oomycete, *Phytophthora infestans*, causes every year large yield losses for Swedish potato growers. Today the only efficient management to control potato late blight is the frequent use of fungicides. Hence it is of a great importance to find new methods with minimized use of fungicides.

One method of choice is induced resistance. BABA (DL-β-amino butyric acid) is the most promising agent and has been shown to reduce potato late blight also under field conditions.

Aim

To investigate if there was any synergy effect between BABA and fungicides in greenhouse and in Swedish field experiments.

Greenhouse experiments

Detached leaf assay was carried out according to Eucablight protocol. After treatment excised leaves were inoculated with *P. infestans*. Lesion sizes were measured 6 days after inoculation.

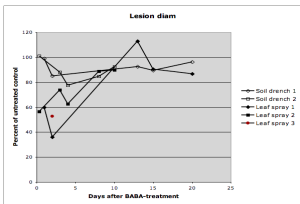


Figure 1. Durability of BABA effect

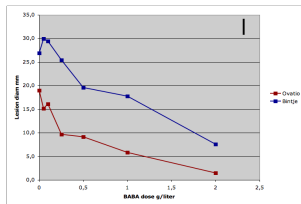


Figure 2. Dose-response of BABA treatment

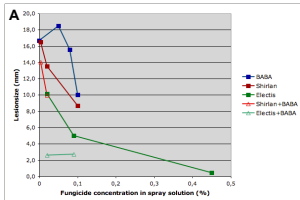


Figure 3 A, B. Effect of BABA in combination with fungicides

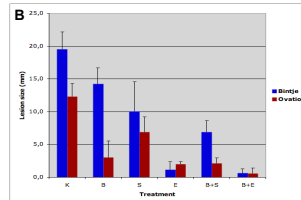


Fig. 1. Durability of BABA effect on cv. Bintje.

Fig. 2. Dose-respons effect of BABA on cvs Bintje (sus.) and Ovatio (partial res.). Bar is SD of overall mean.

Fig. 3. Effects of BABA (B) alone and in combination with the fungicides Shirlan (S) and Electis (E) two days after treatment. Recommended concentrations in field treatments are 0,1% and 0,45 % (v/v) for Shirlan and Electis, respectively.

A. Effect of different combinations two days after treatment. In the figure the lesion sizes are plotted against the fungicide concentration. In the combined treatment BABA concentration was 0,08 (left point) and 0,02% (right point)(w/v).

B. Concentrations in spray solutions were 0,05% for BABA (w/v), 0,02% for Shirlan (v/v) and 0,09% for Electis (v/v).

Results

- BABA reduced the lesion sizes with 40-50% up to 4 days after treatment. Leaf spray had a better effect than soil drench.
- A clear dose-response effect of BABA was found on both cultivars. BABA had a better effect on the partial resistant cv. Ovatio. GLM showed significant effect of dose ($p < 0,001$), variety ($p < 0,001$) and dose*variety interaction ($p = 0,02$).
- The effect of the combination of BABA and fungicide was better than BABA or fungicide alone.

Field experiments

Effects of fungicide treatment (Shirlan) in different doses in combination with the inducer BABA on the development of late blight infection. The fields were treated with Shirlan and/or BABA once per week.

Fig. 5, 6, 7. Effect of BABA in combination with Shirlan in field. Different letters indicate sign. difference ($p < 0,05$). Vertical comparisons, within date, only.

Results

- BABA alone had a weak but significant effect during the early progress of the disease.
- A reduced dose of Shirlan (75% of recommended) in combination with BABA had an equal or better effect on late blight than full dose Shirlan alone.

The project was supported by SLF and Formas. Field experiments were carried out by the Swedish Farmers' association.



Figure 4. Mosslanda 2007

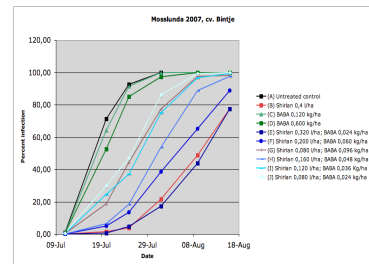


Figure 5. Cv. Bintje in Mosslanda 2007

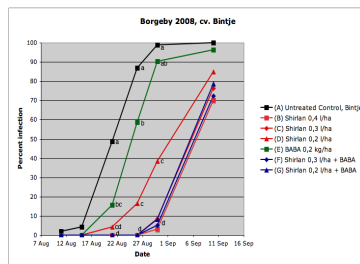


Figure 6. Cv. Bintje in Borgeby 2008

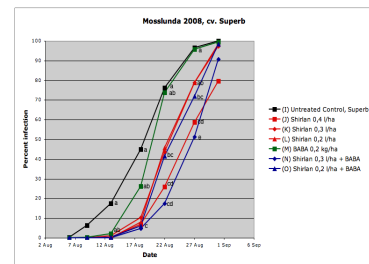


Figure 7. Cv. Superb in Mosslanda 2008

