

# Susceptibility of apple genotypes to strains of *Erwinia amylovora* with different plasmid content

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The fire blight is the most serious bacterial disease of apple trees. The disease is caused by *Erwinia amylovora*, which is considered to be a homogeneous species based on physiological, biochemical, phylogenetic and genetic analysis. However, *E. amylovora* strains differ in plasmid content and virulence. One of the strategy to control this disease is breeding for resistant apple cultivars.

The aim of our study was to compare the susceptibility of four apple genotypes to *E. amylovora* strains with different plasmid content and different virulence ability.

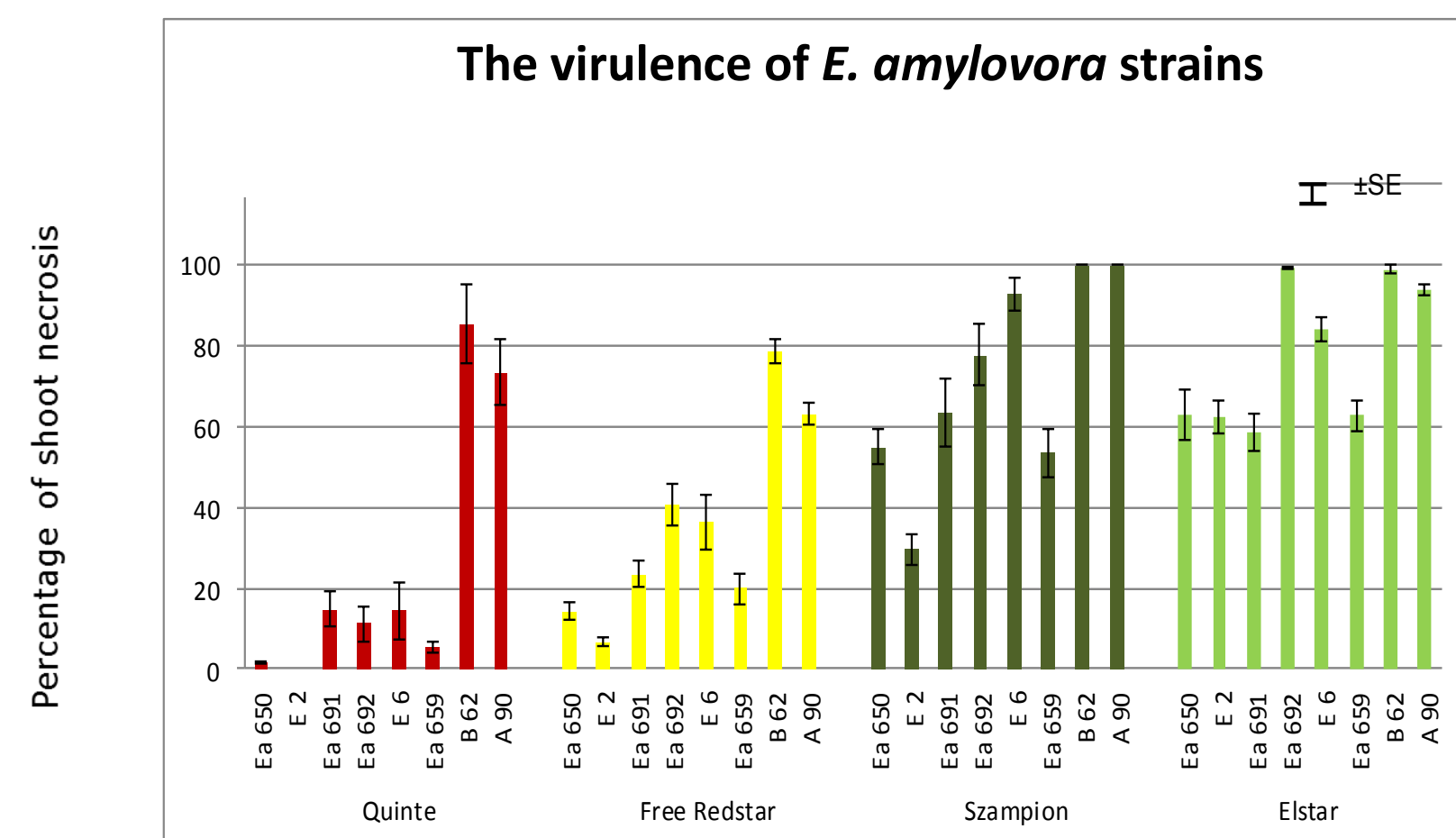
## Analysis of apple genotypes susceptibility to *E. amylovora*

Strains:

Isolated in Poland: 659, 691 – *Malus*; E6 – *Pyrus*; 692 – *Sorbus*; 650, E2 – *Crataegus*.

Isolated in USA: A90, B62 – *Malus*.

Strains were used for inoculation by shoot tips cutting with scissors of 4 apple genotypes: **Sampion** (susceptible), **Elstar** (middle susceptible) and **Free Redstar** and **Quinte** (resistant)



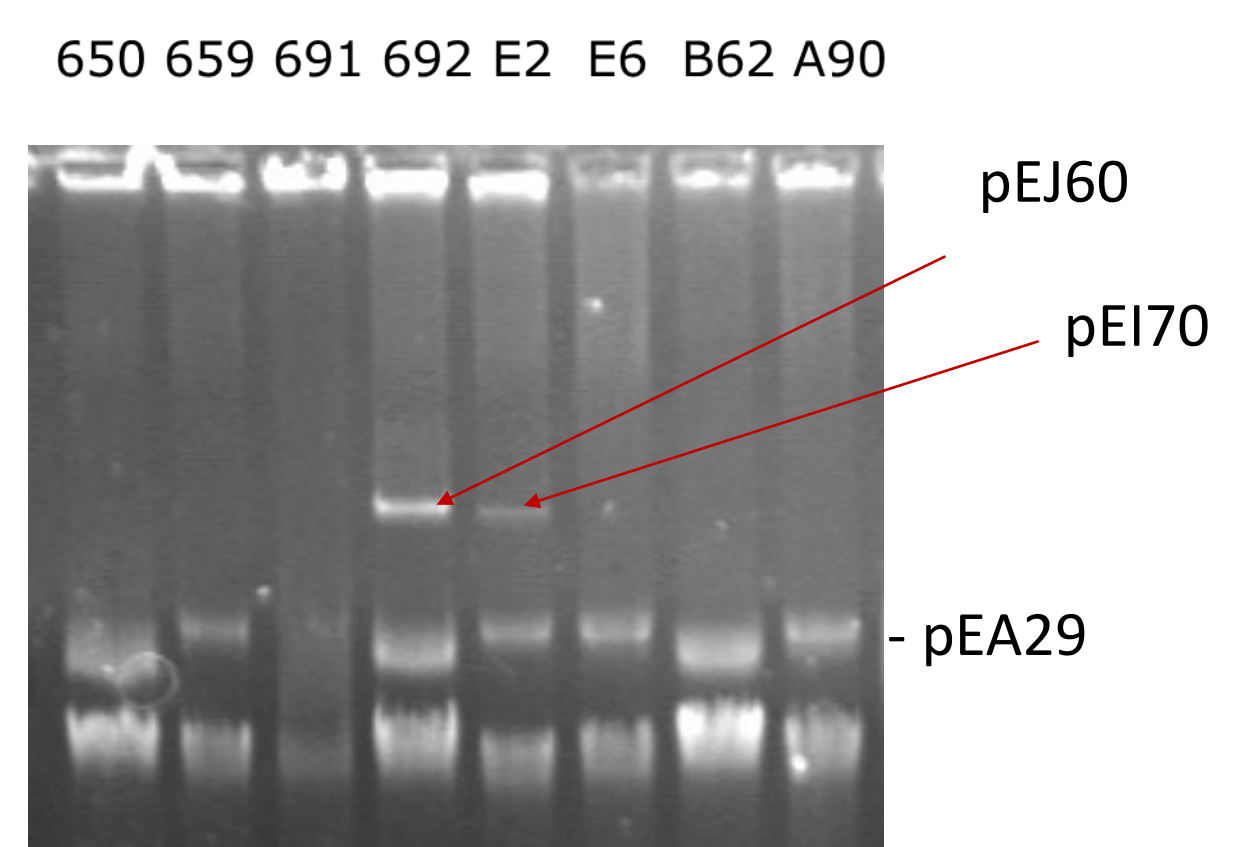
The virulence of tested *E. amylovora* strains— expressed as a percentage of shoot necrosis in relation to entire length of shoot measured six weeks after inoculation.



Fot. 1. Apple trees cultivars: A - Elstar, B - Sampion, C - Quinte 6 weeks after inoculation

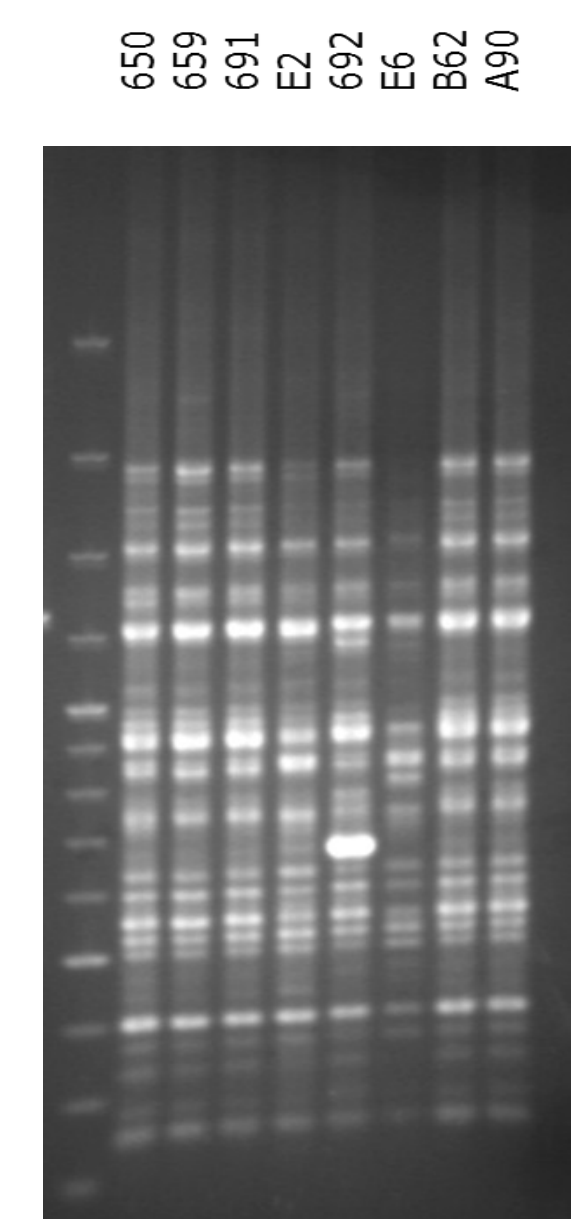
## Analysis of genetic diversity of *E. amylovora* strains

### Plasmid profiles



All strains possessed plasmid pEA29. Plasmid pEI70 (Llop et al. 2008) was found in strain E2 while new plasmid pEJ60 (Puławska, unpublished) in strain 692.

### RAPD



RAPD analysis with 19 different random primers showed almost no differences between strains.

### Analysis of sequences of genes related to pathogenicity

The sequences of genes:

- ⇒ *hrpN* (Jock and Geider, 2004)
- ⇒ *dspA/E* (Giorgi and Scortichini, 2005)
- ⇒ *amsB* (Bereswill et al., 1995)

were identical.

### Summary and conclusion:

- ⇒ All apple genotypes differed in susceptibility to *E. amylovora*.
- ⇒ All *E. amylovora* strains tested differed in virulence on different apple genotypes
- ⇒ Strains B62 and A90 from USA were the most virulent
- ⇒ The highest diversity between virulence was observed on cvs. Quinte and Free Redstar. Both cultivars are useful for the selection of *E. amylovora* strains to evaluate susceptibility of breeding material to fire blight.
- ⇒ Out of strains isolated in Poland, strain 692, which possess a new, till now not described plasmid (pEJ60) was one of the most virulent.
- ⇒ All strains tested were very similar genetically but they possessed different plasmid content.