

# The suitability of the Finnish climate for fire blight epidemics

- based on 20 years weather data

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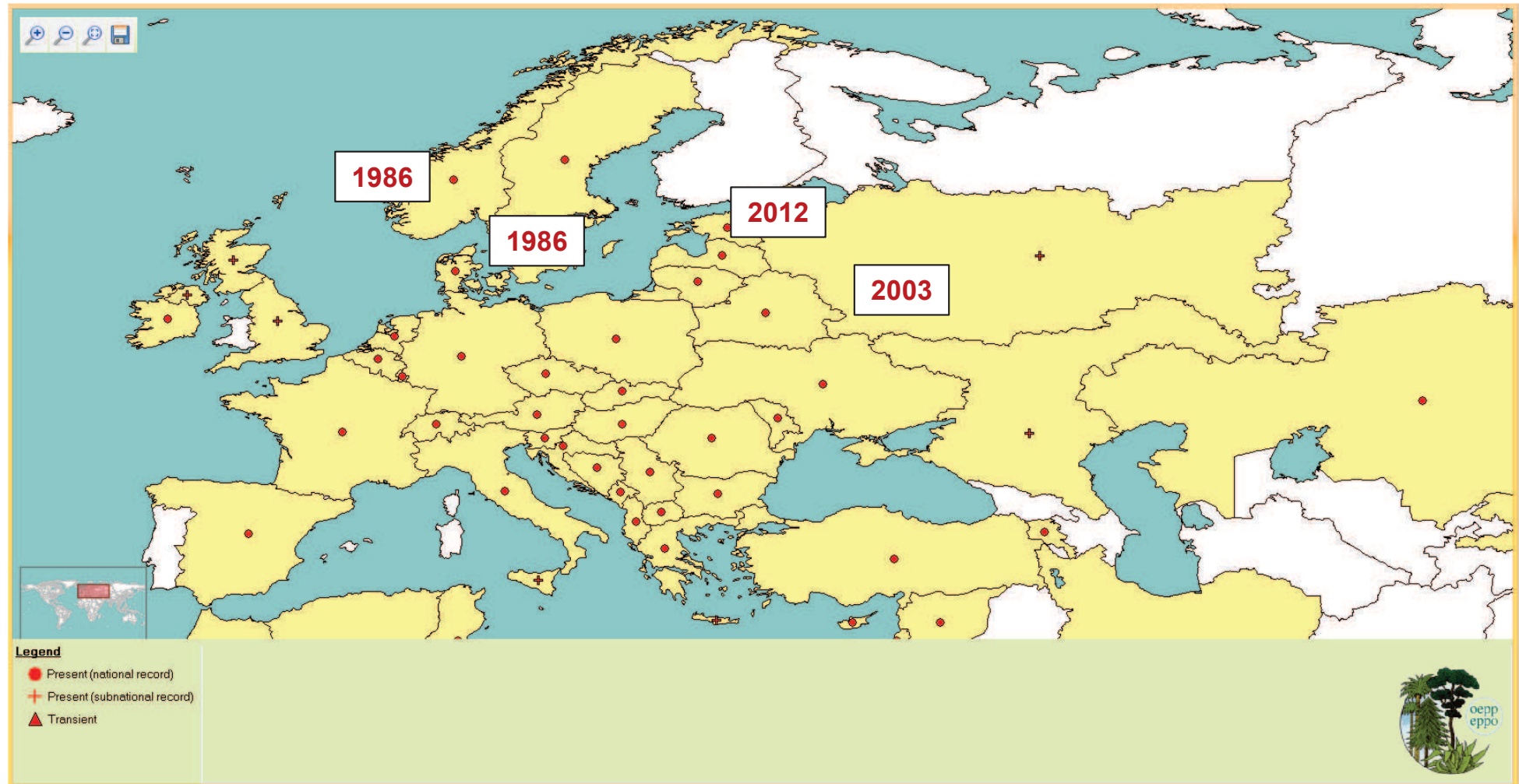
Riskinarvioinnin tutkimusyksikkö, Evira

# Fire blight (Tulipolte)

## - *Erwinia amylovora*

- Destructive
- Sporadic nature
- Depends on weather conditions
- Difficult to control
- Infects all plant parts → different symptoms
- Host plants (family *Rosaceae*):
  - ***Malus*** (omenapuut)
  - ***Pyrus*** (päärynät)
  - *Amelanchier* (tuomipihlajat)
  - *Cotoneaster* (tuhkapensaat)
  - *Crataegus* (orapihlajat)
  - *Sorbus* (pihlajat)
  - etc.

# Fire blight distribution in Europe



# Suitability of the Finnish climate

- **Why?**

- Destructive impact of the fire blight disease
- Present in all neighboring countries
- Depends on weather conditions

- **How?**

- **Maryblyt™** prediction model:
  - infection events (**blossom blight infection**)
  - symptoms development
- Data:
  - Phenological bud stage - *green tip, first bloom, petal fall*
  - Weather data - *daily minimum and maximum temperature, rainfall*

# Scope

- 2 apple cultivars:
  - early flowering cv. **Pirja**
  - late flowering cv. **Lobo**
- 20 years weather data (1993-2012)
- 14 geographical locations:

Ia Jomala

Ib Helsinki, Lohja Kirkniemi, Piikkiö

II Kokemäki, Pälkäne, Hirvensalmi, Lappeenranta

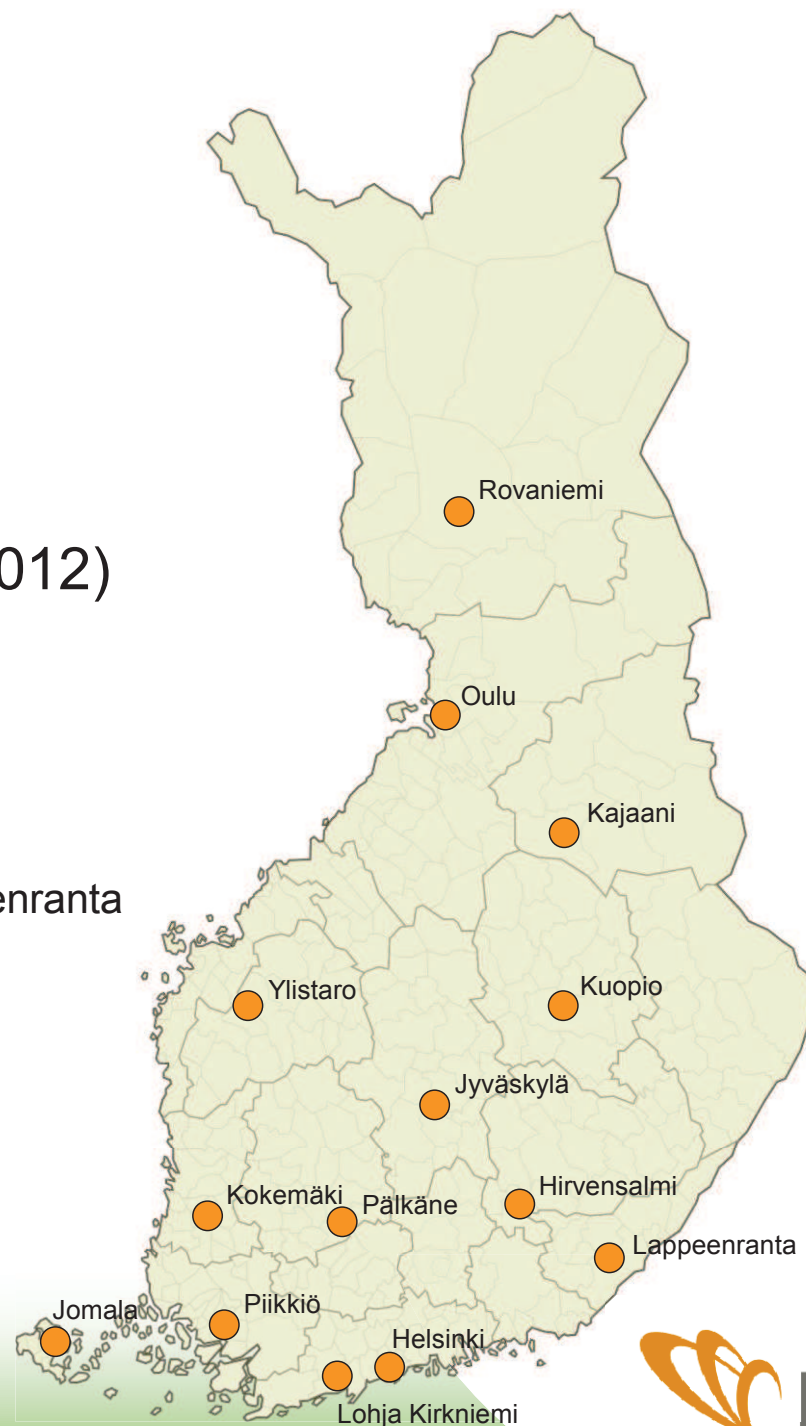
III Kuopio, Jyväskylä

IV Ylistaro

V Oulu

VI Kajaani

VII Rovaniemi

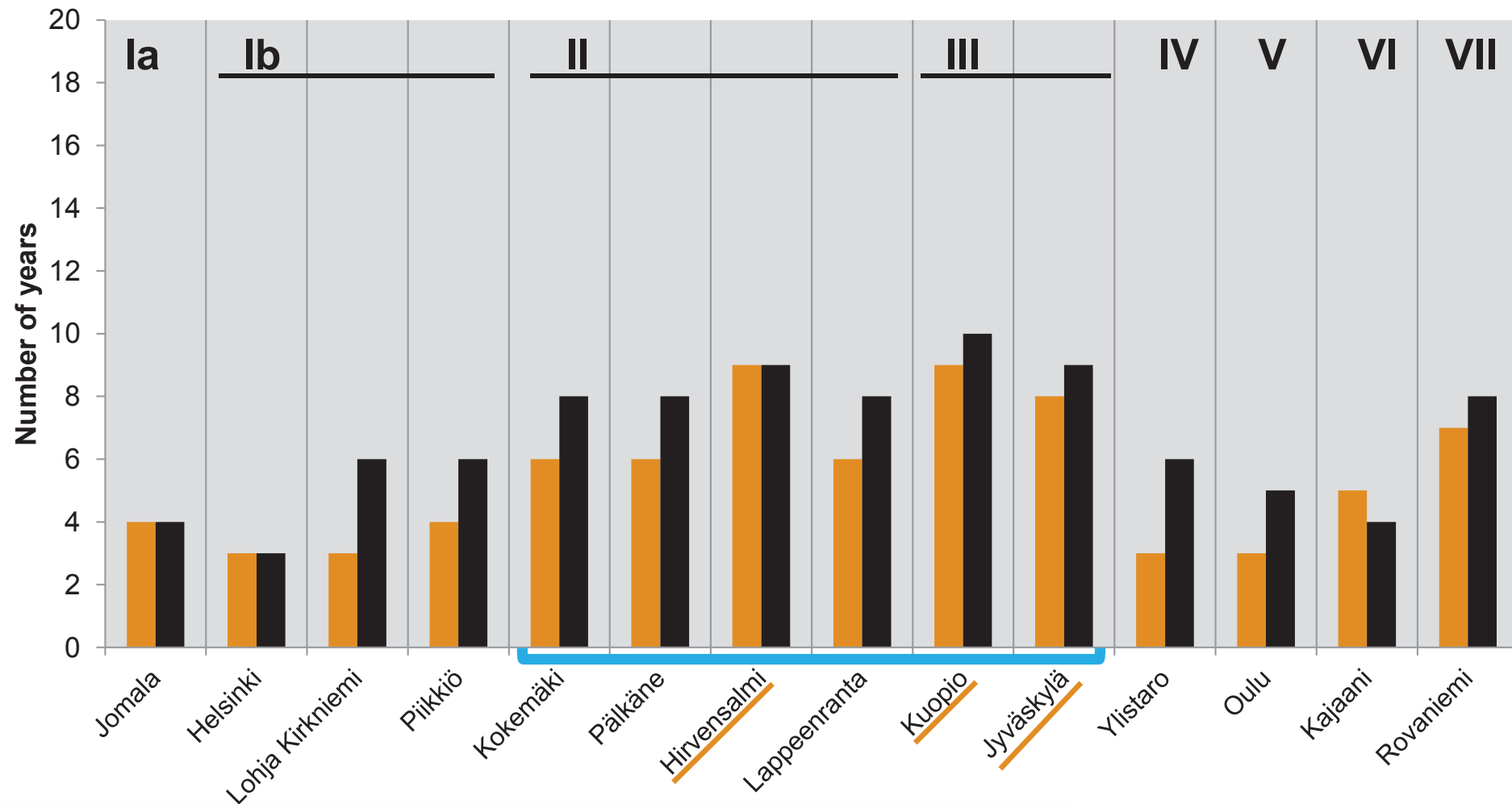


# Requirements for blossom blight infection

- 1) Flowers must be **open**
- 2) Accumulation of **at least 110 degree-hours above 18.3 °C** after the first flowers have opened  
→ infection potential of the bacteria
- 3) **Wetting** event  
- dew, rain, irrigation
- 4) Daily average temperature **at least 15.6 °C**

Risk levels	[	<b>Low</b>	1 requirement is met
		<b>Moderate</b>	2 requirements are met
		<b>High</b>	3 requirements are met
		<b>Infection</b>	all 4 requirements are met

# Number of years with predicted risk level “Infection”

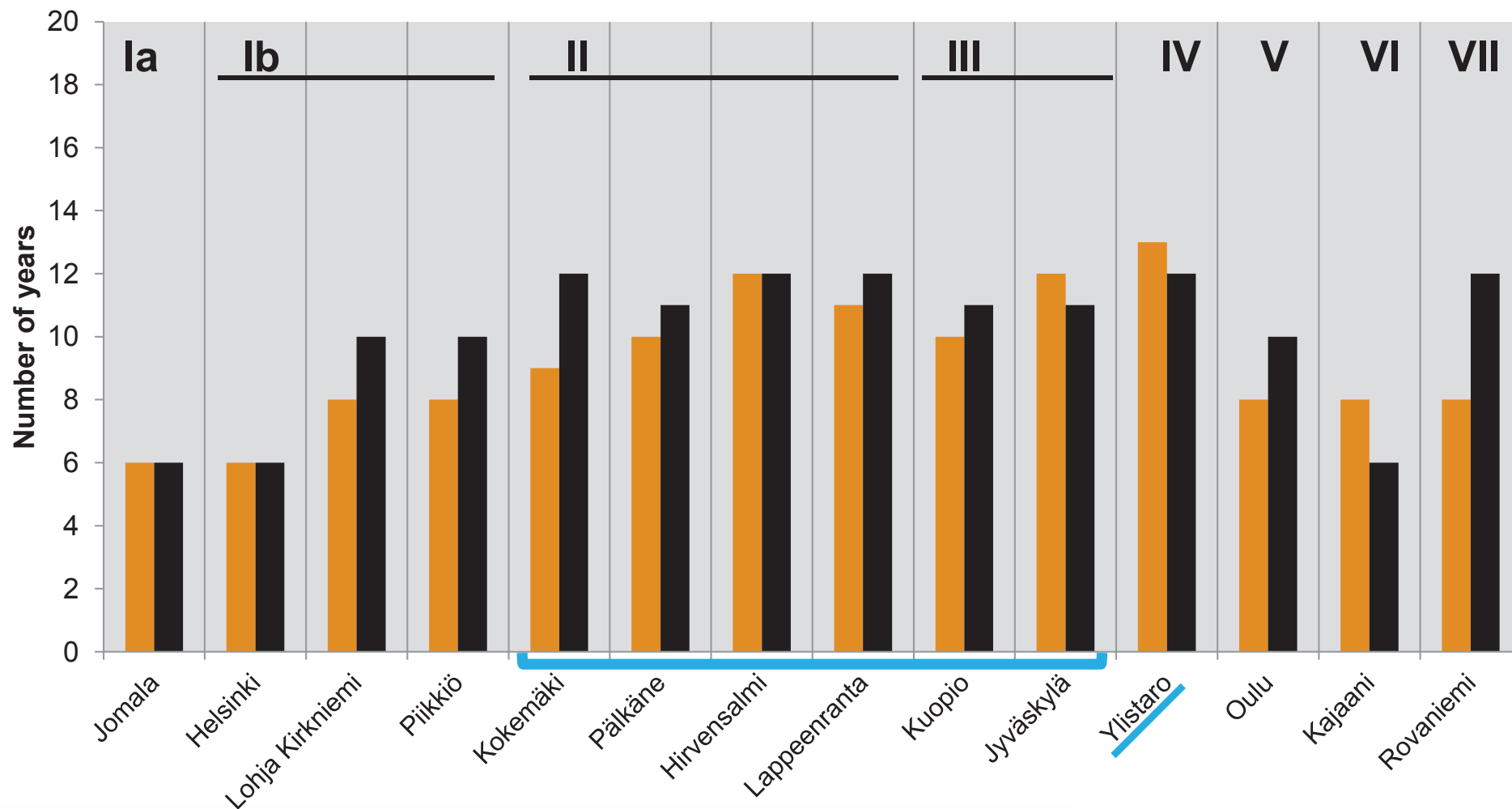


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16.5.2014

early flowering cv. Pirja  
 late flowering cv. Lobo



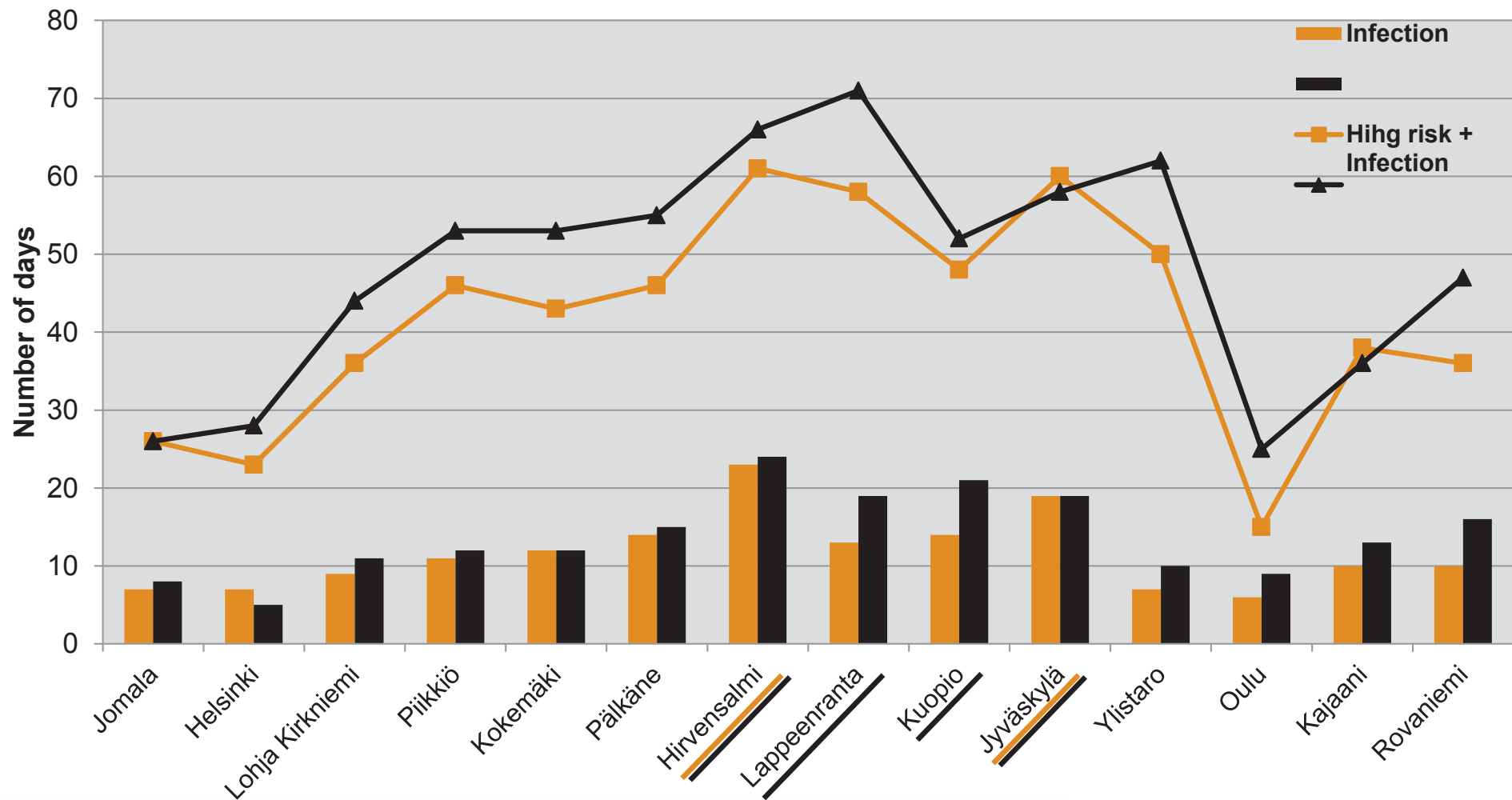
# Number of years with predicted risk level “High risk” (only wetting event is missing)



early flowering cv. Pirja  
 late flowering cv. Lobo



# The number of days in 20 years with risk level “Infection” and “High risk”






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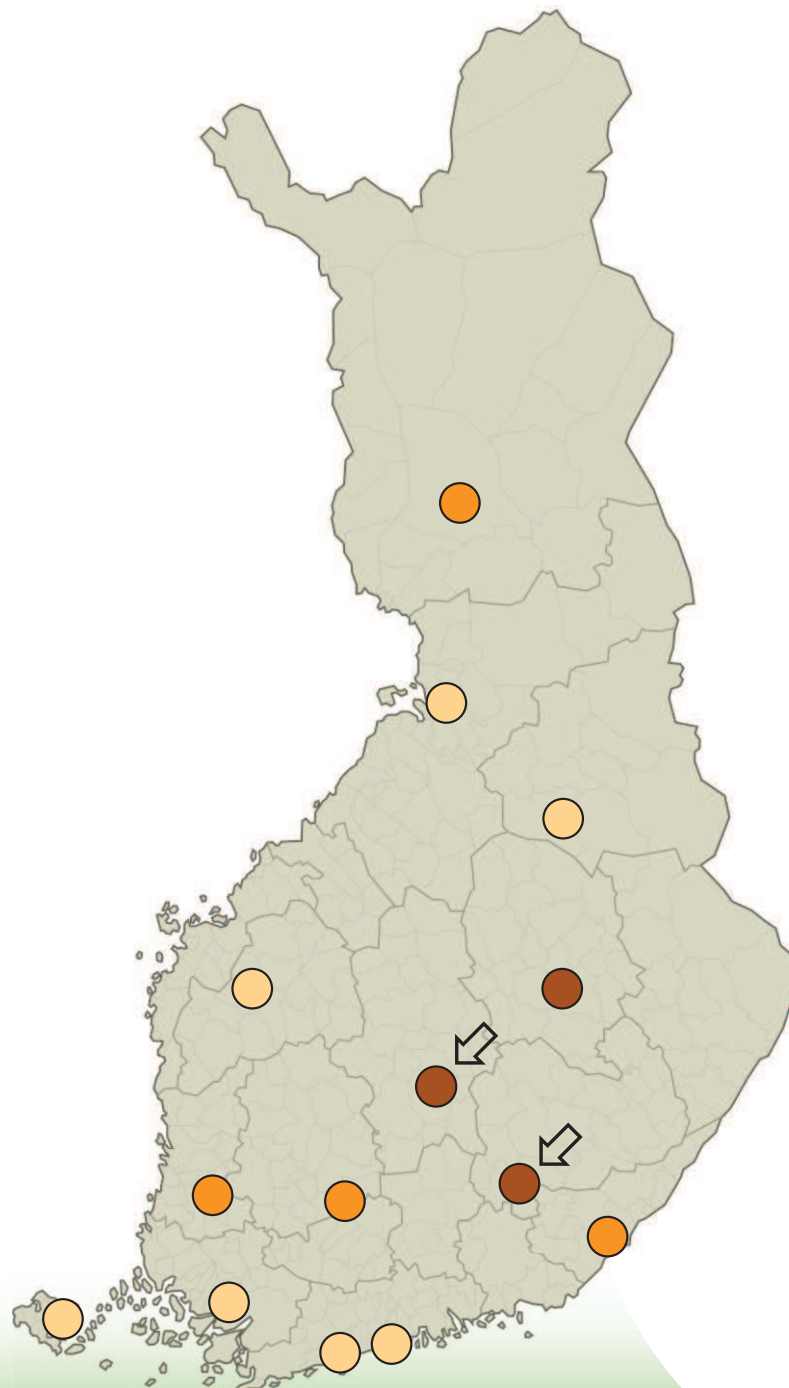
early flowering cv. Pirja  
 late flowering cv. Lobo



# Early flowering cultivar Pirja




“Infection” days and years:

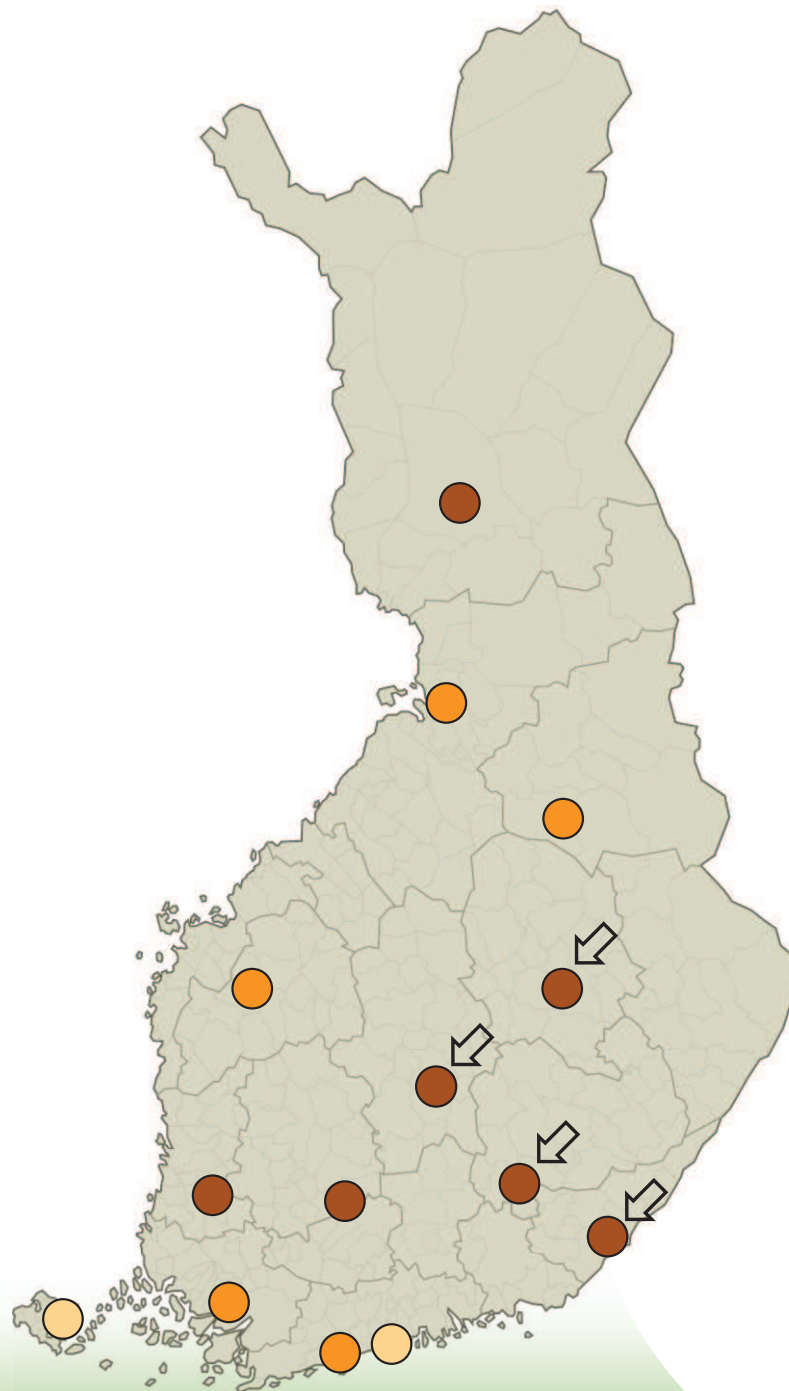
-  **Highest** number
-  **Medium** number
-  **Lowest** number



# Late flowering cultivar Lobo

“Infection” days and years:

-  **Highest** number
-  **Medium** number
-  **Lowest** number



# Conclusions

- **The climate in Finland is suitable** for fire blight epidemics
- This is true **for both apple cultivars**, but the risk is higher for the **late flowering cv. Lobo**
- The climate appears to be most suitable in **growth zones II and III**
- The largest number of days and years with suitable conditions were predicted for:
  - cv. Pirja in **Hirvensalmi** and **Jyväskylä**
  - cv. Lobo in **Hirvensalmi, Lappeenranta, Jyväskylä** and **Kuopio**

**Thank you for your attention!**