

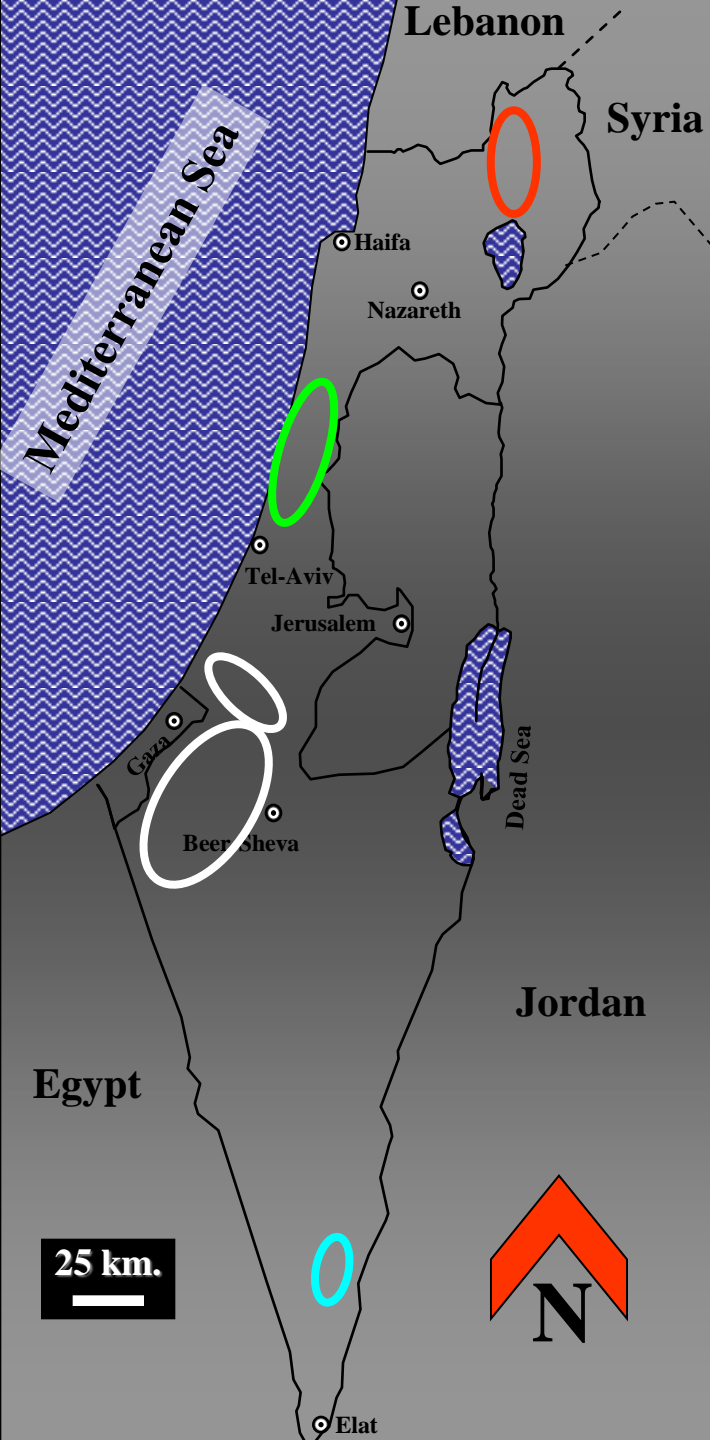


EuroBlight Workshop
Limassol, Cyprus 12-15 May, 2013

Alternaria diseases of potatoes: epidemiology and management

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Potato production in Israel

Cultivated area ~16,000 ha

~500 ha in the north

~3,000 ha in the Sharon area

~12,300 ha in the northern Negev

~200 ha in the Arava

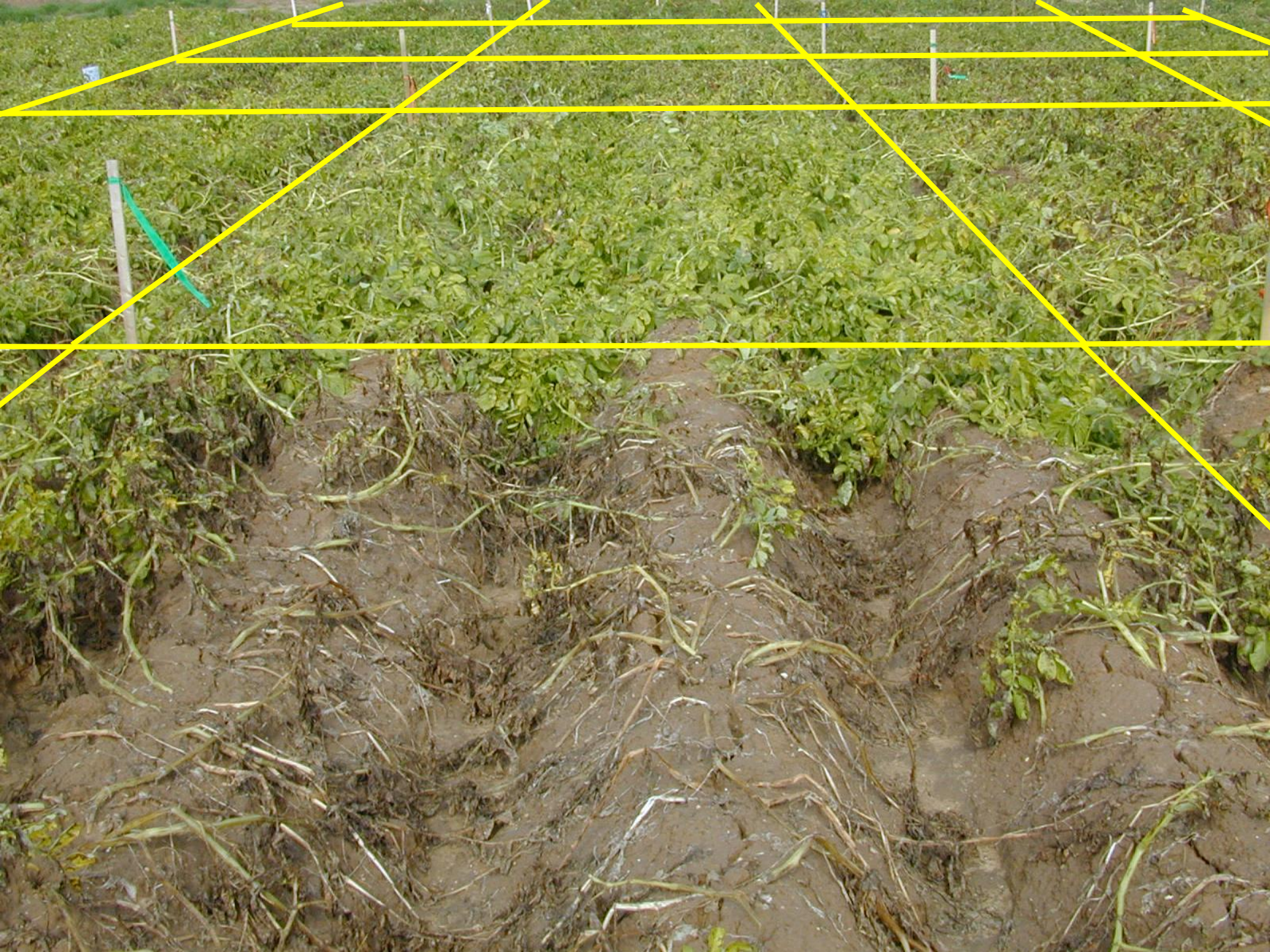




Early blight – *Alternaria solani*







Necrotic lesions – *Alternaria alternata*

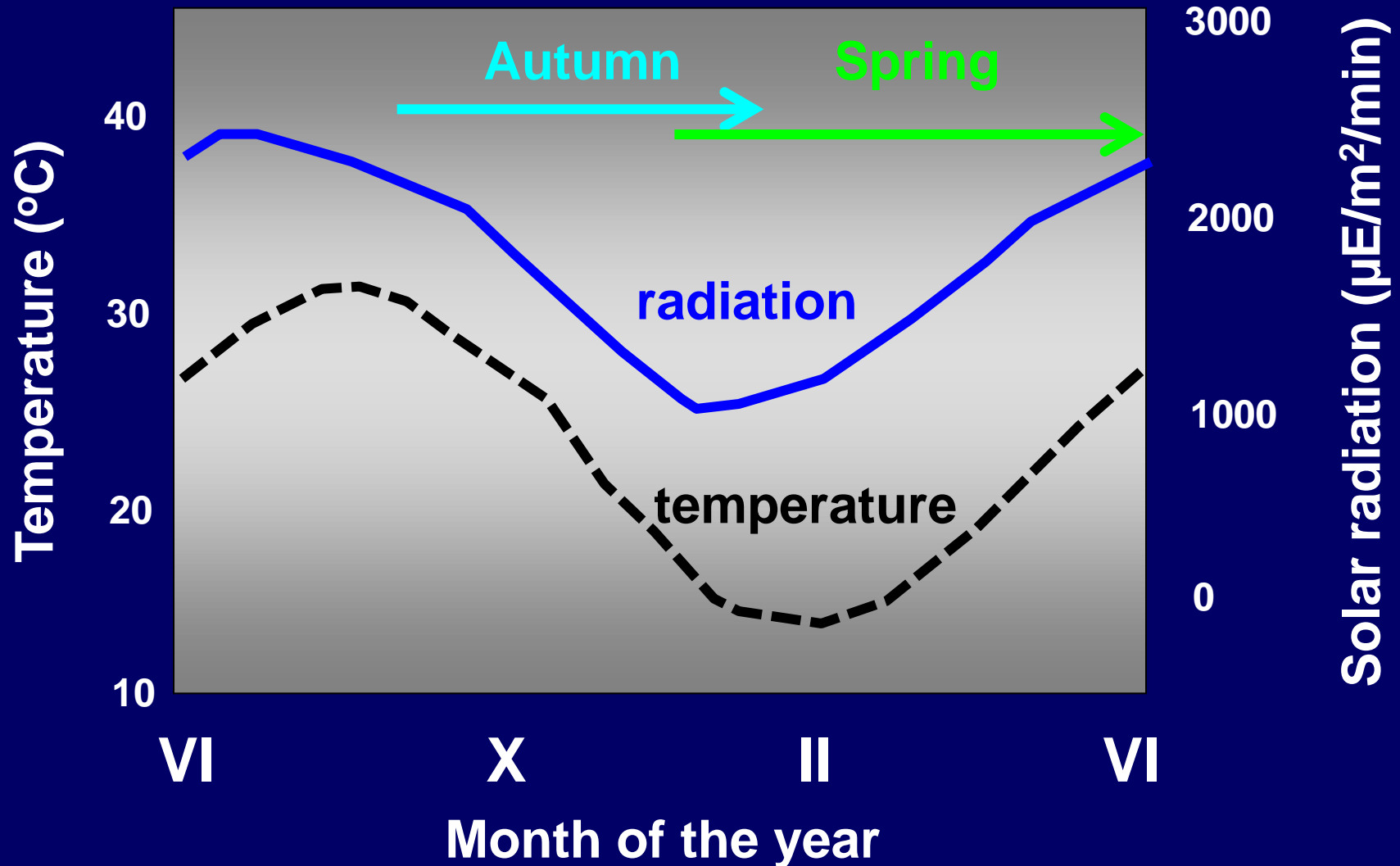


Late blight – *Phytophthora infestans*



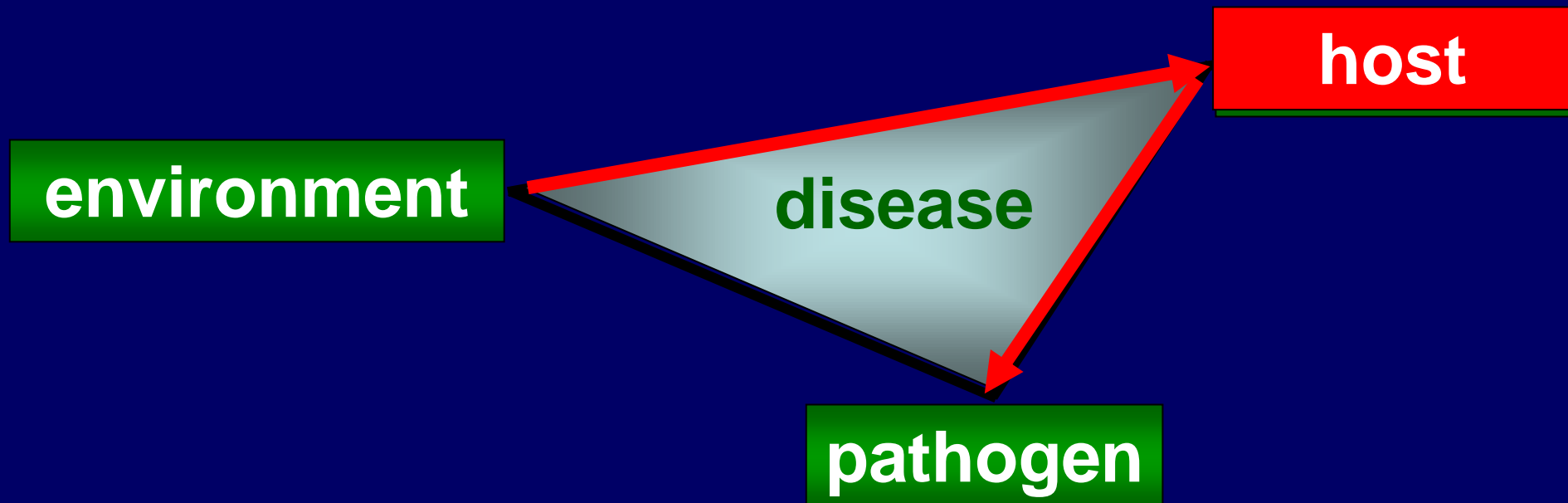


Potatoes are produced in Israel in two growing seasons



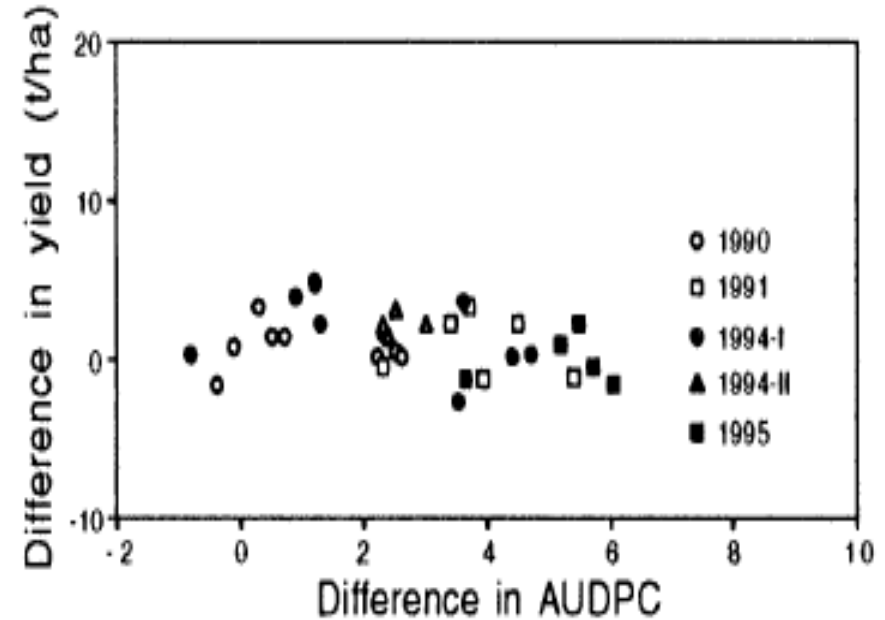
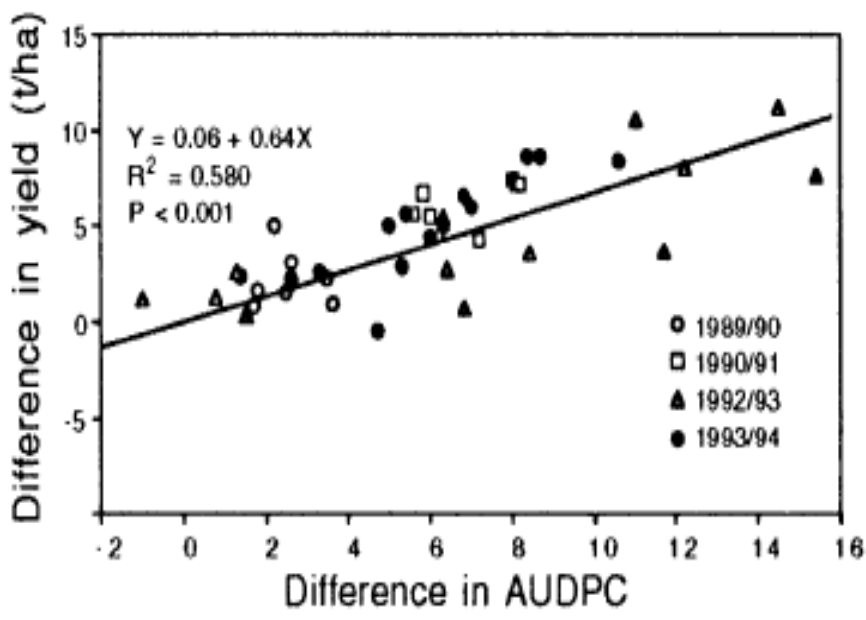
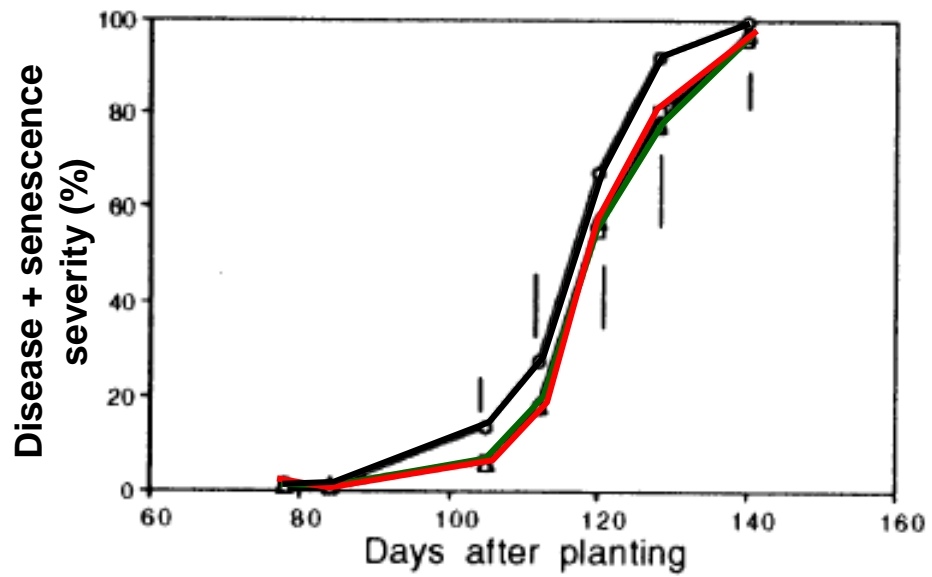
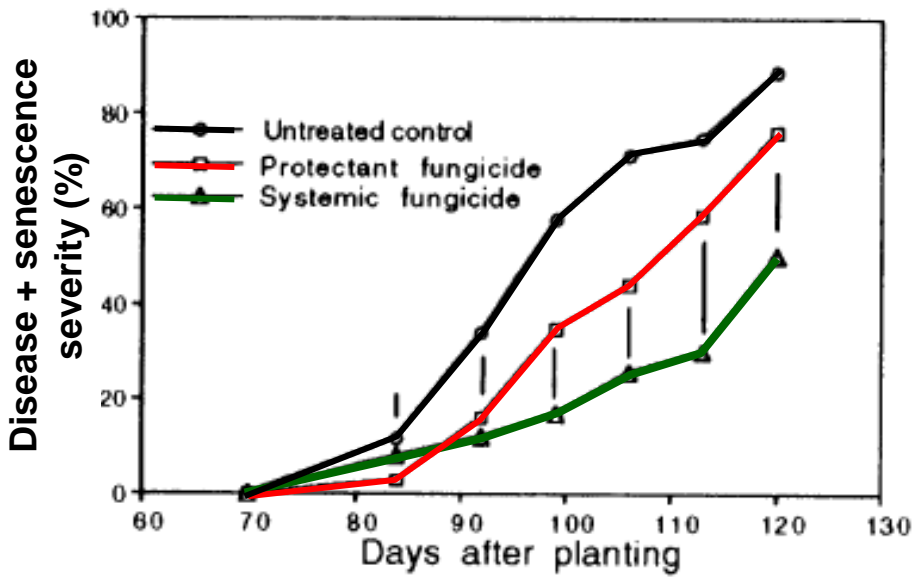
Observations – early blight

1. The primary factor governing early blight intensity is host growth, as influenced by the environment.
2. The disease intensifies in senescing leaves towards the end of the growing season.



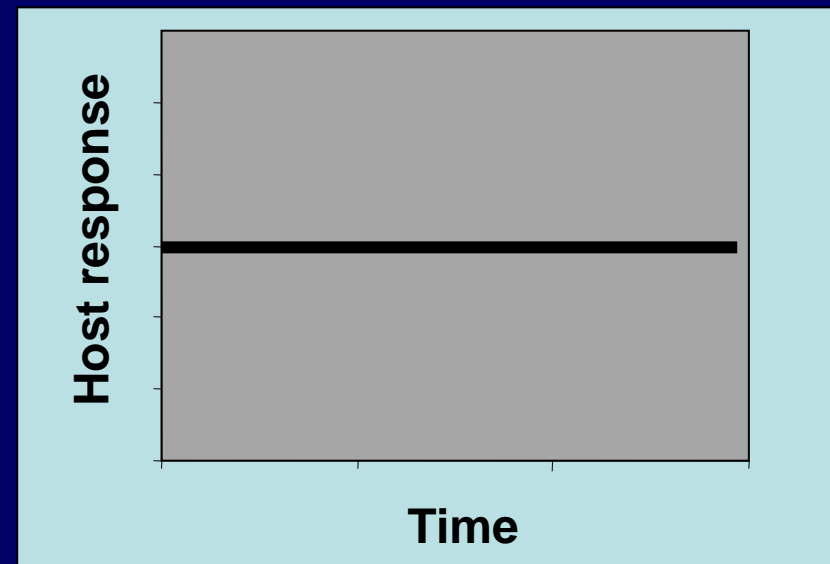
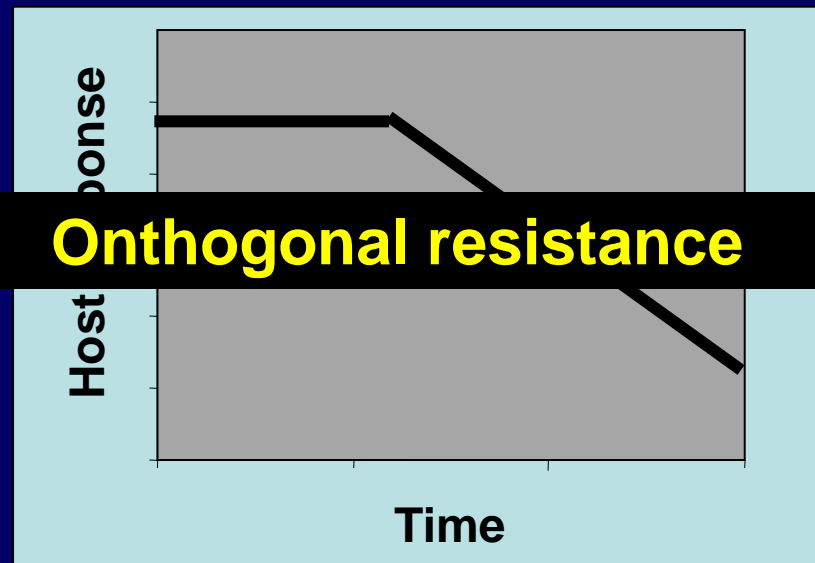
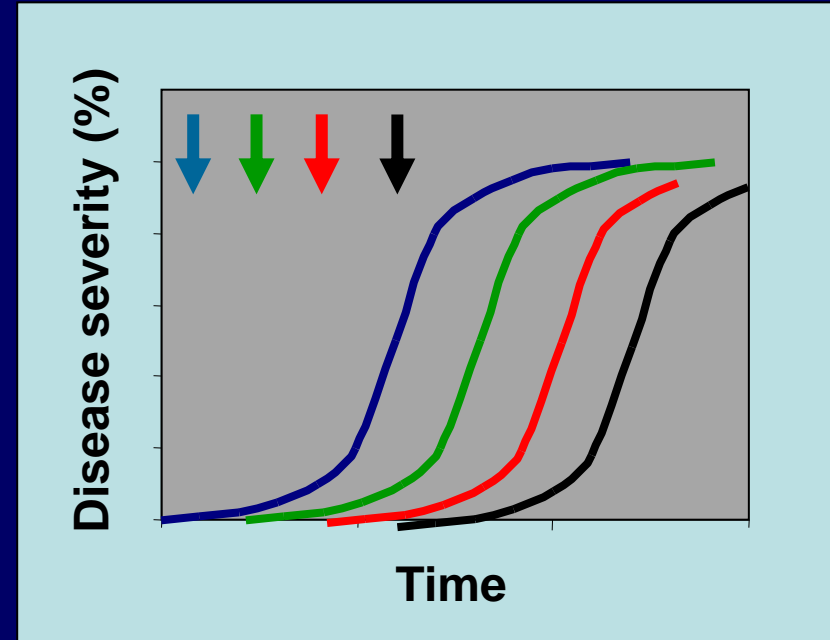
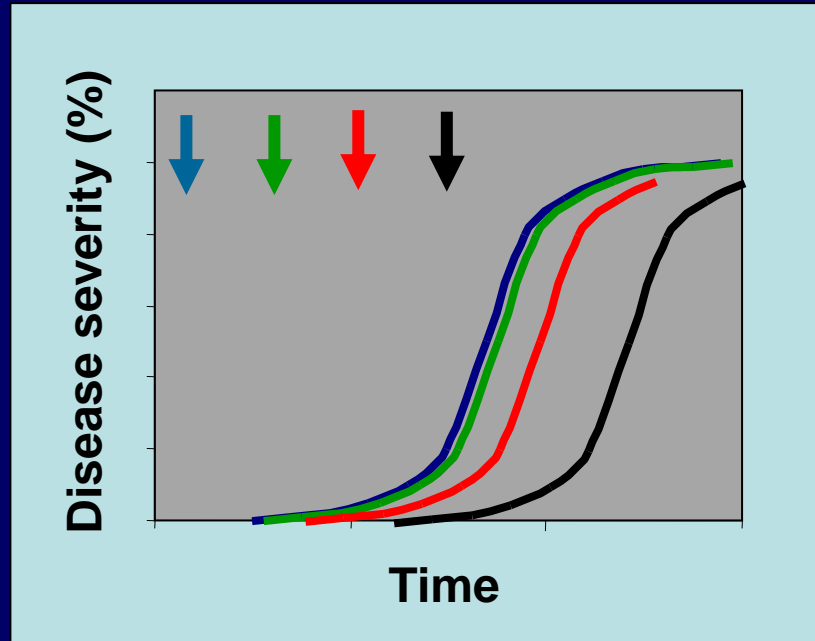
Autumn season

Spring season

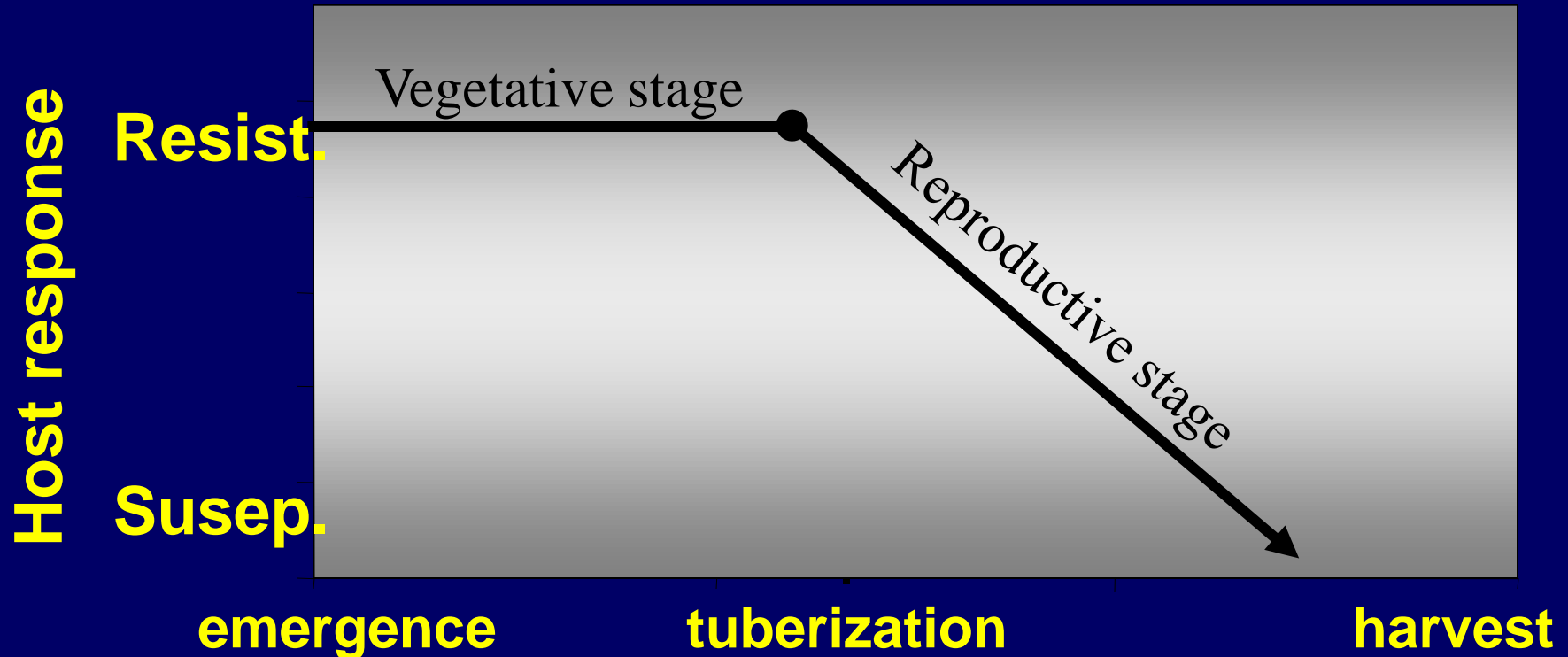


Early blight

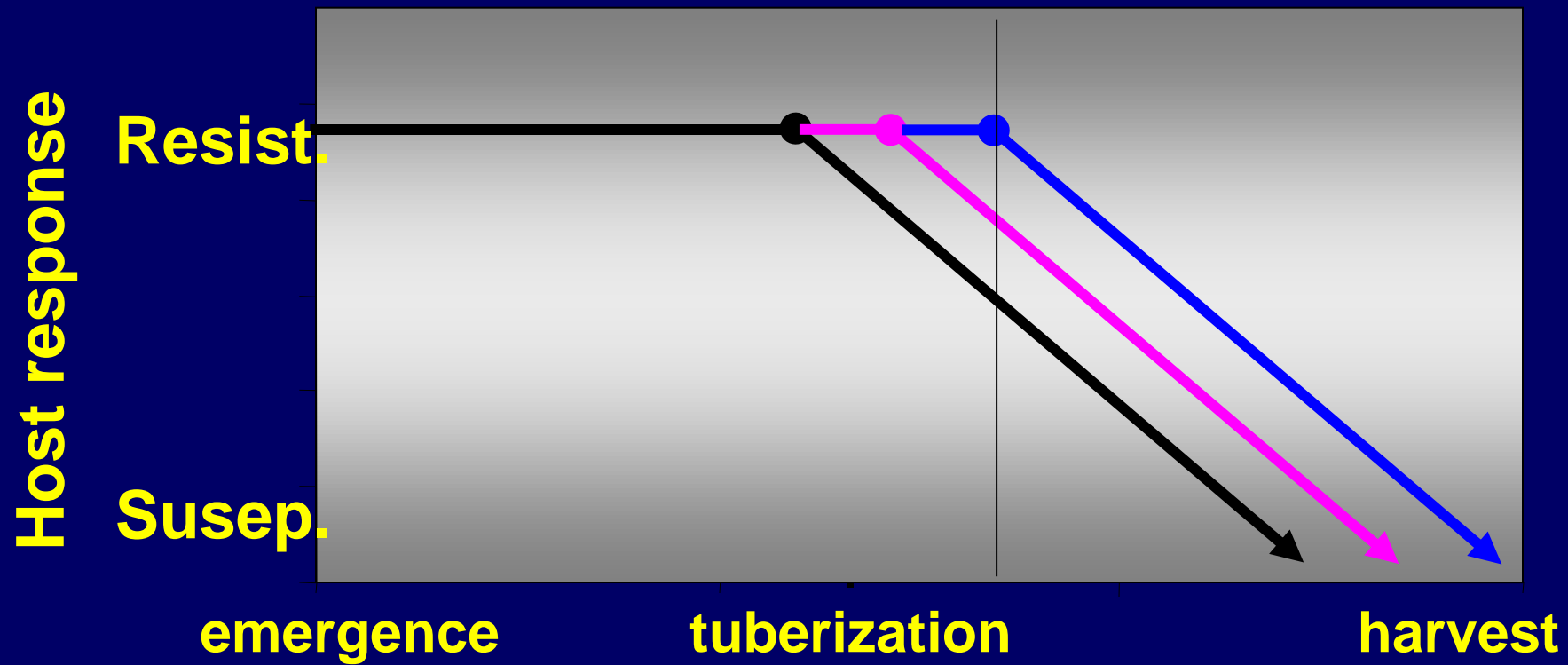
Late blight



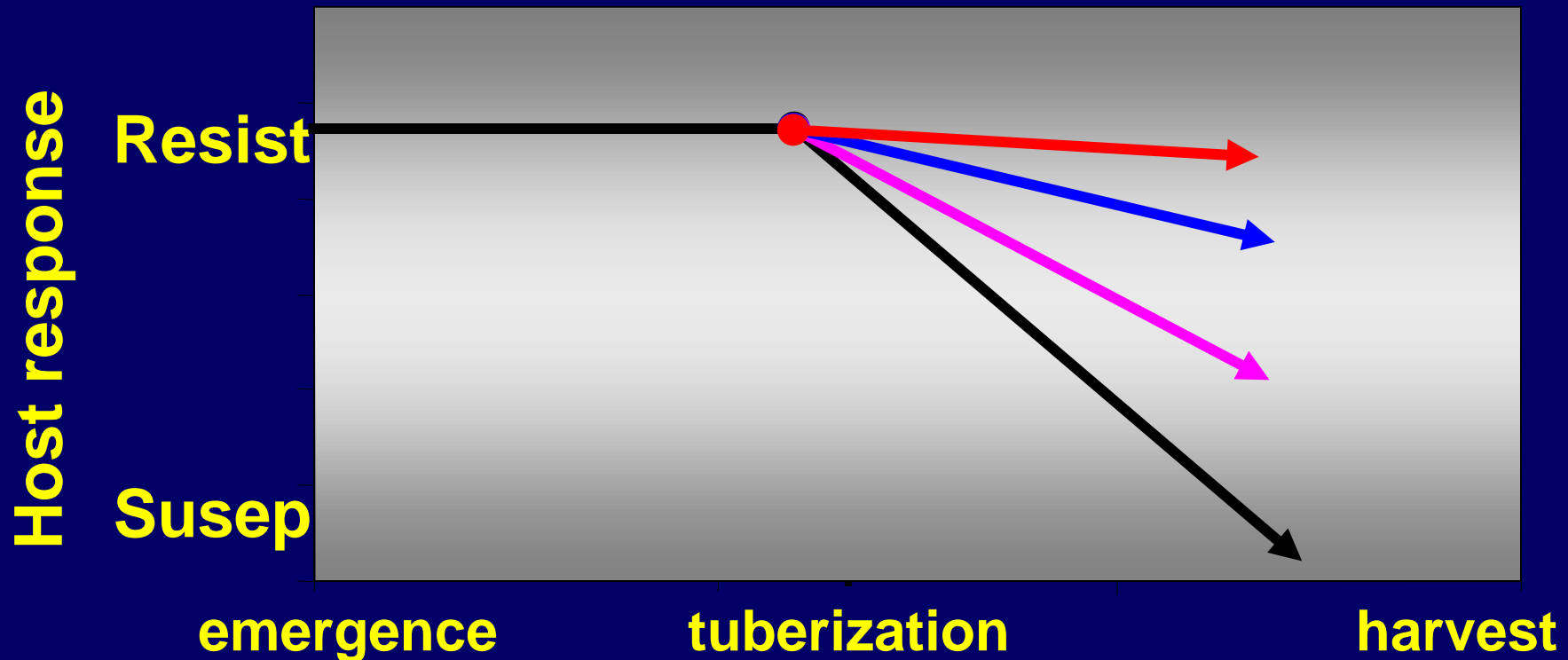
The response to early blight is governed by host physiology



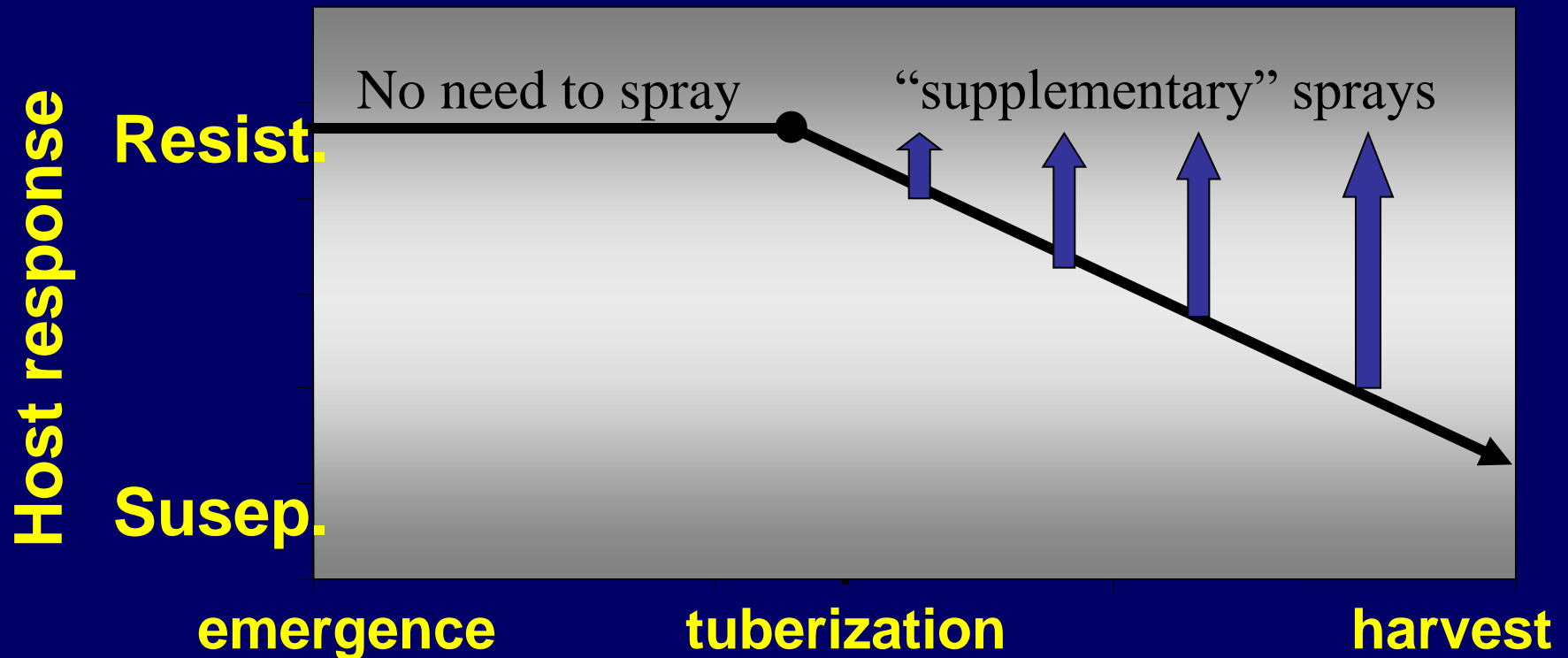
Response of cultivars with different maturity levels



Response of cultivars with different genotype resistance levels



Need for fungicide application



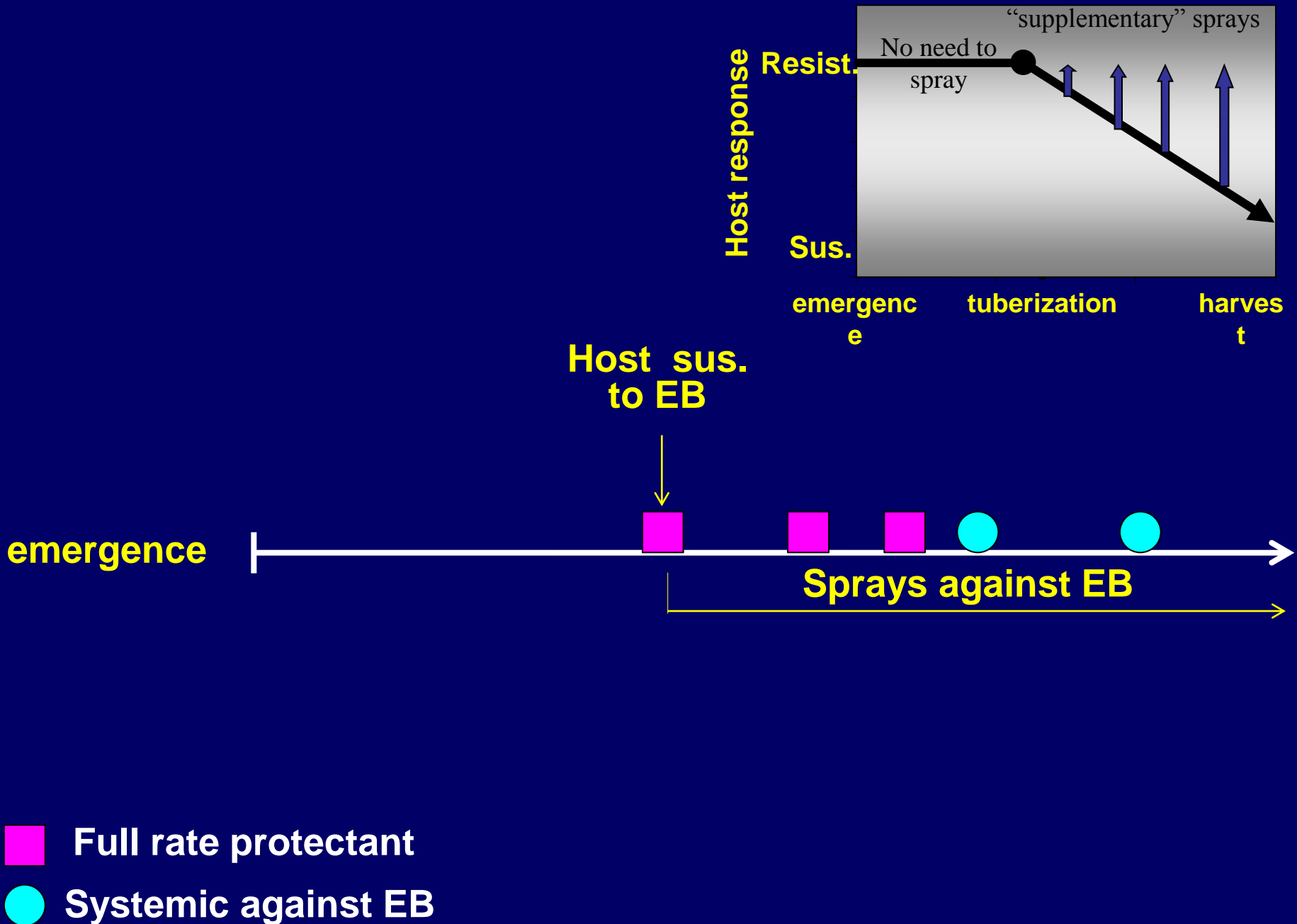
Integrated management strategy for EB + LB

The goal: to effectively manage both diseases

Components in the strategy

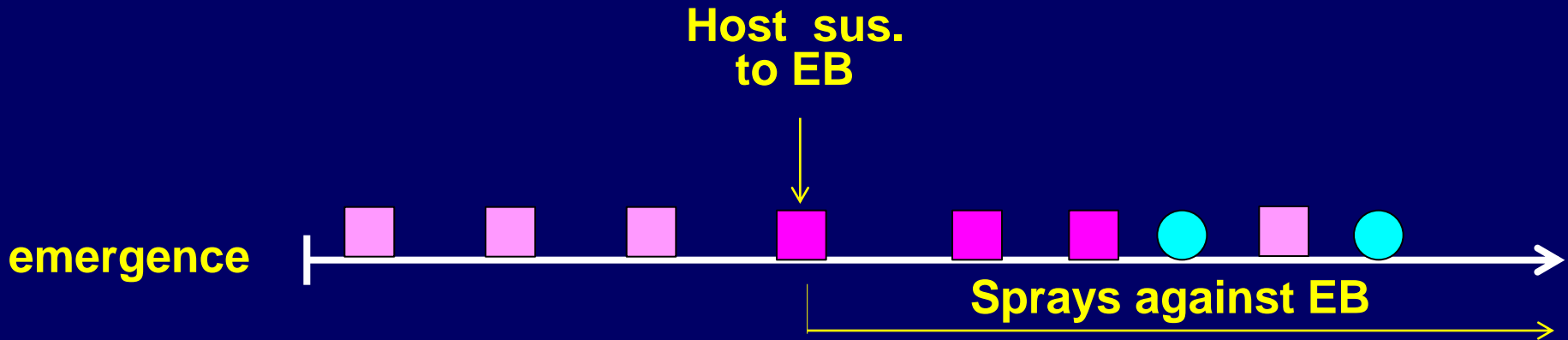
the growing season (autumn or spring)
genotype resistance (to EB and to LB)
age related resistance (to EB)
weather suitability (to EB and LB)
fungicide type and efficacy

Autumn season: management of EB



Autumn season: management of EB and LB

A. no report of LB in the region



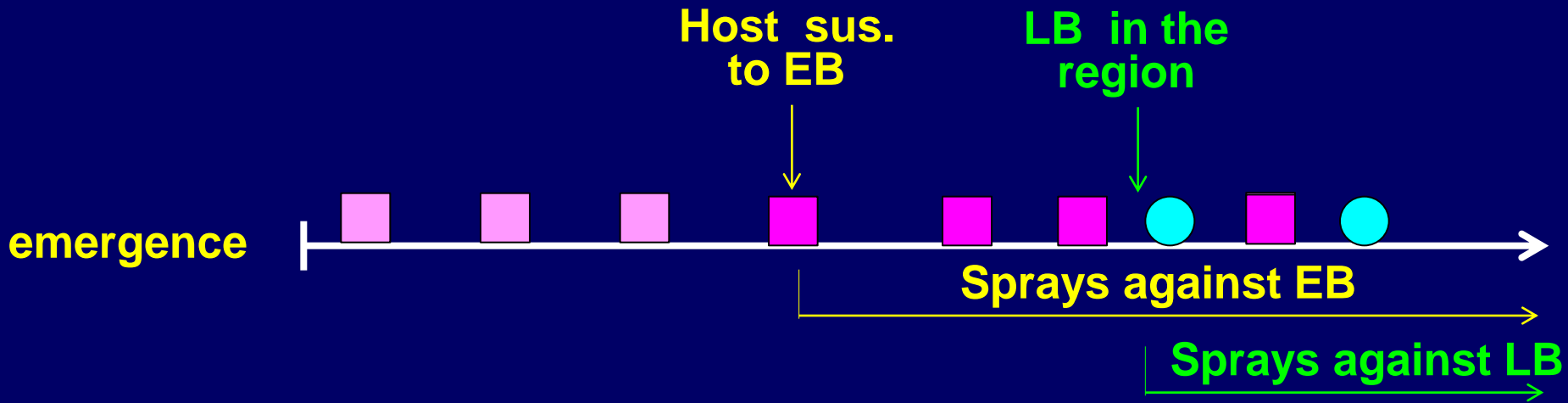
■ Full rate protectant

■ Half rate protectant

● Systemic against EB

Autumn season: management of EB and LB

B. LB in the region but not in the field



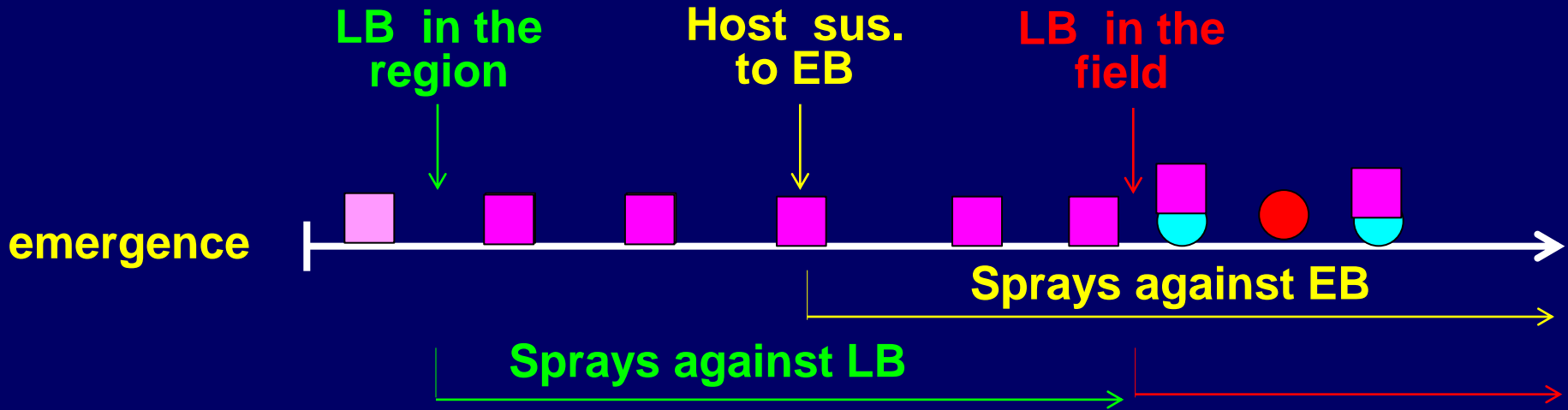
■ Full rate protectant

■ Half rate protectant

● Systemic against EB

Autumn season: management of EB and LB and LB

C. LB in the region and then in the field



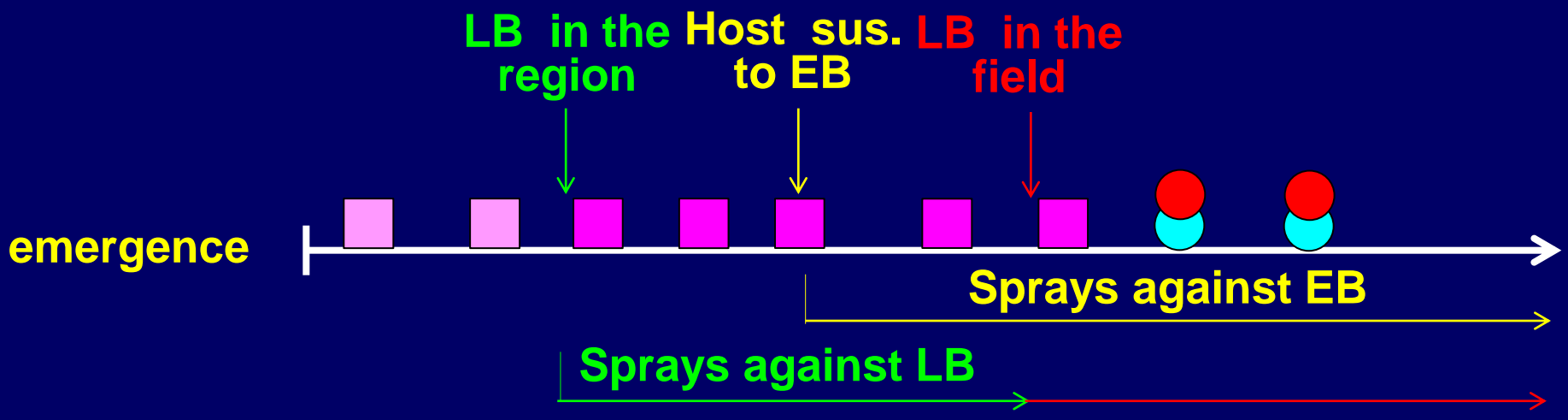
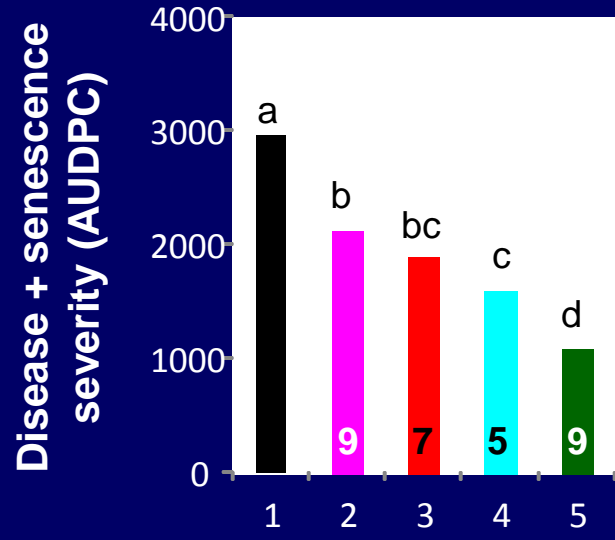
■ Full rate protectant

■ Half rate protectant

● Systemic against EB

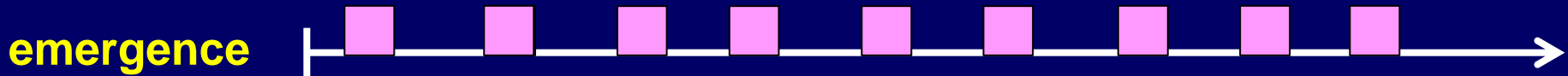
● Systemic against LB

Autumn season 1997/8



- Full rate protectant
- Half rate protectant
- Systemic against EB
- Systemic against LB

Spring season: management of LB



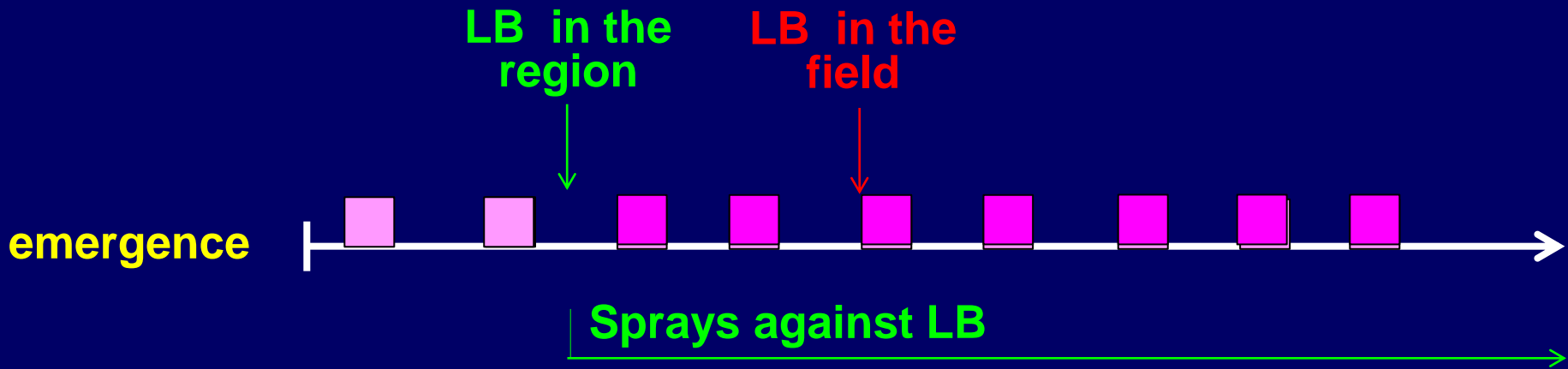
■ Full rate protectant

■ Half rate protectant

● Systemic against EB

● Systemic against LB

Spring season: management of LB



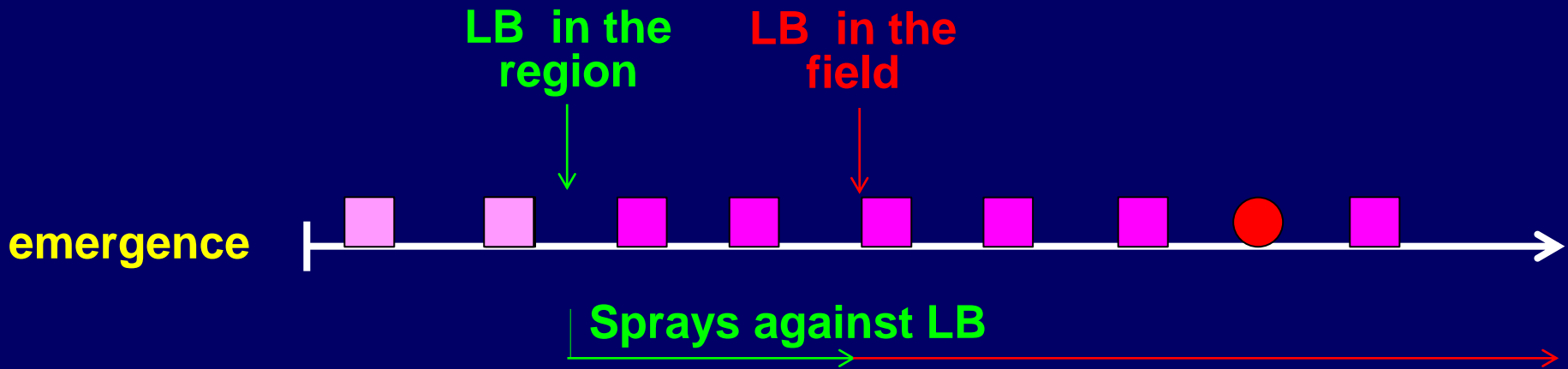
■ Full rate protectant

■ Half rate protectant

● Systemic against EB

● Systemic against LB

Spring season: management of LB



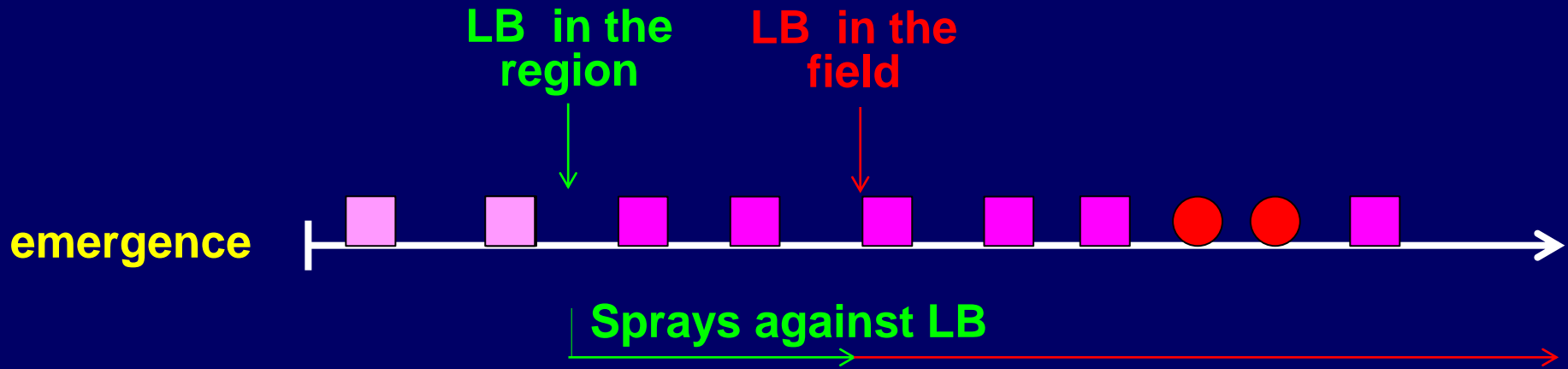
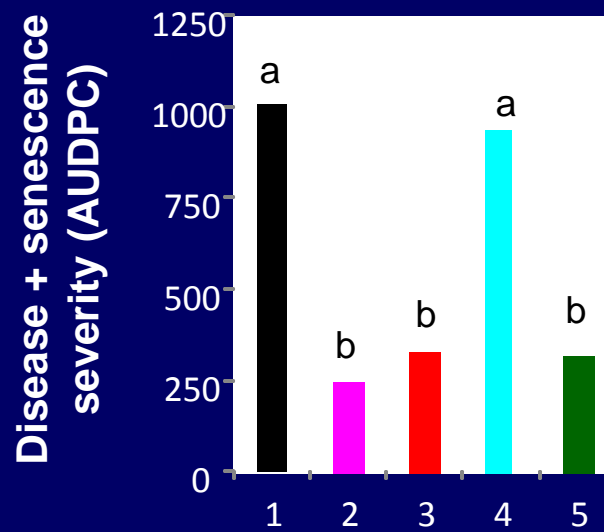
■ Full rate protectant

■ Half rate protectant

● Systemic against EB

● Systemic against LB

Spring season 1996



■ Full rate protectant

■ Half rate protectant

● Systemic against EB

● Systemic against LB

Necrotic lesions – *Alternaria alternata*





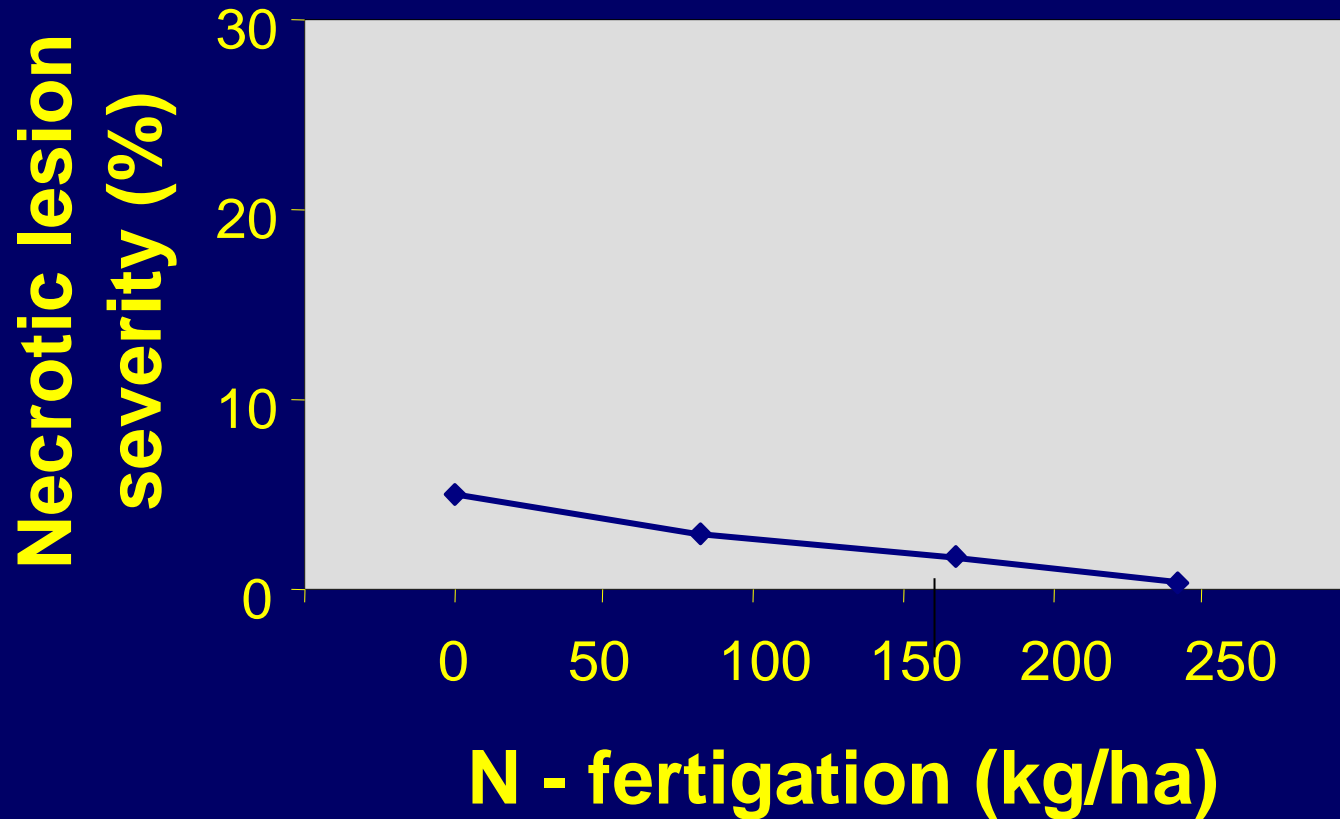
Observations

1. Necrotic lesions appear suddenly in large areas, often after heavy rain events.
2. The phenomenon is more common in crops growing in sandy soils.
3. *Alternaria alternata* was isolated from necrotic lesions and the Koch postulates were completed and proved the pathogenicity of that fungus.

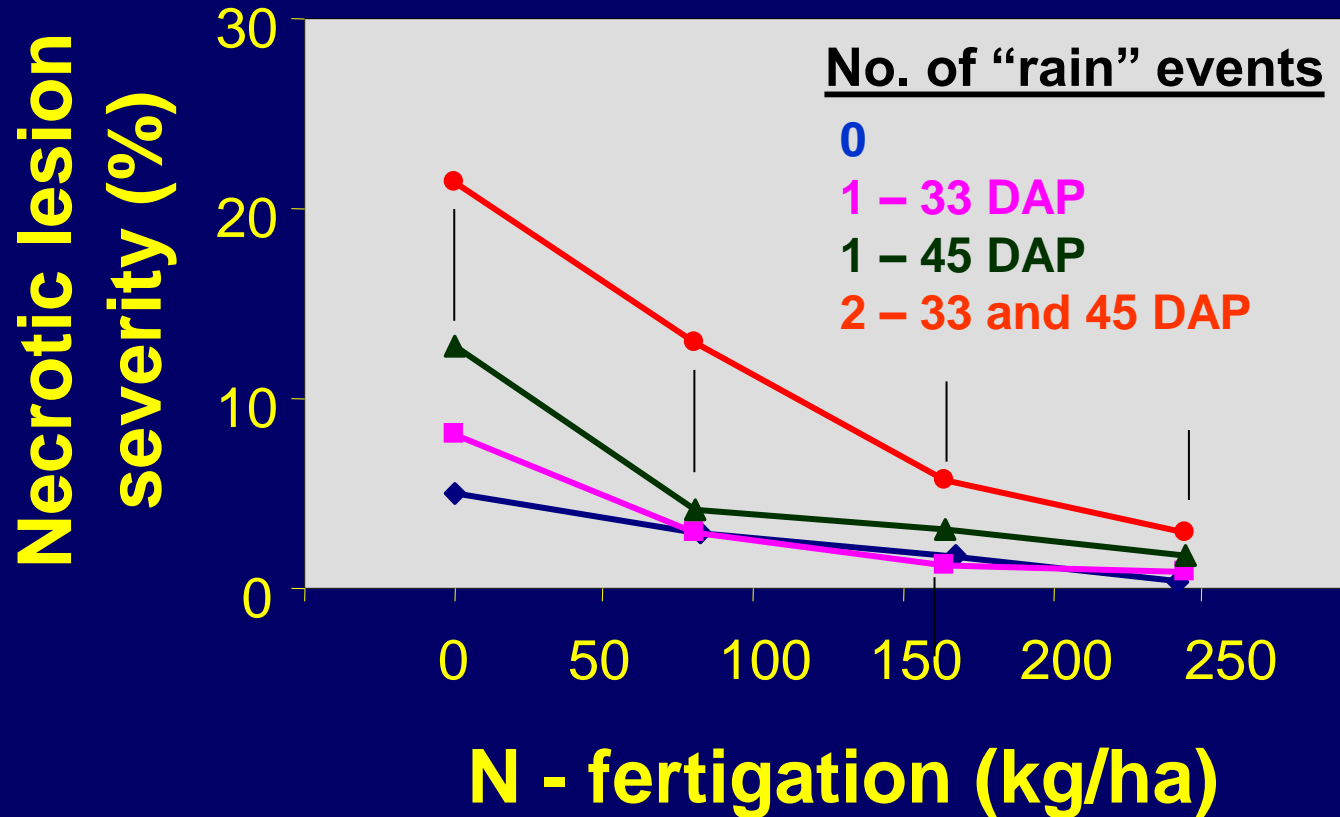
Working hypothesis

- 1. Heavy rains wash the nitrogen fertilizer from the root zone.**
- 2. Necrotic lesions appear in plants suffering from stress imposed by sudden reduction in nitrogen content in the foliage.**

The interactive effects of N fertigation on necrotic lesion severity

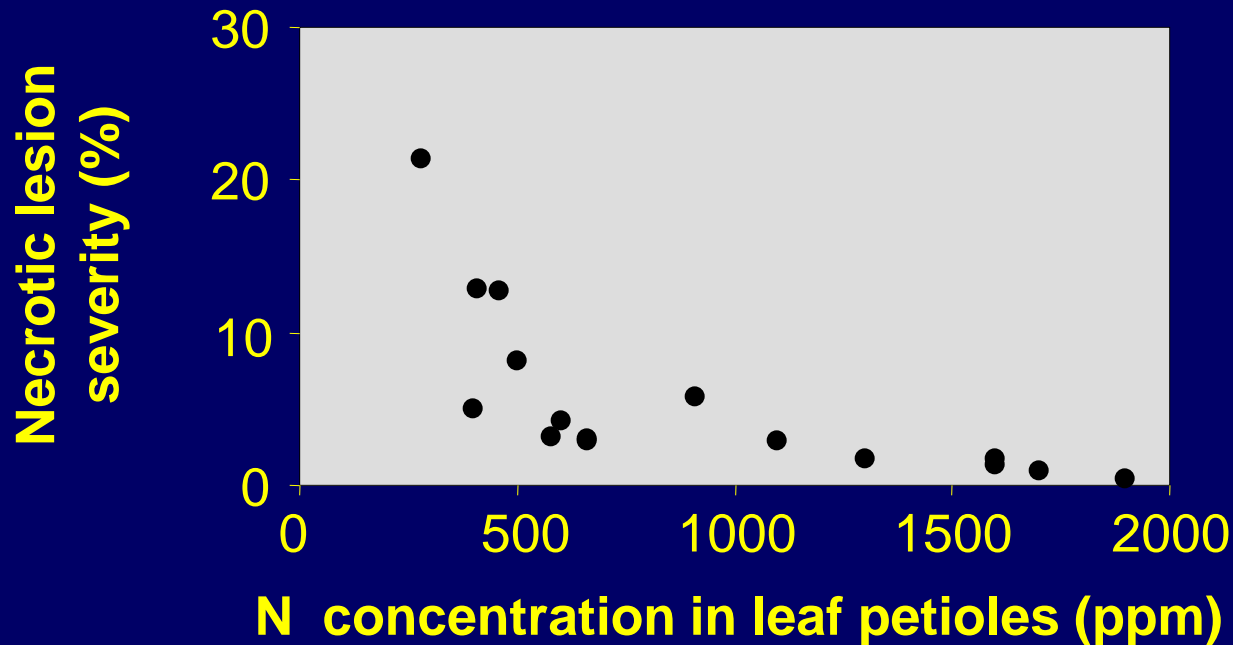
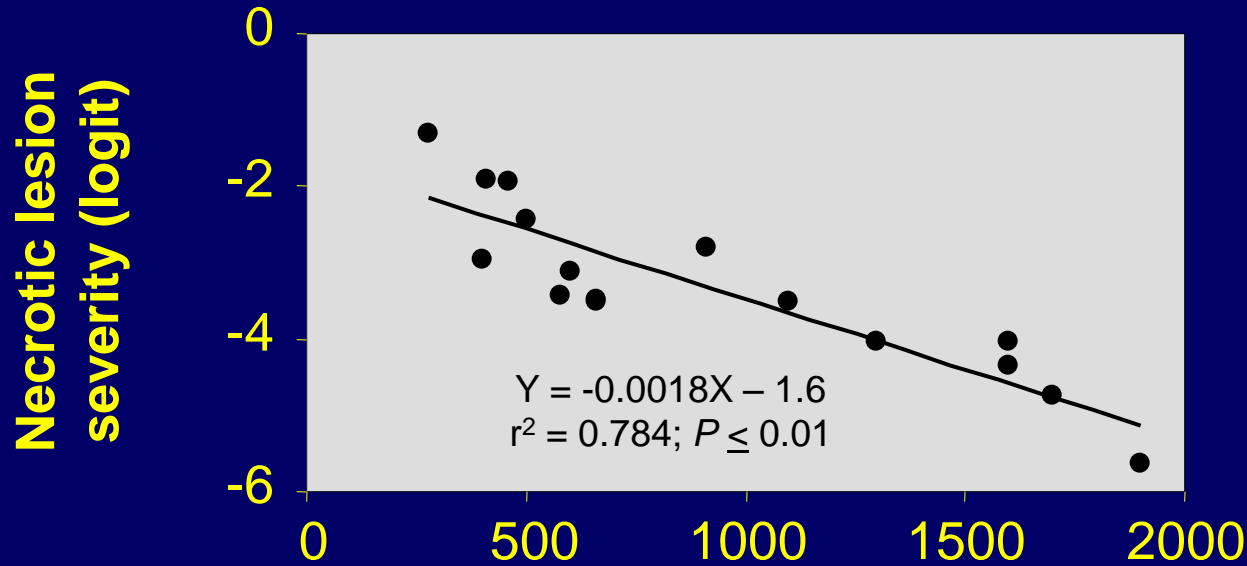


The interactive effects of N fertigation and “rain” on necrotic lesion severity

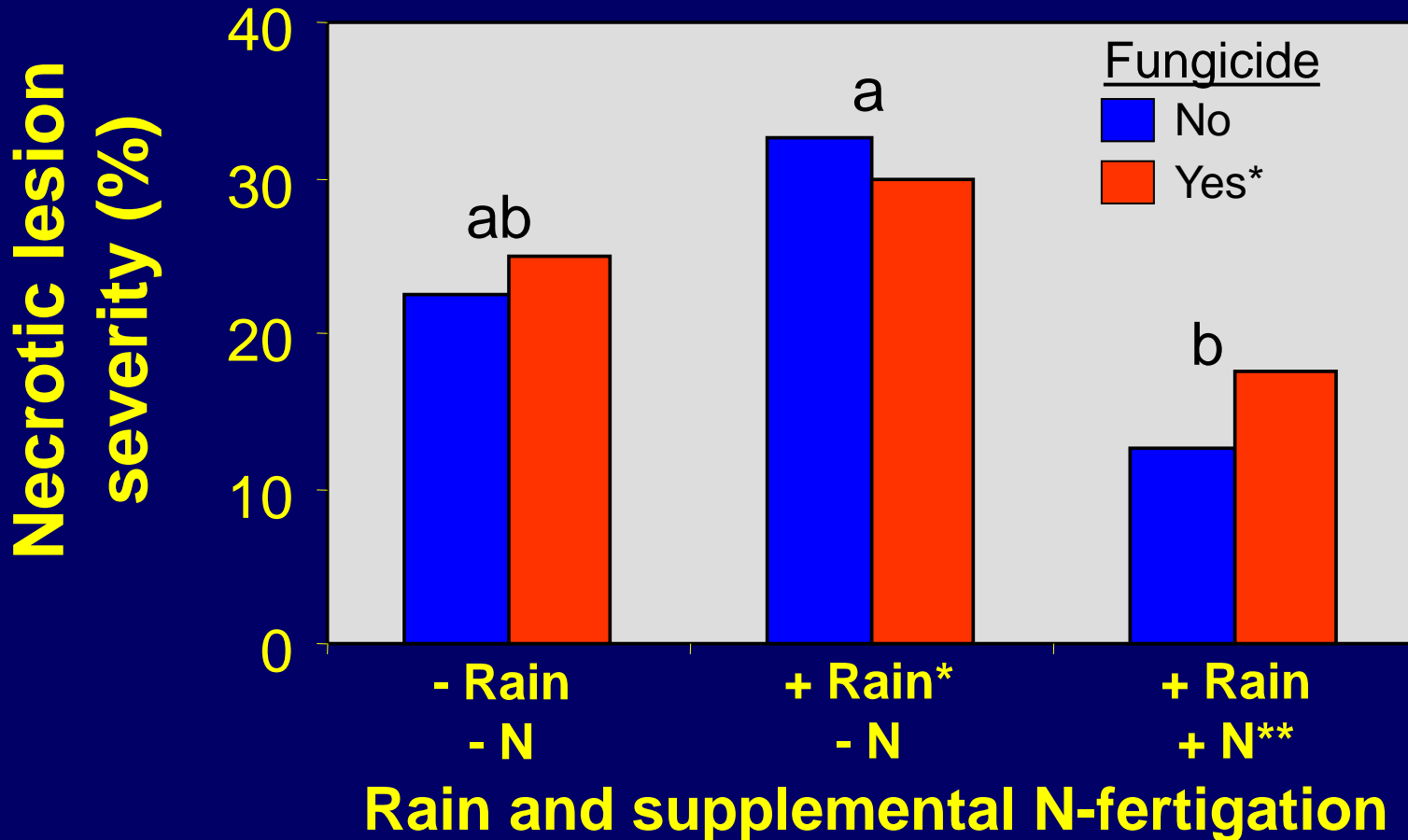


“rain” was mimicked by over head irrigation of 600 m³ water /ha

Relationships between N concentration in leaf petioles and severity of necrotic lesions



The interactive effects of “rain”, supplemental N fertigation, and fungicides, on necrotic lesion



*800 m³ water / ha

**180 kg N / ha

* 4 tebuconazole sprays

Take home messages

- 1. Early blight development is governed by host physiology. Its management should relate to the response of the host to the pathogen.**
- 2. Necrotic lesions develop primarily in nitrogen-stressed plants. Applying supplemental N fertilization reduces necrotic lesion severity.**
- 3. Late blight is the principle disease in Israel; it should be managed in both growing seasons.**
- 4. Concepts for managing potato early and late blight were developed, examined, found effective and are implemented commercially in Israel for about a decade.**

Thank you for your attention

